CARING FOR THOSE WHO ARE NEGLECTED AND FORGOTTEN: PSYCHIATRY IN PRISON ENVIRONMENTS

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CARING FOR THOSE WHO ARE NEGLECTED AND FORGOTTEN: PSYCHIATRY IN PRISON ENVIRONMENTS

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EDITORIAL
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Editorial: Caring for Those Who Are Neglected and Forgotten: Psychiatry in Prison Environments

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Editorial on the Research Topic

Caring for Those Who Are Neglected and Forgotten: Psychiatry in Prison Environments

Prison psychiatry is an area of the psychiatric care system, known only to the few mental health professionals who are working behind bars. As a consequence, the majority may feel unsecure when his or her patient had or has to serve a prison sentence. The aim of this Research Topic is to give an impression of the special challenges of psychiatric work inside correctional institutions.

In general, psychiatric care in prison environments has to deal with a disproportionate burden of psychiatric disease, social marginalization, and substance abuse disorders as well as an elevated prevalence of specific somatic disorders such as infectious diseases. Regarding diagnostic approaches according to the findings of Schildbach, severe mental disorders of prisoners cannot be efficiently detected with the computer aided short screening questionnaire of the DIA-X with a processing time of only a few minutes. Therefore, authors recommended use of the long version of DIA- X interview to open the possibility to identify mental health needs and establish appropriate treatment for those who need it (Schildbach and Schildbach). Although the high prevalence of psychotic disorder, depression, and substance abuse related disorders in prisoners is well-known, evidence about the prevalence of Attention Deficit Hyperactivity disorder in prison environments is scarce. Baggio et al. conducted a systematic review and meta-analysis which pooled 102 original studies including 69, 997 participants. According to their findings the rate of adult ADHD of people living in detention was 26.2%, a 5-fold increase compared to the general population (Baggio et al.).

Prisoners with severe mental disorders have been considered as a vulnerable group of inmates who are especially prone to make false confessions during court procedures. In line with these findings Volbert et al. studied a group of 153 patients of forensic hospitals and found evidence that 25% of the all participants have made at least one false confession.

Violent behavior is a major problem in correctional settings and many measures of restrictive prison routine aim to prevent violence. There is evidence that individuals who suffer from severe mental disorders are in general at higher risk for acting violently. In a retrospective case control study Seidel et al. examined a group of 210 individuals who had acted violently during a stay on a psychiatric ward of a prison hospital and compared them to a group who had never showed violent behavior. A diagnosis of schizophrenia, non-German nationality, no use of an interpreter, having no children and not being previously sentenced were associated with behaving violently during hospital stay (Seidel et al.). Regarding the role of citizenship Neumann et al. examined foreign national and German patients at a prison and compared them to foreign national and German patients at a forensic hospital. Differences in diagnosis were only found in the forensic hospital where foreign nationals were more often diagnosed with schizophrenia. Regarding self-harm foreign nationals were more likely to commit self-harm than Germans during their stay at the prison hospital psychiatric ward (Neumann et al.). Because of the high prevalence of violent

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behavior in prison environments, there is an urgent need for screening instruments which are capable to detect individuals at risk of acting violently. Negatsch et al. compared a patient group at a psychiatric ward in a prison hospital who had acted violently at least once to a group who never showed any violent behavior. The risk assessment tool OxMIV succeeded in predicting violent behavior in patients suffering from schizophrenia or bipolar disorder, and may thus be useful in detecting individuals at risk for behaving violent in correctional settings (Negatsch et al.).

Although violence is an important issue for prison administrations, prisoners in general are also a high-risk population for self-harming behavior and suicide. The fact that the suicide rate in prisoners compared with that in the general population is significantly higher can also be considered to be an expression of increased mental vulnerability of prisoners. Voulgaris et al. compared suicide rates in forensic psychiatric hospitals and prisons and found no significant difference. To our knowledge is this the first study that presents data for suicide rates within German forensic hospital care (Voulgaris et al.).

While during the last century prison was mostly a matter of young men, the numbers of elderly prisoners are constantly rising. Elderly prisoners are considered a vulnerable prison-subpopulation due to their lack of physical strength and because of their generally poor health. Analyzing data from a survey that included all German prison suicides from 2000 to 2013 Opitz-Welke et al. found higher suicide rates in elderly prisoners in comparison to the general population of the same age. When compared to younger suicide victims elderly suicide victims were more likely to be female, of German nationality, had remand status or were serving a life sentence (Opitz-Welke et al.). As suicide prevention is a major subject of prison mental health care the use of suicide screening instruments is widely recommended. Dezsö et al. described and examined the implementation of a suicide risk screening instruments (SIRAS) in a remand prison and found evidence for a shift in specific interventions toward toward the high-risk group.

Often psychiatry in prison environments provides treatment for those who do not have access to community-based healthcare systems or for those suffering from stigmatizing disorders like sexual deviations. Since sexual fantasies are a key factor in sex offender treatment programs Bartels et al. tested the validity of the Wilson-Sex-Fantasy-Questionnaire for the use with men who have sexually offended against children. The results of this study suggest that the two child-related items of the Wilson Sex Fantasy Questionnaire were more useful than just assessing broad fantasy themes (Bartels et al.).

Providing a therapeutic atmosphere inside correctional facilities is sometimes difficult. In an analysis of the impact of social climate on the treatment outcome in correctional treatment units, Sauter et al. showed that measures to improve team climate and working relationship have an impact on inmates as well. Regarding ratings of inmates' prison behavior by prison officers Hausam et al. studied a group of 272 sexual and violent offenders and found that prison officers behavioral ratings can improve risk assessment.

There is sound evidence that the prevalence of antisocial personality disorder (ASPD) and psychopathy in correctional settings is very high and that individuals with ASPD are difficult to treat and pose a high economic burden on society. Brunner et al. did an analysis of a sample of 205 incarcerated male adults who had been admitted to social-therapeutic facilities in German prisons. Treatment dropouts showed a significantly higher risk of having psychopathy personality traits (Brunner et al.). Lehmann et al. examined a group of 215 violent male offenders with the Psychopathy checklist (PCL-R) factor scores. Results indicated four latent classes with differences of recidivism risk, criminogenic needs and general, violent, and sexual reoffending. According to the authors findings may have implications for the issue of treatment amenability (Lehmann et al.). Looking for new therapeutic approaches for individuals suffering from ASPD there is some evidence that treatment with oxytocin may have a benefit in treating individuals with psychopathy. In a systematic review of the literature exploring the potential use of oxytocin in managing ASPD Gedeon et al. revealed that there were diversified effects with oxytocin showing some benefits and some non-desirable effects in managing ASDP and the symptoms of ASPD. To their opinion further high-quality large sample studies are required before the use of oxytocin may become a treatment option for individuals suffering of ASPD.

After a prison stay good transitional preparation preceding release seems to reduce the risk of poor mental health outcome but is hard to achieve. In a naturalistic prospective observational cohort study Smith et al. could provide evidence for the effectiveness of a Pre-Release Planning Programme of sentenced mentally disordered offenders. Schildbach examined four samples of 100 compensation prisoners each from 1999 till 2017. The majority were homeless, single, and unemployed, exhibited a high degree of substance abuse and showed an extraordinarily high prevalence of mental disorders. Because the average stay of compensation prisoners is short, social rehabilitation after imprisonment is lacking. Schildbach pointed out that compensation imprisonment leads to inappropriate transinstitutionalization and further criminalization of poor or mentally ill people and recommends from a criminalistic perspective community service instead of compensation imprisonment (Schildbach and Schildbach). For improving transition management from prison to community healthcare knowledge about cost effectiveness of mental health in correctional facilities seems crucial. Sridhar et al. reviewed prison healthcare expenditure internationally and found a lack of comparability. They developed a set of consistent and transparent guidelines for consistent and transparent reporting of healthcare costs (Sridhar et al.). The challenges of the treatment of delinquent patients with schizophrenia at the interface of health and justice system is described in a case report from swiss Forensic services. Authors point out that prison environments are difficult for individuals who lack social competences as a consequence of a severe mental disorder (Steinau et al.).

In general research in correctional institutions offers the option for a better understanding of clinical conditions which are rare in the community but common in prison. Evidence about individuals suffering from ASPD or of individuals who self-harm or act violently is necessary for improving treatment

and prevention strategies in those cases. Although prison mental health care is often seen as strictly separated from community health provision this is in fact not true. In many cases prison psychiatry offers treatment for mentally disturbed offenders that from an early point have got lost in community health care. After mentally ill individuals are released from prison successful integration in community mental health care can help to prevent reoffending. Research collaboration of prison mental health professionals with providers of mental health in the community offers excellent opportunities for better understanding of factors that hinder the reintegration process. The editors are convinced that all clinicians working inside correctional institutions should be strongly encouraged to get involved in clinical research helping to develop evidence-based treatment strategies for the specific challenges of psychiatric work in prison.

AUTHOR CONTRIBUTIONS

AO-W wrote the first draft of the manuscript. NK und BV provided critical revison of the manuscript and important intellectual contributions. AO-W, NK, and BV read and approved the submitted version.

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SYSTEMATIC REVIEW
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Prevalence of Attention Deficit Hyperactivity Disorder in Detention Settings: A Systematic Review and Meta-Analysis

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Background: Previous studies have reported a high prevalence of attention deficit hyperactivity disorder (ADHD) among people living in detention (PLD) corresponding to a five- to ten-fold increase compared to the general population. Our main study objective was to provide an updated ADHD prevalence rate for PLD, including PLD in psychiatric units. Sub-objectives included (i) comparing different ways of assessing ADHD, including DSM-5 criteria and (ii) identifying which types of PLD are more likely to have ADHD.

Methods: We conducted a systematic review and meta-analysis following the PRISMA guidelines and the MOOSE checklist. PubMed/Medline, PsycINFO, and Web of Sciences were searched combining "ADHD" and "prison" keywords and synonyms for articles published between January 1, 1966 and January 2, 2018. Potential sources of variation to the meta-analytic ADHD prevalence rate were investigated using meta-regressions and subgroups analyses.

Results: The meta-analysis pooled 102 original studies including 69,997 participants. The adult ADHD prevalence rate was 26.2% (95% confidence interval: 22.7–29.6). Retrospective assessments of ADHD in childhood were associated with an increased prevalence estimate (41.1, 95% confidence interval: 34.9–47.2, $p < 0.001$). There was no significant difference in the prevalence estimate between screenings and clinical interviews in adulthood. Only three studies used the DSM-5 definition of ADHD and results were non-significantly different with other DSM versions. We found no difference according to participants' characteristics.

Conclusion: Our results confirmed the high prevalence rate of ADHD among PLD, corresponding to a five-fold increase compared to the general population. In light of such high ADHD prevalence, our results reinforce the importance of addressing this critical public health issue by (i) systematically offering ADHD screening and diagnosis to all individuals entering detention, and (ii) delivering treatment, monitoring, and care

for ADHD during and after detention. These strategies may help reduce recidivism and reincarceration, as well as violence in detention settings, in addition to improving the health and wellbeing of people living in detention. Additionally, our study suggests that using screening scales may be a reliable way of assessing ADHD, although caution is needed because a complete evaluation by an experienced clinician is required to provide a formal diagnosis.

Keywords: ADHD, incarceration, offender, prevalence, prison

INTRODUCTION

ADHD in the General Population

Attention deficit hyperactivity disorder (ADHD) is a disorder characterized by difficulties paying attention, poor impulse control, and hyperactive behaviors. ADHD starts in early childhood and persists in adulthood in 40–60% of cases (1). There is growing evidence that adult ADHD is a major health concern (2). It is associated with at-risk behaviors and comorbid psychiatric disorders (3) and affects several areas of life, such as psychosocial functioning, school, work, and health care access and health care use (4).

ADHD in Incarcerated Population

ADHD is associated with an increased risk of having judicial contact at a younger age, including rule-breaking behaviors, delinquency, criminality, and recidivism (5–7). ADHD seems to be significantly more prevalent in incarcerated populations in comparison with the general population and it has been extensively studied in detention settings over the two last decades (5). Compared with other offenders, incarcerated individuals with ADHD are more likely to engage in misconduct in prison, for example, be verbally and physically aggressive (8, 9), have higher rates of recidivism (10), and have unsuccessful experiences with the criminal justice system as well as with probation (11). Therefore, ADHD seems to be a critical factor of the criminal career (7), but further investigations are needed to understand how ADHD is associated with involvement in the legal system.

To date, the only meta-analysis reporting ADHD prevalence in incarcerated populations included studies published until 2012. The study identified a five- to ten-fold increase in prevalence of ADHD compared to the general population (5): 25.5% compared to 5% in the general population (12–14). Since 2012, several studies have investigated the prevalence rates of ADHD in people living in detention (PLD) worldwide. Additionally, this meta-analysis did not include PLD detained in psychiatric units and therefore PLD with formal diagnostic of comorbid psychiatric disorders were likely to be excluded. A more complete picture of ADHD in prison setting is therefore needed.

Measures of ADHD

ADHD was introduced for the first time in the second version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-II), as "kyperkinetic disorder of childhood" (15). It emphasized on hyperactivity as a cardinal feature of the disorder. In the subsequent version of the DSM (DSM-III), the disorder was labeled "Attention deficit disorder with or without hyperactivity" (16). It emphasized on the attentional aspects of the disorder, being considered as a tri-dimensional disorder. However, subtypes were not considered. The main changes introduced in the DSM-IV (17) were to label the disorder "ADHD" and to define three subtypes (inattentive, hyperactive, and combined). Then, two major changes in the diagnostic criteria for adult ADHD were introduced in the fifth version of the DSM (DSM-5), which may affect the prevalence rate of ADHD (18). In the DSM-5, there are a reduced number of symptoms for the diagnosis in adults (five instead of six) and a later age of onset (twelve instead of six) needed to diagnose ADHD. These changes to the DSM-IV aim to address the restrictive diagnostic thresholds (19) and the late onset of some symptoms that may occur in adulthood (20). Recent studies concluded that the switch from DSM-IV to DSM-5 diagnostic threshold resulted in a modest increase and less biased ADHD prevalence rate (4, 21).

To date, no systematic review and meta-analysis has provided an overview of how DSM-5 criteria may have affected the prevalence rate of ADHD, especially among PLD. Furthermore, a recent article questioned the reliability of ADHD prevalence rate among PLD, as some major methodological shortcomings, such as self-reported assessments or non-representative sampling, may have resulted in high prevalence rates (22). Evidence regarding the quality of ADHD studies in prison was therefore needed.

Objective of the Study

This meta-analysis aimed to provide an updated estimate the prevalence rate of ADHD in PLD over the past three decades, including articles published since 2012. Sub-objectives included (i) comparing different ways of assessing ADHD and in particular investigating whether the DSM-5 resulted in an increased prevalence rate of ADHD, and (ii) identifying which characteristics of PLD were more likely to be associated with ADHD (e.g., socio-demographics).

METHODS

The systematic review and meta-analysis adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (23) and the Meta-analysis of Observational Studies in Epidemiology (MOOSE) checklist (24). The protocol for this review was previously registered on Prospero (CRD42017075510).

Eligibility Criteria

All studies investigating ADHD in PLD were eligible for this systematic review. In addition, articles were eligible if they (i) reported an empirical study, (ii) were written in English, and (iii) were published in a peer-reviewed journal.

Search Strategy

We searched Pubmed/Medline, PsycINFO, and Web of Sciences from their inception date until January 2, 2018. We used the terms "attention deficit hyperactivity disorder" or "ADHD" and "prison" or "prisoner" or "inmate" or "detaine*" or "custod*" or "detention" or "crim*" or "offend*" or "correctional" or "forensic" or "penal institution." Published meta-analyses on the subject identified in the search were hand-searched for other relevant studies using their reference lists and studies quoting them. These meta-analyses were excluded from the calculation of prevalence estimates. Reference lists of retrieved studies were also hand-searched.

Study Selection

After article duplicates were removed, a first round of selection was performed to exclude studies meeting exclusion criteria defined in the subsection Eligibility Criteria by screening titles and abstracts, and, if necessary, the whole article. A second round of selection was performed by reviewing the full text of articles. We excluded articles reporting on the same dataset, articles focusing only on participants with ADHD (100% prevalence rate), articles reporting no prevalence rate (after unsuccessful correspondence with the corresponding author), articles with mixed prevalence rates for males and females, because gender is known as an important predictor of ADHD (25) (for which the corresponding author did not provide an answer regarding separate prevalence rates), or if we were unable to access the article.

Two rounds of reviewers (SB and AF/DG/MG) independently screened all the abstracts in the first selection round. In case of disagreement, consensus was achieved by discussion, and, if required, by a third-party arbitration (HW).

Data Extraction

Characteristics of studies included in the meta-analysis were extracted independently by two rounds of reviewers (SB and EV/MG/NTT) using an electronic data abstraction form on Excel. The form included the following study characteristics: (1) year of publication (we used this information instead of year of data collection because the latter was missing in 43.1% of the studies); (2) geographic location; (3) sample size; (4) study population (adults vs. youths); (5) type of detention setting (prison, youth detention centers, or psychiatric unit); (6) gender; (7) mean age; (8) presence of psychiatric disorders in the sample (sample of psychiatric participants vs. "ordinary" participants); (9) type of offenders (serious vs. non-serious offenders; with "serious offending" defined in the corresponding article as: violent or high-risk PLD, rapists, maximum-security PLD, long-term sentences); (10) diagnostic tools (self-reported screening for ADHD in adulthood/adolescence, self-reported screening for ADHD in childhood, or clinical interview), (11) criteria used for diagnosis (DSM-III, DSM-IV, or DSM-5); and (12) ADHD prevalence rate. Mean age was included for descriptive purposes. Studies involving both gender and/or using different diagnostic criteria (e.g., a self-reported assessment and a clinical interview) were recorded as separate observations.

We contacted the authors of 67 articles regarding missing information. Five authors answered but were unable to provide gender-disaggregated prevalence rates, 35 provided missing information, and 27 did not answer. Studies with missing information on other variables than prevalence rates were kept for descriptive purposes and to estimate the meta-analytic prevalence rate of ADHD—this was not an exclusion criterion. Listwise deletion was used for other analyses.

Risk of Bias Assessment

Articles included in the systematic review and meta-analysis were assessed for the risk of bias using an adaptation of the Quality in Prognosis Studies including the following relevant items (26): (1) sample selection, (2) study participation, (3) outcome measurement, and (4) presence of exclusion criteria. Each study was rated as low, moderate, and high quality by two rounds of reviewers (SB and EF/MG/TNT) (see Appendix 1 in Supplementary Materials).

Statistical Analyses

We first undertook a descriptive analysis of the studies. We then estimated the meta-analytic prevalence of ADHD. We provided separate prevalence estimates for studies with an adolescent/adult measure (screenings and clinical interviews) and childhood measure. We also computed the prevalence estimate for studies using clinical interviews, the most reliable and valid way to assess ADHD. Indeed, screening tests are not diagnostic tests (established using clinical interviews). They are designed to detect people at risk for the corresponding disease. Diagnostic tests establish the presence of the disease and are used to determine the need for treatment (27, 28). Finally, we tested potential influences of study characteristics. Covariates were first tested using univariate meta-regressions, and then simultaneously in a multivariate meta-regression for all studies and for studies using clinical interviews. In multivariate analyses, only factors with a sufficient number of observations were included. As prison type was redundant with study population and presence of psychiatric disorders, we excluded it from the analyses. We used random-effects model with restricted maximum-likelihood estimator (29) and the Knap and Hartung method (30). We reported "variance accounted for" (VAF) using a pseudo-R^2. VAF is an indicator of effect size and corresponds to the percentage of the heterogeneity in the prevalence that is accounted for in each model. Analyses were performed using R 3.4.3 and the package "metafor" version 2.0.0.

RESULTS

Study Selection

We identified 916 records on PubMed/Medline, psycINFO, and Web of Sciences. After removal of 223 duplicates, 693 publications remained. We excluded 527 publications after a first screening because they did not focus on ADHD in PLD or did not report empirical findings. After further review of the remaining 166 publications, 81 were excluded: 23 articles did not report ADHD prevalence rates or gender-disaggregated prevalence rates, 8 used samples composed of participants with 100% ADHD, 47 relied on data already used in other articles, and 3 because we had no access to the full article. The manual search of published meta-analyses led to the identification of 17 other studies. A total of 102 publications were included in the meta-analysis (**Figure 1**). It led to 142 samples: 67 studies with a single sample, 26 studies with both genders, 9 studies with two assessment tools, one study with both genders and two diagnostics, and one study with three diagnostics (one childhood screening, one adulthood screening, and a clinical interview). Data are reported in the Appendix 3. References for all studies are reported in the Appendix 2.

Studies' Characteristics

The meta-analysis pooled 102 original studies (142 samples), including 69,997 participants (males: 89.0%; females: 11.0%; adults: 27.5%, mean age = 32.7, range 24.8–44.9; youths: 72.5%, mean age = 16.4, range 14.0–20.0). A total of 64.7% of the studies were published in the 2008–2017 period, whereas 29.4% were published between 1998 and 2007, and 4.9% between 1988 and 1997, plus one publication in 1985 (1.0%). The 25, 50, and 75th percentiles of year distribution corresponded respectively to years 2004, 2010, and 2014. Data came from 28 countries distributed as follows: Europe (49.0%, $n = 67$), North America (35.3%, $n = 53$), Asia (6.9%, $n = 8$), Australia (4.9%, $n = 9$), and South America (3.9%, $n = 5$). The information on the number of studies included for each region and other characteristics are reported in the first column of in **Table 1**. Most studies used a clinical diagnosis (58.5%, $n = 83$), while 21.1% ($n = 30$) used self-reported screenings of childhood ADHD and 20.4% ($n = 29$) self-reported screenings of adolescent/adult ADHD. A total of 16.2% ($n = 23$; total number of participants = 2,321, not shown in **Table 1**) of the studies focused on samples of participants with a psychiatric diagnosis other than ADHD (for example, participants with conduct or personality disorders, schizophrenia, or referred for psychiatric assessment), and 15.5% on serious offenders ($n = 22$; total number of participants=15,360, not shown in **Table 1**). Overall, the quality of the studies was high. There was 23.2% ($n = 33$) of studies with a "weak" quality: in total, 13.4% had a response rate ≤60% or a convenient sample, 24.7% excluded non-native speakers, and 16.2% excluded PLD with psychiatric or somatic disorders (e.g., psychotic symptoms, presence of severe mental disorder, or physical illness, but of course participants with ADHD symptoms were not excluded) (not shown in **Table 1**).

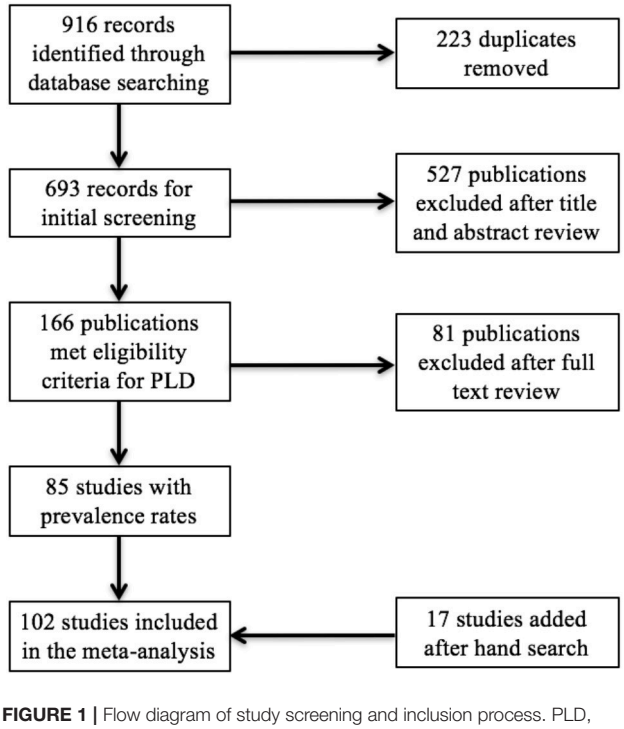

FIGURE 1 | Flow diagram of study screening and inclusion process. PLD, people living in detention.

Overall Prevalence Rate of ADHD

The ADHD adolescent/adult meta-analytic prevalence estimate was 26.2% [95% confidence interval (CI): 22.7–29.6]. The childhood ADHD meta-analytic prevalence estimate assessed retrospectively in adolescence/adulthood was 41.1% (95% CI: 34.9–47.2). Data based on clinical interviews (83 study samples) showed an overall prevalence estimate of 26.7% (95% CI: 22.7–30.7). Prevalence estimates for all study samples according to the year of publication are reported in **Figure 2**.

Factors Related to ADHD Prevalence Estimate

Results of meta-regressions for all studies ($n = 142$ samples) are reported in **Table 1**. Only one covariate was significantly associated with heterogeneity of prevalence estimates. Screenings of childhood ADHD were associated with an increased prevalence rate compared to current diagnosis using clinical interviews (i.e., for the univariate model: respectively b = 0.28, which correspond to a prevalence estimate of 28% and b = 0.15, which corresponded to a prevalence estimate of 0.28 + 0.15 = 43%, $p < 0.001$) or screening of adolescent/adult ADHD (univariate and multivariate models: estimate = 0.17, $p < 0.001$, not shown in **Table 1**). For the diagnosis of adolescent/adult ADHD, there was no difference between clinical interviews and screenings ($p \geq 0.574$).

When pooling only articles using diagnostic interviews ($n = 83$), the results were almost similar, with no covariate reaching the significance level (**Table 2**). For models with significant predictors, the VAF remained small (VAF ≤ 10.3%).

TABLE 1 | Univariate and multivariate meta-regressions for all study samples ($n = 142$).

	No. of study samples	Univariate models			Multivariate model		
		Estimate	*p*-value	VAF%	Estimate	*p*-value	VAF5
Intercept	–	–	–	–	**0.23**	**<0.001**	**7.8**
Region							
North America (reference)	53	**0.29**	**<0.001**	1.5	–	–	
Asia	8	0.07	0.331		–	–	
Australia	9	−0.07	0.307		–	–	
Europe	67	0.03	0.453		–	–	
South America	5	−0.14	0.113		–	–	
Gender							
Male (reference)	104	**0.30**	**<0.001**	0.0	–	–	
Female	38	−0.01	0.768		−0.01	0.901	
Study population							
Adults (reference)	77	**0.31**	**<0.001**	0.0	–	–	
Youths	65	−0.01	0.694		0.03	0.340	
Psychiatric diagnosis							
No (reference)	119	**0.29**	**<0.001**	0.0	–	–	
Yes	23	0.04	0.340		0.05	0.228	
Serious offenders							
No (reference)	120	**0.30**	**<0.001**	0.0	–	–	
Yes	22	−0.01	0.803		−0.01	0.778	
Diagnostic							
Interview (reference)	83	**0.28**	**<0.001**	**10.3**	–	–	
Current screening	29	−0.03	0.574		−0.01	0.924	
Retrospective screening	30	**0.15**	**<0.001**		**0.16**	**0.003**	
DSM Version							
DSM-IV (reference)	112	**0.29**	**<0.001**	0.0	–	–	
DSM-III	18	0.02	0.618		–	–	
DSM-5	5	0.08	0.484		–	–	
Quality							
Strong (reference)	57	**0.27**	**<0.001**	0.5	–	–	
Moderate	52	0.04	0.328		0.01	0.950	
Weak	33	0.06	0.138		0.02	0.662	

VAF, Variance accounted for (pseudo-R^2).
Significant and marginally significant results are in bold.

DISCUSSION

ADHD Prevalence Rate Among People Living in Detention

This study updated the prevalence rate of ADHD in prison settings (including PLD detained in psychiatric units). We identified 102 studies meeting study criteria (142 study samples) published from 1985 to 2017 with data collected in 28 countries. The pooling of all studies yielded an adolescent/adult ADHD prevalence rate of 26.2%, while the pooling of only those using clinical interviews found a similar rate of 26.7%. This high ADHD prevalence rate corresponds with a five-fold increase in comparison with that of the general population (12–14). These findings are consistent with those of Young et al's earlier meta-analysis (31) and added more evidence for the relationship between ADHD and involvement in the legal system.

By contrast, the retrospective assessment of ADHD in childhood was higher at 41.1%. This suggests a remission rate of 63.8%, although a study with a longitudinal design would be required to definitively confirm this. Nevertheless, the estimation corresponds to data obtained from the general population reporting remission in 40–60% of cases (1).

These results suggest that PLD bear a heavy mental health burden on secure services as around one-third may require treatment for ADHD. PLD with ADHD should be referred to mental health services, not only to confer personal health and well-being, but because treatment may support them in their interface and progress within the criminal justice system (6, 11). Several studies have reported the efficacy and safety of pharmacotherapy for ADHD during adulthood, also in prison (32–35). These studies reported strong treatment effects with positive outcomes (e.g., reduction in the symptomatology of

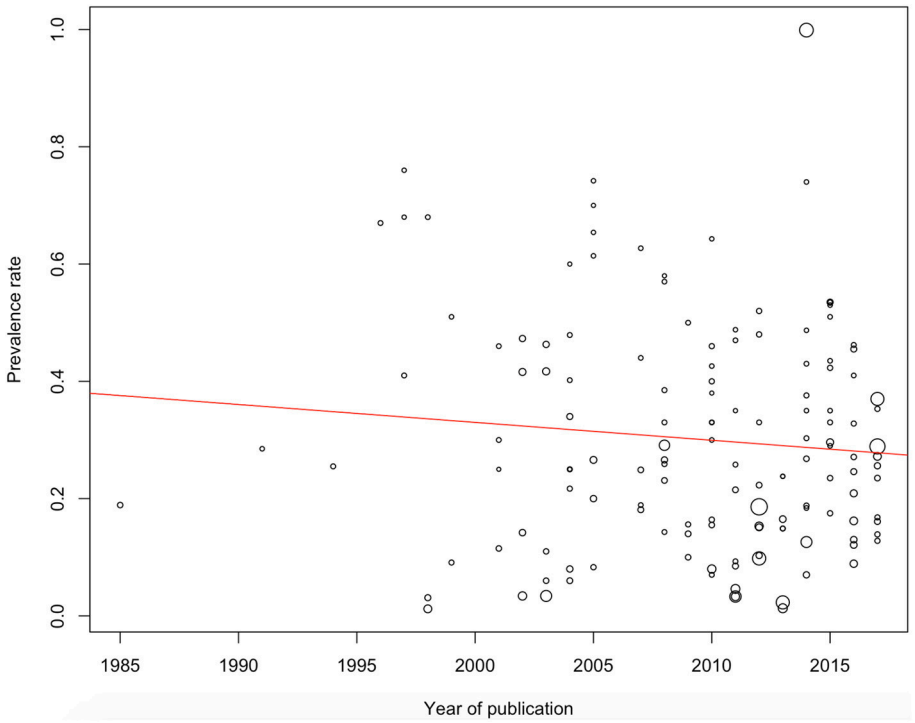

FIGURE 2 | ADHD prevalence estimates according to publication year. The point sizes correspond to the standard error (a larger size indicates a higher error).

ADHD over time, no drug abuse during the study, increase in psychosocial outcome). Most of the studies included in our meta-analysis did not report ADHD treatment. Therefore, intervention studies to treat ADHD in prison are needed in addition to screening and diagnostic studies.

Furthermore, the meta-analysis of Young et al. (36) reported that PLD with ADHD (compared with those without ADHD) had significantly higher rates of mood disorder in youth institutions and those in adult institutions presented with significantly higher rates of conduct disorder in childhood, anxiety, mood, personality, and substance use disorders. Hence, they are individuals with a higher rate of comorbidity. Even if some specific psychological interventions have been developed for youths and adults with ADHD [e.g., (31, 37, 38)], there is a dearth of data on both pharmacological and psychological intervention for people with ADHD in the criminal justice system and this should be investigated as a priority, given the high prevalence of ADHD in detainees.

Comparing ADHD Assessments

Our study results are influenced by the methods used to ascertain ADHD. Screenings for ADHD in childhood were associated with increased prevalence estimates in comparison with evaluation of adolescent/adult ADHD (using clinical interviews and self-reported screenings). Previous studies already demonstrated that methods have an effect on the prevalence estimate (5, 12). This result was probably due to the fact that some participants were in remission from ADHD (39, 40). Consequently, prevalence rates for childhood and adult ADHD should not be grouped together. Attention should be given to the kind of assessment used to estimate the prevalence rate of ADHD when interpreting the data.

Prevalence estimates pooled from studies using screenings for adolescence/adult ADHD were not significantly different from estimates of studies using clinical interviews. Recent studies showed that self-reported assessments of ADHD in adulthood are reliable [for example, the ADHD self-reported screening scale, ASRS, (41): sensitivity = 91.4%, specificity = 96.0%; the Barkley screen (B-BAARS) (42): sensitivity = 84%, specificity = 82%]. Our results suggest the same conclusions. Using self-reported screening may be a reliable way of assessing adult ADHD, although caution is needed because a complete evaluation by an experienced clinician is required to provide a formal diagnosis. Clinical interviews may also find psychiatric comorbid states.

To our knowledge, no meta-analysis has investigated differences in estimates according to DSM versions, including the DSM-5. Unfortunately, there were only three studies using the DSM-5 version to assess ADHD among PLD. There was no significant difference between the versions of DSM, but there was probably a bias due to a lack of statistical power. Further studies should test whether there is an increase in the prevalence rate of ADHD when the DSM-5 definition is used (4, 21). We recommend that all future studies use the DSM-5 to provide unbiased prevalence rates of ADHD (41).

From a methodological point of view, the quality of the studies did not significantly affect the prevalence estimates of

TABLE 2 | Univariate and multivariate meta-regressions for study samples with clinical interviews ($n = 83$).

	No. of study samples	Univariate models			Multivariate model		
		Estimate	*p*-value	VAF%	Estimate	*p*-value	VAF%
Intercept	–	–	–	–	**0.20**	**<0.001**	**3.5**
Region							
North America (reference)	40	**0.27**	**<0.001**	2.4	–	–	
Asia	7	0.10	0.203		–	–	
Australia	4	−0.15	0.115		–	–	
Europe	32	0.02	0.600		–	–	
South America	0	–	–		–	–	
Gender							
Male (reference)	59	**0.27**	**<0.001**	0.0	–	–	
Female	24	−0.01	0.949		0.01	0.896	
Study population							
Adults (reference)	28	**0.22**	**<0.001**	2.2	–	–	
Youths	55	0.06	0.133		0.07	0.105	
Psychiatric diagnosis							
No (reference)	63	**0.25**	**<0.001**	2.3	–	–	
Yes	20	0.09	0.073		0.09	0.057	
Serious offenders							
No (reference)	71	**0.27**	**<0.001**	0.0	–	–	
Yes	12	−0.05	0.361		−0.05	0.433	
DSM Version							
DSM-IV (reference)	65	**0.26**	**<0.001**	0.0	–	–	
DSM-III	10	−0.02	0.718		–	–	
DSM-5	3	0.11	0.331		–	–	
Quality							
Strong (reference)	54	**0.26**	**<0.001**	0.0	–	–	
Moderate	25	0.04	0.339		–	–	
Weak	4	−0.05	0.676		–	–	

VAF, Variance accounted for (pseudo-R^2).
Significant results are in bold.

ADHD (presence of exclusion criteria, high non-response rate, or convenient samples, and use of self-reported screenings). Previous studies criticized methodological weaknesses in many prison (22, 43). However, our meta-analysis pooled studies of generally high quality that used reliable and valid ADHD diagnostic approaches as well as robust methods altogether agreeing a high ADHD prevalence estimate.

ADHD According to Participant Characteristics

One of our sub-objectives was to identify which characteristics of PLD were associated with ADHD. Among the five characteristics included in our meta-analysis, none was associated with a significant increase in the ADHD prevalence rate.

Although ADHD is highly comorbid with other psychiatric disorders (36, 44), we did not identify a significant increase of ADHD among PLD with a comorbid diagnostic. In incarcerated populations, Young et al. (36) reported that several psychiatric disorders co-occur with an ADHD diagnostic in PLD, including conduct disorder, substance use disorder, mood disorder, depressive disorder, anxiety disorder, and personality disorder. In our study, "PLD having a psychiatric disorder" included a large range of disorders (conduct disorder, substance use disorder, mood disorder, and personality disorder). Our non-significant result might suggest that PLD without a formal diagnosis of comorbid disorders, not detained in psychiatric units or who have not been referred for psychiatric forensic investigation may in fact also have psychiatric comorbidities. This would in turn suggests that PLD are a highly comorbid population as a whole and that attention should be given to ADHD even if no other formal diagnosis exists. Another explanation was that ADHD is comorbid with some specific disorders (e.g., substance use disorders or antisocial personality disorder). Theses specific features have been missed since the comorbidity group included all psychiatric conditions in a general way.

There were no significant differences for gender and age (adults vs. youths). This supported the previous meta-analysis of Young et al. (5) conducted on a prison population and contrasted with findings from the general population (reporting higher prevalence of ADHD amongst males and youths). Regarding gender, a previous study reported that the prevalence rate ranges from 2.1 to 5.4% among males and 1.1 to 3.2% among females,

but females were more likely to have persistent ADHD in adulthood (45). However, this narrative review reported that gender differences may be partially due to methodological bias rather than fundamental differences in the expression of ADHD. For example, males may be over-referred and over-diagnosed in comparison with females (45–47). This referral bias is lost with offenders, because female offenders become noticed due to their offending. Another explanation is the 8:1 ratio of males to females living in detention may mean that females benefit from protective measures that keep them out of detention (5). Female offenders are therefore likely to be more serious cases with a high rate of psychiatric disorders, including ADHD, in comparison with male offenders (48, 49).

Regarding population age, studies have reported that full remission of childhood ADHD commonly occurred in adulthood after brain maturation (39, 40). However, we did not find any difference between adolescents (mean age = 16.2) and adults. The higher prevalence rates for childhood prevalence in comparison with adolescence/adulthood prevalence may be due to the remission between childhood and adulthood. Another explanation may be that young offenders with ADHD are diverted out of the criminal justice system and referred early on to psychiatric outpatient clinics or adapted residential homes (5). Further, adults with ADHD may be over-represented in prison settings in comparison with the general population, because ADHD symptoms is associated with an increased risk of offending (5–7).

LIMITATIONS

Only methodological and PLD characteristics that were available across studies, or in most studies, were included. This may have led us to miss some important factors associated with the heterogeneity of study findings. For example, we were unable to extract precisely the type of detention (e.g., pre-trial, post-trial, high-security prison). Most studies did not report ADHD treatment, which may have been helpful in understanding ADHD remission. Second, the validity and reliability of ADHD assessments may have contributed to the heterogeneity of the prevalence estimates. However, our meta-analysis took into account the overall diagnostic approach, even if the specific characteristics of the assessment scales were not included in the model. The heterogeneity of the samples used was also a possible source of variability in the prevalence estimates. This was taken into account by using random study effects. Finally, there were insufficient studies applying the DSM-5 definition of ADHD for meaningful analysis and some regions of the world were under-represented (South America), whereas other were completely missing (e.g., Africa).

CONCLUSION

ADHD has been an important research focus in the last 2 decades, with 102 studies published in 28 countries regarding prevalence in prison settings around the world. In light of the high ADHD prevalence among PLD (including PLD with comorbid disorders incarcerated in psychiatric units), a five-fold increase in comparison with the general population, our results reinforce the importance of addressing this critical public health issue by (i) systematically offering ADHD screening and diagnosis to all individuals entering detention (youths, adults, men, women) following the most up-to-date criteria, and (ii) delivering treatment, monitoring, and care for ADHD and other psychiatric comorbidities to patients while they are in prison and after their release. These strategies may benefit PLD, prison staff, and society in general. Further studies should research the needs of this population and investigate the efficacy and effectiveness of treatment (both pharmacological and psychological) for PDL with ADHD are required.

AUTHOR CONTRIBUTIONS

SB, AF, PH, DD, and HW conceived the study. SB, AF, MG, EF, DG, NTT, and HW collected data. SB drafted the manuscript and performed statistical analyses. All authors excepted SB made substantial contributions for the interpretation of data and revised the manuscript critically for important intellectual content. All authors approved the final version to be published and agreed to be accountable for all aspects of the work related to its accuracy and integrity.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2018.00331/full#supplementary-material

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ORIGINAL RESEARCH
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Prison Suicide in Comparison to Suicide Events in Forensic Psychiatric Hospitals in Germany

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Background: There is limited international as well as national research on suicide events in prisons and in forensic psychiatric hospitals. This retrospective study compares completed suicide events within these two high-risk populations in state institutions over a time period of 5 years from 2000 to 2004.

Material and Methods: Data was collected through a nationwide survey: all forensic psychiatric hospitals within Germany were contacted via postal mail and received a questionnaire concerning the suicide events from 2000 to 2004. All federal lands of Germany were similarly assessed by a survey endorsed by the respective federal ministries of justice. All prison institutions (100%) participated in the survey, while 84% (53 units) of the forensic psychiatric hospitals nationwide contributed. A comparative statistical analysis was conducted using Fisher's exact test or the Mann-Whitney U-test (age). A multivariate logistic regression analysis was done to assess adjusted effects. For the Kaplan-Meier analysis, the months until suicide were analyzed followed by a Cox-regression analysis.

Results: There was no statistically significant difference between the mean suicide rate in forensic psychiatric hospitals (123/100.000, 95% confidence interval: [0.00103, 0.00147]) and in the prison system (130/100.000, 95% confidence interval: [0.00109, 0.00154]). Patients who committed suicide in the forensic hospitals were, in comparison to the prison system, more likely to have committed a violent offense and have had a prior history of suicide attempts. The duration from admission into the institution to the suicide event was significantly shorter in the prison group. Also, younger people commited suicide earlier during their stay in a forensic psychiatric hospital or prison.

Conclusions: While the results suggest a necessity to optimize data collection in the prison system (prior suicide events and history of mental disorder), it is important to discuss the current discharge arrangements within the forensic hospitals.

Keywords: suicide events, prison, forensic psychiatry, schizophrenia, mental disorder, substance abuse disorder

INTRODUCTION

All European legislations recognize the concept of criminal responsibility as a prerequisite for punishment. Most European countries require some degree of reduced responsibility for the crime committed for entry into the forensic psychiatric system, while offenders with full responsibility can be subject to a prison sentence. In the UK, access to forensic psychiatric care is determined only on the basis of the mental condition at the time of assessment (1). Regarding the duration of stay, most countries allow detention of mentally disordered offenders beyond the length of the prison sentence their offense would have attracted had they been imprisoned (Sampson et al., submitted). In Croatia, Portugal, and Italy, the time of psychiatric detention is limited to the prison sentence the individual would have received without a mental disorder. In Germany, the longer the detention in a forensic psychiatric hospital, the more important the considerations are regarding the proportionality of the patient's right to freedom against any risk he or she may pose (2).

Although specialized forensic institutions exist in many countries, most offenders with mental disorders are found in prison settings (1). The international literature suggests an increased prevalence of mental disorders in prison inmates (3–6). Fazel and Seewald found a pooled prevalence of psychosis of 3.6% in male prisoners (3.9% in female prisoners) and for major depression, the prevalence was 10.2% in male prisoners (14.1% in female prisoners) (3). The rates for comorbidity ranged from 20.4 to 43.5% in those with any mental disorder who had comorbid substance misuse (3). The study by Fazel and Danesh that included nearly 23,000 prisoners from 12 countries showed similar results for schizophrenia and depression. Personality disorders were detectable in 65% of the male and 42% of the female detainees (4). In a German study, 88.2% of the subjects in a prison in Bielefeld were diagnosed with at least one mental disorder (7). Similar research among 80 randomly selected Greek prisoners yielded a prevalence of mental disorders of 78.7% among the participants and of 37.5% each for anxiety disorder and antisocial personality disorder (8).

In correctional settings, suicide is often the single most common cause of death (9, 10). Suicide prevention and the treatment of mentally disordered people with a higher risk of committing suicide are central aspects of the clinical work for psychiatrists and psychotherapists (11). It is well known that suicidality is a multifactorial conditioned phenomenon with general risk factors being mental disorder, hopelessness, impulsivity, former suicide attempts, age, gender, ethnicity, relationship status, and a positive family history with suicide events (12). Males are more likely than females to die by suicide, and middle-aged adults as well as elderly people, especially elderly males, are described as high risk groups for suicide (10, 13, 14). While major depression is the most common mental disorder in the general population and most often associated with suicide risk (15), another group at higher risk consists of young schizophrenic patients (16, 17). According to the findings of a Swedish study group (18), patients with a schizophrenia who were once treated because of suicidality committed suicide more frequently in the course of time in comparison to patients with other mental disorders. Apart from psychiatric disorders, there are indications that troubling "life events" lead to an increase in suicide risk (19) and it seems comprehensible that imprisonment, as well as admittance into a forensic institution, may be considered as such a life event (1, 20).

Suicide rates per 100,000 prisoners have been found to range from 58 to 147 in a review of 12 studies from Western countries compared to figures of 16 to 31 in the general population (21) and prisoners with psychosis, depression or substance abuse disorder are at an even greater risk (22). In Europe, the rate of prison suicide events correlated with the number of mentally disordered prisoners (23), and in 72% of prison suicide events, mental disorders were found in the specific medical history (24). A more recent German study by Opitz-Welke et al. (25) identified a mean suicide rate of 105.8 per 100,000 in male prisoners and 54.7 per 100,000 in female prisoners, with specific risk factors being the special situation (imprisonment), the separation of loved ones, pre-trial detention, small prisons, a single cell/isolation, (expectance of) a long sentence, former suicide attempts, and the arrest for a violent crime (26).

In a comparative study, Otte et al. (27) demonstrated that the level of mental distress measured via the Symptom Checklist-90-Revised and Brief Symptom Inventory was as high in long-term detainees as in patients of a general psychiatric hospital and even higher than in patients of forensic psychiatric institutions. The lowest level of mental distress was described in short-term detainees.

Although it is known that over the course of time, the number of patients in the forensic psychiatric system has increased significantly not only in Germany (28, 29) but in many Western European countries (30), literature on suicide events in these institutions is still very limited compared to prison suicide.

AIM OF THE STUDY

This study compares completed suicide events in two high-risk groups: the group of prison inmates and of the patients in the forensic psychiatric institutions in Germany (2000–2004). Due to the immense lack of information on suicide events in forensic psychiatric hospitals we want to determine a suicide rate for this specific setting. In our opinion, it is important to understand the impact of institutionalization on suicidality in forensic hospitals as well as in the prison system.

Our first hypothesis is that the rate of completed suicide events in forensic psychiatric hospitals is higher than that in prison. All patients in these settings suffer from a mental disorder and are exposed to the same general and specific risk factors as the prisoners are. Furthermore, in Germany, the duration of stay in a forensic hospital is potentially unlimited in comparison to a prison sentence. Considering this, we also hypothesize that in forensic hospitals, the time from admission to suicide is longer than in the prison system. This could lead to a new direction in suicide prevention in forensic hospitals pointing to the duration of stay in comparison to prison suicide, where literature suggests a higher risk in the first weeks of admittance. In addition, our aim

is to describe the potential differences and similarities between the two high-risk groups.

MATERIALS AND METHODS

Forensic psychiatric hospitals in Germany consist of two departments. According to §63 StGB (penal code), the duration of stay depends on the treatment prognosis. If the patient is no longer "dangerous" to the public, the institutionalization may be suspended on probation. According to §64 StGB, offenders with a leading psychotropic drug dependence syndrome and sufficiently concrete therapeutic prospects are confined to special detoxification centers in forensic psychiatric hospitals. Here, the duration of stay is generally limited to 2 years. In this study, patients of both departments were included.

Data was collected through a nationwide survey: all forensic psychiatric hospitals within Germany were contacted via postal mail and received a questionnaire concerning the completed suicide events from 2000 to 2004 in their hospitals. Attempted suicide events were not considered in this study. The questionnaires were sent directly to the head of the department of each forensic hospital. They were then completed directly by the medical staff of the forensic hospital and sent back to us via postal mail. This questionnaire was not standardized, and it asked for specific information regarding the patients who committed suicide: gender, age, nationality, relationship status, date of admittance to the hospital, date of suicide, school degree, legal status (pre-trial or sentenced), type of offense, mental disorder, former detention, and former suicide events. The type of offense was categorized as violent offense and non-violent offense. Violent offenses included homicide, murder, manslaughter, aggravated battery, arson, rape, and sexual violence. Mental disorders were defined by the medical staff of the forensic hospitals, on the basis of the Tenth Revision of the International Classification of Diseases for the classification of mental and behavioral disorders.

The numbers of prison suicide events on all federal lands of Germany were assessed by a survey endorsed by the respective federal ministries of justice. Data on the prison suicide events was collected through the use of a specific questionnaire. The respective federal lands rated the questionnaires. Information was attained using the reports on exceptional events from the routine documentation ("Generalakten"). Official data on occupancy rates in both institutions on a yearly reference date was used as a basis for the calculations of the mean suicide rates (28, 31). For the calculation of the confidence intervals, the method suggested by Agresti-Coull was used (32). Comparative statistical analysis was conducted using Fisher's exact test or the Mann-Whitney U-test (age). A multivariate logistic regression analysis was done to assess adjusted effects for the dependent (prison and forensic group) and the independent variables (see **Table 1**). We added the confidence intervals for the estimated odds ratios of the variables that were found statistically significant. The variable mental disorder was underreported and not considered for the multivariate logistic regression analysis. For the Kaplan-Meier analysis, the time in months until the suicide events were analyzed. Censored cases did not occur. Cox regression models were subsequently defined with the time to suicide as the dependent variable and the two groups (forensic hospital, prison) as independent variables. For all analyses referring to the time until suicide, an adjustment for age was done. For that, the whole population was divided into two groups of equal size (median-split). All analyses were performed with the R statistical software, Version 3.5 and the "survival" and "survminer" packages.

TABLE 1 | Suicide events in prisons and in forensic hospitals in Germany (univariate analysis).

	Prison 2000–2004			Forensic hospital 2000-2004			
Total		479			40		
Male		475	99%		37	93%	
Female		4	1%		3	7%	$p = 0.012$
Age (mean ± *sd*)		36.2 ± 11.9			38.9 ± 13.1		$p = 0.342$
Non-german		114	24%		5	13%	$p = 0.118$
Pre-trial		256	53%		7	18%	$p < 0.001$
Violent crime		248	52%		28	70%	$p = 0.032$
Mental disorder		32	7%		40	100%	$p < 0.0001$
Former detention	$N = 314$	120	38%	$N = 35$	9	26%	$p = 0.195$
Former suicide attempt		70	15%		19	48%	$p < 0.0001$

RESULTS

A total of 53 from 63 (84%) forensic institutions completed the questionnaire, while all German prisons (100%) participated in the survey. In total, the sample consisted of 519 completed suicide events: 479 prison suicides and 40 suicides in forensic psychiatric hospitals (see **Table 1**). The mean age of the group was 36.4 ± 12.0. Men committed 99% of the suicides, 23% were of non-German nationality, 51% were in an early stage of confinement, and 53% were in prison or in a forensic hospital because of a violent crime. In only 14% of the cases was a mental disorder detectable, and in 17% of the cases, former suicide attempts were documented. Thirty-seven percent of the people who died by suicide were in prison or in a forensic hospital before: thus, 63% were in prison or a forensic hospital for the first time. There was no statistical difference regarding mean age and the nationality in the two institutional settings. In prison, 53% of the suicide events occurred during pre-trial status, yet this was the case in (only) 18% of the suicide events in the forensic psychiatric hospitals ($p < 0.0001$). In 52% of the suicide events in prison, the reason for detention was a violent offense, while this was the case in 70% of the suicide events in the forensic psychiatric hospitals.

While all patients were diagnosed with at least one mental disorder (e.g., schizophrenia, personality disorder, substance

abuse disorder) in the forensic psychiatric hospital, this was reported in only 7% in the group of prison suicides. In addition, former suicide attempts in the prison group were documented for 15% of the inmates who committed suicide, while this was known for 48% of the patients who committed suicide in the forensic setting. There was no statistical difference regarding the item of "former detention".

The multivariate logistic regression analysis found significant effects for gender ($p = 0.005$, 95% confidence interval: [1.984, 140.583]), pre-trial status ($p < 0.001$, 95% confidence interval: [2.168, 17.374]), and former suicide attempt ($p < 0.001$, 95% confidence interval: [2.440, 11.892]).

The duration from admission into the institution to the suicide event was statistically significantly ($p < 0.0001$) shorter in the prison group in comparison to the forensic hospital group (see **Figure 1**).

After adjusting the time-to-event analysis for the age categories, we still found a significant difference between the two

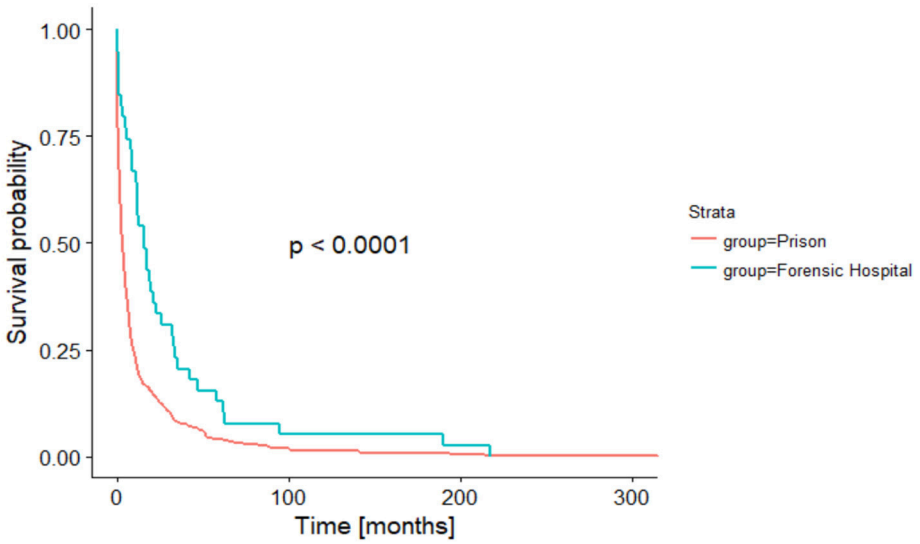

FIGURE 1 | Time in month until suicide (Kaplan-Meier analysis).

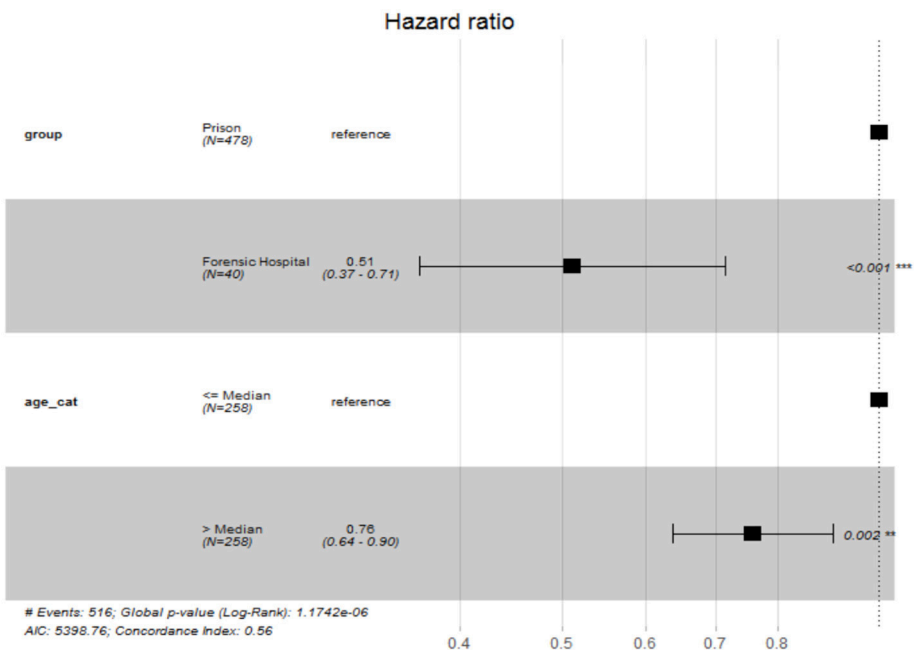

FIGURE 2 | Hazard ratios of independent variables of Cox-Regression.

groups ($p < 0.001$) and a significant effect for age ($p < 0.001$), indicating that younger people tend to commit suicide earlier during their stay in a forensic psychiatric hospital or prison (see **Figures 2**, **3**).

The mean suicide rate in the forensic psychiatric hospitals was 123/100,000 patients per year (95% confidence interval: [0.00103, 0.00147]). In comparison, the rate in the prison system was 130/100,000 prisoners per year (95% confidence interval: [0.00109, 0.00154]). This difference is not statistically significant ($p = 0.706$) (see **Table 2**).

DISCUSSION

When we compared suicide events in the German institutional penal systems, we found that the mean suicide rates in the prison system and in the forensic hospitals did not differ statistically significant. Our hypothesis that a possible accumulation of general and specific risk factors in forensic psychiatric patients, as mentioned above, may lead to a higher rate of suicide events compared to the group of prisoners did not stand ground. However, an accumulation of general and specific risk factors were identified in the suicide events in the forensic hospitals: in all cases, a mental disorder was diagnosed, in 70% of the events, the patient was institutionalized due to a violent (including sexual) offense and in 48% of the events, former suicide attempts were known.

It is not surprising that most of the cases of reported suicide events in our study were committed by men. First, the male gender is an established risk factor (33), and second, in both institutional systems, the total populations consisted of a significantly higher proportion of men. There was no age difference in the groups nationwide. How the mean age differed from the total populations in both systems was not recorded.

In both groups, then majority of suicide events were commited by German citizens. Compared to the prison group, the proportion of non-German patients who committed suicide in forensic psychiatric hospitals was smaller, but this difference was not statistically significant. We didn't find comparable data regarding suicidality in forensic psychiatric settings, specifically regarding nationality.

It is interesting that the proportion of suicide events during pre-trial detention was significantly higher in the prison group (53 vs. 18%), which matches the findings of Bennefeld-Kersten (26) that pre-trial detention is a specific risk factor for prison suicide. In contrast, in the forensic psychiatric hospital, the pre-trial status of the patient seemed to be of lesser significance for suicidality. It seems understandable that in a specialized psychiatric setting, such as in the German forensic hospitals, suicide prevention is a routine task and due to professionally trained personnel (medical doctors/psychotherapists), treatment is optimized in comparison to a prison system.

The duration of stay from the admission to the suicide event differed significantly in both groups. Suicide events occurred earlier in prison than in forensic hospitals. In addition, in both institutions, the younger inmates and patients committed suicide earlier than older ones. Thus, young age could be understood as a

TABLE 2 | Suicide rate in Prisons and Forensic psychiatric hospitals in Germany.

	Prisons		Forensic hospitals	
	Total pop.	**Suicides**	**Total pop.**	**Suicides**
2000	70.252	117	5.617	4
2001	70.203	107	5.903	11
2002	70.977	77	6.587	7
2003	79.153	83	6.959	10
2004	79.452	95	7.278	8
Mean rate	130/100.000		123/100.000	

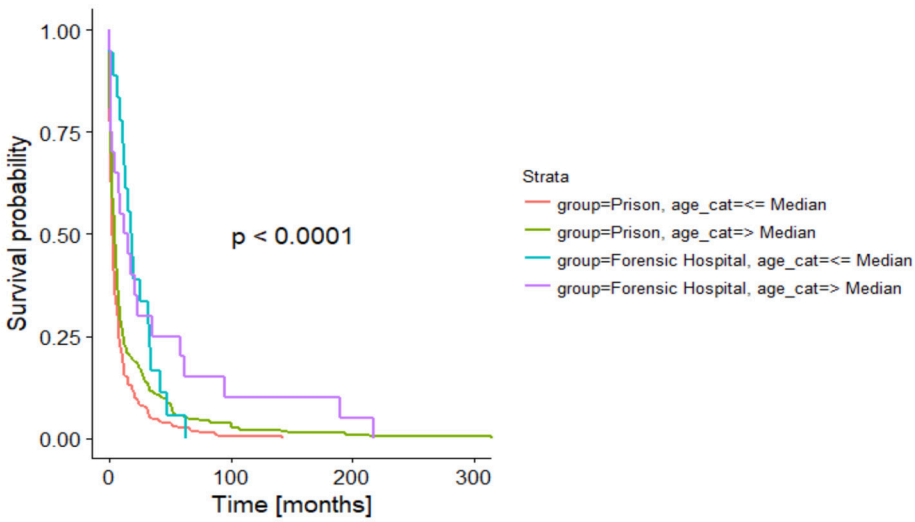

FIGURE 3 | Time in months until suicide regarding age (Kaplan-Meier analysis).

potential risk factor for early suicide in forensic hospitals and in prison. It may be discussed if the later onset of suicide events in the forensic hospitals correlates with the distribution of diagnoses in the groups. Suicide risk in men with schizophrenia increases with the number of admissions to a hospital and thus over the course of time (34), while in patients with depression the suicidal risk decreases over the course of time, and suicide attempts are committed instead at the beginning of a depressive episode (35, 36). Another reason for the difference in time from the admission until the committed suicide could be the potentially unlimited duration of stay in German forensic psychiatric hospitals. The missing prospect of a final date of dismissal may lead to a feeling of hopelessness that could increase in the course of past (unsuccessful) years of therapy. Lack of hope has been described as a general risk factor for suicidality (12). To what extent the amendment of the German penal code for institutionalization in a forensic hospital will improve the prospects of patients within a forensic institution remains to be seen. These amendments from April 2016 included a higher frequency of external expert witness reports and a stronger focus on proportionality between the committed offense, the duration of stay and the probability of severe violent offenses in the future.

There was a small amount of information available on potential mental disorders in the group of prison suicide events; in only 7% of the cases was a psychiatric disorder registered. This is in stark contrast to the international literature (3, 4, 22) that indicated a higher prevalence of mental disorders in prison in general and in suicide events specifically, such as depressive episodes and adjustment disorders (6). In addition, the information on "former suicide attempts" was documented in only 15% of the prison group in comparison to 48% of the forensic hospital group. It seems that these two items in the prison group were underreported and thus must be considered a major limitation of this study. However, this may indicate an expression of a lack of standardized psychiatric assessments and suggest an optimization of the information collection process regarding suicide prevention. Data on former suicide attempts in prisoners is especially significant since this risk factor is (even) more important than socio-demographic data and mental disorders (37).

In summary, institutional suicide events can be considered multifactorial in nature. While in a prison setting, suicide events tend to occur at an earlier stage of the secure confinement, it is important to consider the influence of specific life events as "imprisonment" and "conviction" on suicidal thoughts and impulses. The use of a specific screening tool for suicidality at the beginning of imprisonment, as well as during critical landmarks (verdict, trial days) consequently seems recommendable. Mental health in general, as well as the specific former psychiatric history, should be frequently addressed and documented by the personnel in charge. In forensic psychiatric hospitals, because of the plentitude of patients with schizophrenia, the natural (and often chronic and complicated) course of the disorder must be considered when interpreting the results. Apart from the higher suicide risk within this disorder itself, a possible lack of future prospects due to the uncertain duration of stay may relate to a higher suicide rate and later onset of suicide events in forensic psychiatric institutions. This should be a possible starting point for further research activities aiming for an optimization of suicide prevention in forensic institutions.

Our study has a number of significant limitations. It was not possible to compare our findings with the total numbers within each institution separately, as this data was not obtainable. In addition, the presented numbers in the groups were very small and, in respect to certain items, incomplete ("former detention"). The data concerning mental disorders in prison seemed to be vastly underreported, which makes a comparison with inmates of a forensic psychiatric hospital, where every patient has a mental disorder, especially difficult.

ETHICS STATEMENT

According to current legal regulation, no approval from the local ethics committee was required for the current study.

AUTHOR CONTRIBUTIONS

AV and AO-W designed the study. AV, NaK, and AO-W collected the data. AV, NK, and AO-W analyzed and interpreted the data. AV and AO-W wrote the initial draft of the manuscript. AV and AO-W had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of data analysis. All authors have contributed to, read, and approved the final version of the manuscript.

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frontiers in Psychiatry

ORIGINAL RESEARCH
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Criminalization Through Transinstitutionalization: A Critical Review of the Penrose Hypothesis in the Context of Compensation Imprisonment

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In 1939, the Penrose hypothesis suggested that the number of psychiatric hospital beds was inversely related to the size of prison populations. Central to a causal interpretation of the Penrose hypothesis is the idea that a small proportion of any population requires institutional mental care. Several studies re-examining longitudinal and cross-sectional data found that a fall in available psychiatric hospital beds occurred over the same period as a rise in prisoner numbers. The observed inverse relationship was mostly interpreted as being the consequence of a lack of compassion for the disadvantaged in society, while other studies concluded that the correlation was spurious and determined by confounders. In Germany, Austria, and Switzerland, lawbreakers who are unwilling or unable to pay a fine for committing a petty crime such can face compensation imprisonment. Every tenth German detainee serves compensation imprisonment with an average incarceration time of 2–3 months. We analyzed the social-economic backgrounds and the levels of mental disorders in four populations of compensation prisoners, consisting of 100 participants each, in the German capital Berlin in 1999, 2004, 2010, and 2017. Largely, the compensation prisoners were homeless, single, and unemployed, exhibited a high degree of substance abuse and showed an extraordinary high prevalence of mental disorders. Unfortunately, as the average stay in prison is short, there are no decisive concepts for social rehabilitation after imprisonment. In addition to a lack of resocialization, potential job loss, and social stigmatization, the newly acquired subcultural contacts facilitate reoffending. This study aims to give an overview of the medical, sociologic, and psychopathologic examinations on compensation prisoners. By analyzing trends in the prevalence of mental disorders, we will discuss the medical appropriateness and sociologic sense of compensation imprisonment with respect to the Penrose hypothesis. Thereby, we aim at shedding light on the question whether compensation imprisonment is an indispensable tool for law enforcement or if it is a punishment of the poor or mentally ill, which further deteriorates their unfavorable socio-economic situation. Finally, we will propose measures to reduce the number of reoffenders and to enable the compensation detainees to reintegrate successfully into society.

Keywords: compensation imprisonment, mental disorders, penrose hypothesis, transinstitutionalization, DIA-X

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INTRODUCTION

In 1939, the English scientist Lionel Penrose found an inverse correlation between the size of psychiatric inpatient clinics and the number of detainees based on cross-sectional data from diverse European countries (1). His assumption that the number of psychiatric hospital beds was inversely related to the size of prison populations was later termed the "Penrose hypothesis." A common expression summarizing Penrose's findings is "transinstitutionalization," which refers to a process where mentally ill individuals, who are discharged from, or no longer admitted to, mental hospitals, are frequently found in prisons (2–4).

Even 80 years after its formulation, the Penrose hypothesis has neither been rejected nor confirmed. Despite repeated observations of transinstitutionalization, and an increase of the numbers of imprisoners, it is still unclear whether there is an association between capacities in psychiatric clinics and prison sizes (5).

In 2004, a meta-analysis on data from 158 countries found the opposite relationship compared to Penrose, namely that in low-and-middle-income countries, prison, and psychiatric populations were positively correlated (6). However, similar to the preceding study by Penrose, this meta-analysis used cross-sectional data.

Longitudinal data on treatment histories of U.S. prisoners revealed that the decrease in the number of psychiatric hospital beds accounted only for a small proportion of the expanding prison populations between 1968 and 1978 (7). Longitudinal data from Europe indicated that psychiatric care might have reached a phase of transinstitutionalization (8, 9), in which the numbers of mental health care beds might further decline, and that at the same time, capacities in prisons might extend (10). Still, none of these studies provided undisputable evidence for a direct correlation between decreasing capacities of mental health care institutions beds and increasing prison populations (11, 12). Another study suggested that both the numbers of mental health care beds and the numbers of detainees might be influenced by economic factors (13). However, none of the published studies have thus far sufficiently disproved Penrose's direct inverse association theory (14).

A recent longitudinal study found that since 1990, capacities of mental health care institutions were considerably cut down in South America, while prison populations boosted despite a strong economic growth (15). The observed developments appear to support the Penrose hypothesis, because the numbers of psychiatric beds decreased more substantially when and where the number of imprisoners increased (15). Comparable conclusions of a decline of mental health care beds and a simultaneous rise in numbers of detainees were documented in Ireland and Norway (16, 17).

In Germany, Austria, and Switzerland, the penalty system includes a certain type of punishment termed "compensation imprisonment." If a convicted person refuses to pay the fine for a crime, he or she must go to jail instead for a short period. This compensation imprisonment is regulated under section 43 of the German Penal Code and is conceived to ensure the effectiveness of the penalty system (18, 19). The proportion of compensation prisoners amounts for ∼10% of all inmates in Germany (20). For nearly two decades, the meaningfulness of compensation imprisonment has been discussed (21–23). Because of the fact that the mean period of imprisonment is short, there are no meaningful approaches for social rehabilitation after imprisonment. As a consequence of this lack of resocialization, the detainees have to face potential job loss and social stigmatization, and the newly achieved contacts with other criminals facilitate reoffending (24).

In our previous longitudinal study from 1999 to 2017 on the prevalence of mental diseases in compensation prisoners, we found that 72.75% of these special clientele suffered from alcohol-induced mental and behavioral disorders, 45.5% suffered from mental and behavioral disorders due to use of illegal drugs, 35% exhibited phobic anxiety disorders, and 26.25% showed signs of depressive disorders (25). In addition, somatoform disorders and dysthymia were found at frequencies between 10 and 20% (25).

Therefore, our hypothesis is that compensation imprisonment is a punishment of the poor and mentally ill. With respect to the Penrose hypothesis, we suggest that the proposed process of transinstitutionalization can most likely be observed in compensation prisoners, as these detainees would most likely benefit from a mental health care treatment, while they are put into prison instead. Thereby, compensation imprisonment increases inequality and poverty among people at the edge of society.

STUDY POPULATION AND METHODS

Study Population

The process of data acquisition and diagnosis of mental disorders was described before (25). In total, four study populations of randomly selected compensation prisoners were collected in the years 1999 (26), 2004 (27), 2010 and 2017 (25). As all study participants were diagnosed with the same diagnostic system DIA-X, the data were pooled for inferring the prevalence of diverse mental disorders in compensation prisoners.

Diagnostic System DIA-X

For diagnosing psychiatric disorders, the long form of the computer-aided expert system DIA-X was used (28). DIA-X supports the user reliably and efficiently with the diagnosis of about 100 mental disorders according to ICD-10 (International Classification of Diseases) and DSM-IV (Diagnostic and Statistical Manual of Mental Disorders) (29). The long version of DIA-X is a standardized interview for measuring mental disorders in the last 12 months. The modular structure and the possibilities of branching ensure that despite the standardization only the symptom constellation important for the respective subject is placed in the center of the interview. DIA-X was applied as computer version. For the DIA-X standardized interview, the interrater agreement was reported to range between 97 and 100% for the most common mental disorders, and the interrater kappa was reported to range between 0.67 (somatization disorder) and 0.99 (agoraphobia) (28).

Additionally, selected social and demographic characteristics basic data were collected. Each session lasted between 90 and 120 min, on average 105 min (25).

Data Sources

In order to compare compensation prisoners with general prisoners and with the general population in terms of the prevalence of the diverse mental disorders, a literature search was performed to assess the prevalence rates of the mental illnesses. For mental diseases in general prisoners, the following articles were consulted: (30–34).

The prevalence of mental diseases in the general population were extracted from Angst (35), Martin (36), Bloomfield et al. (37), Hilderink et al. (38), Patra and Sarkar (39), Qian et al. (40), Grant et al. (41), Chang et al. (42), Vandeleur et al. (43), and Leutgeb et al. (44).

In order to assess the percentage of compensation prisoners in all detainees and to be able to determine a temporal trend, we used data from the German Federal Statistical Office. The Federal Statistical Office publishes at regular intervals the stock of prisoners in the German prisons with respect to their regional placement and with respect to the form of imprisonment on the deadlines March 31, August 31, and November 30 of each year. For this study, the total number of inmates and the number of compensation prisoners were taken from the collections on November 30 each year starting from 2009 to 2017 (45, 46).

Statistical Analyses

A simple linear regression analysis was used for modeling the relationship between the percentage of compensation prisoners on all prisoners (dependent variable) and the time in years since 2009 (independent variable).

RESULTS

Mental Disorders in Detainees, Compensation Detainees, and General Population Samples

Table 1 gives an overview of the prevalence of various mental illnesses among prisoners and the general population. Furthermore, a distinction was made between detainees in general and compensation prisoners.

The first striking feature of this statistic is that the prevalence of mental illness due to the use of alcohol among compensation prisoners was 72.75%, while prisoners in general exhibited prevalence rates of 21–47%. In the normal population, the prevalence of alcohol-related mental illnesses was only around 3–5%. Compensation prisoners were therefore three times as likely to suffer from alcohol-related mental illness as average prisoners were and 10–20 times as likely to be troubled by alcohol-related mental illness as the average population.

Mental illness caused by substance abuse was found to have a prevalence of 50.25% among compensation prisoners, while its prevalence varied between 21 and 38% among general inmates and lay at only 10% in the general population.

In hypomania and depressive disorders, there were no deviations in the prevalence in compensation prisoners. Dysthymia affected 11.5% of compensation prisoners but only 2.1–5.2% of average prisoners and 2.0–3.3% of the norm population. With regard to dysthymia, the prevalence of compensation prisoners was thus threefold higher than that of the average population.

Phobic anxiety disorders were detected in 35% of compensation prisoners, but the prevalence in the normal population was only 6.2%. The difference in adjustment disorders was particularly pronounced: with a prevalence of 7% for compensation prisoners and 1.9–4.6% for general detainees and only 0.9% for the norm population, the presence of adjustment disorders among compensation inmates exceeded the norm many times over.

Another eye-catching finding was that 16% of compensation inmates were diagnosed with somatoform disorders, while only 1.7% of other inmates and only 1.5–21.0% of the general population suffered from somatoform disorders.

On average, about 1% of the population suffers from eating disorders, with women being significantly more affected than men are. In prisons, on average, 0.3% of men and 2.0% of women suffered from eating disorders. Therefore, it was conspicuous that our study population of compensation prisoners, which consisted exclusively of men, had an eating disorder rate of 2.25%.

Temporal Development of Numbers of Prisoners in Germany

Table 2 presents the development of the numbers of all detainees and of compensation detainees in Germany from 2009 to 2017. The number of inmates in Germany has declined considerably in recent years. From the beginning of available records in 2003 until 2009, the number of inmates exceeded 70,000 every yearly cut-off date (45). The number of inmates was below 70,000 for the first time in 2010 (45), and since then the numbers have been decreasing constantly (46). On the other hand, the numbers of compensation prisoners remained constant or increased steadily since 2009, both in absolute terms and in percentage terms.

To sum up, the number of compensation prisoners in Germany, who were in jail by the end of November in each year, increased nationwide from 3,868 detainees in 2009 to 4,580 detainees in 2017, with a simultaneous decrease in the total number of prisoners. While 5.5% of all inmates were compensation prisoners in 2009, in 2017 the amount of compensation prisoners increased to 7.1% of all prisoners. More concretely, this finding in relative terms meant that the total number of detainees decreased by 9.1% from 2009 to 2017, while the number of compensation prisoners increased by 18.4% between 2009 and 2017.

A simple linear regression analysis with the time in years as independent factor and the percentage of compensation prisoners on all prisoners as dependent variable explained a large amount of variance in the data ($R^2 = 0.871$). Every year, the proportion of compensation prisoners on all prisoners

TABLE 1 | Overview of the average prevalence of mental disorders compensation prisoners, general prisoners and in the general population.

ICD-10	Diagnosis	Prevalence in compensation prisoners (%)	Prevalence in general prisoners (References)	Prevalence in general population (References)
F10	Mental and behavioral disorders due to use of alcohol	72.75	21–46.7% (31, 33, 34)	3–5% (37)
F11-16	Mental and behavioral disorders due to drug abuse	50.25	21–38% (30–34)	9.9% (41)
F20–F29	Schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders	3.75	0.3–3.4% (30, 31, 47)	1.25–1.5% (36, 42)
F30	Hypomania	3.0	0.5% (32)	5.5% (35)
F32–F33	Depressive disorders	26.25	3.3–26.2% (31, 34, 47)	16.8–19.2% (43)
F34.1	Dysthymia	11.5	2.1–5.2% (32)	2.0–3.3% (36, 43)
F40	Phobic anxiety disorders	35	2.4–7.3% (32, 47)	6.2% (36)
F43	Reaction to severe stress, and adjustment disorders	7.0	1.9–4.6% (30, 31)	0.9% (39)
F45	Somatoform disorders	16	1.7% (47)	1.5–21.0% (38, 44)
F50	Eating disorders	2.25	0.3–2.0% (31)	1.01% (40)

TABLE 2 | Number of prisoners in Germany.

Year	Total number of prisoners	Compensation prisoners
2009	70,817	3,868 (5.5 %)
2010	69,385	3,776 (5.4 %)
2011	68,099	3,802 (5.6 %)
2012	65,902	3,936 (6.0 %)
2013	62,632	3,968 (6.3 %)
2014	61,872	4,460 (7.2 %)
2015	61,737	4,135 (6.7 %)
2016	62,865	4,487 (7.1 %)
2017	64,351	4,580 (7.1 %)

The numbers were collected at the end of November in each year.

increased by 0.253%, and the association was highly significant ($p < 0.001$).

DISCUSSION

Mental Disorders in Compensation Detainees

Convicts who cannot pay the fine for committing a petty crime like fare evasion have to serve compensation imprisonment. The risk of compensation imprisonment is therefore many times greater for poor people than for financially well-off people.

The comparison of the prevalence of mental disease in compensation prisoners with population samples from general prisons and from the general population yielded a clear result: compensation prisoners are many more times more prone to suffer from mental diseases induced by alcohol and drug abuse than the normal population. Even in comparison with population samples from worldwide prisons, the prevalence of alcohol- and drug-abuse related disorders was extraordinarily high. Our finding that 72.75% of compensation prisoners suffered from mental and behavioral disorders due to use of alcohol is in line with the findings of Konrad and Opitz-Welke, who reported that 77% of their study population consisting of compensation and investigation prisoners were diagnosed with alcohol abuse (48)

In addition, dysthymia, phobic anxiety disorders, adjustment disorders, somatoform disorders, and eating disorders occurred at frequencies wide above the standard levels. The exceptionally high prevalence of adjustment disorders could reflect immediate negative reactions to incarceration (49).

One explanation for this observation could be an interaction between being poor and being mentally ill. Indeed, several studies could demonstrate that people who live in poverty appear to be at higher risk for mental illnesses (50–52). However, the association between poverty and mental disorders is complex and bidirectional. On the one hand, besides genetics, adverse life events or substance abuse, poverty can be a main factor causing mental illness. On the other hand, mental illness may lead people down a road to poverty, because of disability, stigma or the need to spend extra money on health care (50, 51). Lund and colleagues suggest that poverty more often leads to depression while disorders like schizophrenia more often lead to poverty (50, 51).

Therefore, the conversion of the monetary fine for committing a petty crime into imprisonment primarily affects the socially marginalized, the poor, and the mentally ill. Consequently, compensation imprisonment may constitute the backbone of the sanction system, but it seems dysfunctional to our subjects.

Results in Relation the Penrose Hypothesis

The longitudinal analysis of prisoner numbers in Germany yielded a clear trend: while the number of people in jail is constantly decreasing, the number of compensation prisoners is constantly increasing. As social-demographic study on compensation prisoners demonstrated that these people were mainly homeless, unemployed, and had hardly any sustaining family background (25). The finding that compensation prisoners suffered from a wide spectrum of mental disorders, which exceeded the standard population by a magnitude, underscored the hypothesis that these people are in fact victims of a transinstitutionalization process.

If prisons in fact could be a substitute for mental health care clinics, then the question arises to what these facilities could offer to the many inmates with serious mental disorders. One modality that jails offer is structure, which is implemented in the form of a

protected setting and of employees who can hold back improper and destructive behavior, and conceive a personalized psychiatric treatment regime. However, for those people with serious mental disorders and who serve compensation imprisonment, this structured setting is not sufficient, as their stay in prison is generally very short and standard treatment plans are not being carried out for reasons of time. For this clientele, psychiatric inpatient treatment and drug and alcohol withdrawal would be preferable to incarceration into a prison.

It is broadly accepted that numerous people with genuine psychological problems, who have been criminalized, could be dealt with effectively in the community, if there were sufficient and available treatment facilities (53). However, in Eastern Germany, after the political change, the number of general psychiatric beds fell by 61% and the prisoners' rate dropped by 77%, so that within a few years the rates between East and West Germany converged. In both parts of Germany, capacities were built up in the execution of sentences, assisted living and rehabilitation facilities. In West Germany, the number of psychiatric beds fell by 40% between 1989 and 2003 (54). However, at the same time, forensic psychiatric bed numbers increased in most countries, especially in East Germany (12). Consistent with the Penrose hypothesis, it seemed that the extensive decline in general mental health care beds might have partly been compensated by a rise in forensic mental health care beds. Although the reduction of general psychiatric beds may not have caused a growth of prison populations, available data do not allow excluding a possible transinstitutionalization of people with mental disorders from psychiatric hospitals to prisons (12).

Lamentably, the deficient treatment of mentally challenged people during compensation imprisonment and the inadequate number of clinic beds (acute, intermediate, and long term) for the individuals who require them are some of the realities of transinstitutionalization that have set the stage for criminalization (55).

The Penrose hypothesis has been a valuable reference point for investigations into the intricate relationship between the mental health care system and the legal enforcement system for more nearly 80 years (53). Our results do not prove that validity of the Penrose hypothesis, but in the special setting of compensation imprisonment, our observations support the idea of a transinstitutionalization process. This transinstitutionalization process could possibly lead to an unintentional stigmatization of socially marginalized, poor and mentally ill persons as criminals (56, 57).

However, it is important to emphasize that within the context of this study, the Penrose hypothesis was used as an analogy and that our results were purely descriptive. Therefore, our implications and conclusions are of speculative nature and cannot be confirmed by the descriptive data.

Limitations

One limitation of the study is that was not possible to diagnose personality orders with the diagnostic system DIA-X. However, antisocial, borderline, and paranoid personality disorders were associated strongly with substance-use disorders (58–60). Therefore, determining the prevalence of personality disorders would provide interesting insights into the mental health of this particular study population, which has an extremely high rate of substance abuse. The diagnosis of personality disorders could be a relevant factor especially for compensation prisoners minimize recidivism among those in legally supervised treatment (61).

Another limitation of using the diagnostic system DIA-X is constituted by a potential underestimation of more chronic forms of schizophrenia that are dominated by negative symptoms in compensation prisoners.

Finally, we cannot validate whether the reduction of mental health care beds in Germany concerned mostly chronic diseases like schizophrenia or mental disabilities, as there are no statistical reports on this issue. However, this information would be a prerequisite in order to prove that substance abusers were especially affected by the reduction of psychiatric hospital beds.

Recommendations

The German law already offers an alternative to compensation imprisonment, which is community service. People sentenced to serve compensation imprisonment can apply for serving voluntary community work instead (19). This seems very meaningful, as imprisonment would further deteriorate their precarious financial and social situation and would further impair their fragile state of mental health. If these people are put to jail and released again without support, they will find themselves in a vicious circle without the hope of ever escaping their compromising situation.

Given that a large proportion of the compensation prisoners suffered from mental illness, we believe that it is advisable to first psychologically diagnose anyone convicted of compensation imprisonment. This could be achieved with the DIA-X diagnostic system, for example. Then a therapy should take place accompanying the voluntary work, which should deal with the respective problems of the individual. For serious mental illness, a transfer to a psychiatric hospital would be worth considering. In any case, nothing should be left unturned to integrate the convict into a functioning social environment.

CONCLUSIONS

Our studies add weight to claims that compensation imprisonment leads to an ethically questionable and clinically inappropriate transinstitutionalization and further criminalization of poor or mentally ill people from the edge of society into prisons, which are poorly set up to treat and support them. Policymakers should therefore consider the current limits of compensation imprisonment.

ETHICS STATEMENT

In January 2016, a comprehensive research proposal was submitted to the criminal services of the penal institutions in Berlin and to the social services of the penal institution Plötzensee, which were both approved in February 2016. In addition, the prison management of the penal institution Plötzensee approved the study in April 2016. Finally, the Berlin Commissioner for Data Protection issued a clearance certificate in May 2016.

AUTHOR CONTRIBUTIONS

CS conducted the literature search, collected and evaluated the data, performed the statistical analyses, and supported SS with writing the article wrote the article. SS conceived and prepared the study, wrote the research proposal, communicated with the authorities, recruited the patients, organized the data collection, and wrote the article.

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Yield and Efficiency of Mental Disorder Screening at Intake to Prison: A Comparison of DIA-X Short- and Long-Screening-Protocols in Compensation Prisoners

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Background: Inmates are several times more likely to suffer from mental disorders than the general population. In order to take appropriate curative or preventive measures, a precise psychiatric diagnosis at detention start would therefore be imperative, but is frequently not carried out for reasons of time. The computer-aided expert system DIA-X enables a rapid and reliable diagnosis of psychiatric disorders. DIA-X is available as a short screening questionnaire with a processing time of a few minutes and as a standardized interview, which takes ∼1 h to complete.

Objective: The aim of this study was to assess the efficiency and accuracy of the DIA-X short screening questionnaire.

Methods: One hundred detainees were recruited randomly from compensation prisoners, who were imprisoned because they were unwilling or unable to pay a fine for committing a criminal offence, from the penal institution Berlin-Plötzensee in 2017. Both the short screening questionnaire and the standardized interview from the DIA-X expert system were used for diagnosing mental disorders. Based on the results of the standardized interview from four study populations of compensation prisoners from 1999, 2004, 2010, and 2017, the sensitivity, specificity and the predictive values of the screening form were inferred.

Results: More than half of the compensation prisoners suffered from mental and behavioral disorders caused by the abuse of alcohol or psychoactive substances. Phobic anxiety disorders were detected in one out of ten compensation prisoners and two out of ten compensation prisoners suffered from major depressive disorders. The DIA-X screening questionnaire was able to detect all mental illnesses with a sensitivity of 100%. However, specificities were low for nicotine dependency, drug and alcohol abuse. High specificities and high predictive values were obtained for psychoses and anxiety disorders.

Conclusions: As the main test quality criteria of the DIA-X screening forms were so low, we cannot recommend the application of the DIA-X screening form for obtaining a valid diagnosis. Therefore, we explicitly recommend using the long form DIA-X for the detection of the most serious cases of mental illness. Then, these prisoners could receive either therapy or special social training.

Keywords: compensation imprisonment, mental disorder screening, DIA-X, sensitivity and specificity, predictive values

INTRODUCTION

At present, there are between 9 and 10 million people in prisons worldwide (1), and an even larger number of former prisoners live in society (2). Therefore, determining the physical and mental health status of current and former inmates is an important issue in public health.

In Germany, approximately 80% of all penalties are imposed as monetary fines. If a convict is unwilling or unable to pay the fine for committing a criminal offense, he or she can face compensation imprisonment instead, as regulated under Section 43 of the German Penal Code (3, 4).

Thus, compensation imprisonment ensures the effectiveness of the penalty system. Despite small variations between the different federal provinces, the proportion of compensation prisoners amounts for ∼10% of all inmates in Germany (5).

The duration of the compensation imprisonment corresponds to the number of daily rates that an offender was sentenced to pay. The number of daily rates corresponds to the severity of the crime, and if for example the court sanctioned a fine of 30 daily rates, then the convicted person faces a 30-day compensation imprisonment. At the same time, a compensation imprisonment can be averted by paying the fine or by completing community service (4).

However, the application of compensation imprisonment is subject to an ongoing discussion in Germany (6–8). As the average stay in prison is short, there are no decisive concepts for social rehabilitation after imprisonment. In addition to a lack of resocialization, potential job loss and social stigmatization, the newly acquired subcultural contacts facilitate reoffending (9).

Numerous epidemiologic studies demonstrated that prisoners are more likely to suffer from mental disorders than the average population (1, 10–12). In addition to the observation that the majority of prison inmates (81%) were male, 3.7% of male, and 4% of female inmates experienced psychotic disorders, 10% of males and 12% of female inmates showed signs of depression and 65% of the male and 42% of female inmates were diagnosed with personality disorders (1).

In comparison to the American or British average population of the same age (13, 14), prisoners suffered from psychotic illnesses, severe depression and dissocial personality disorders 2–10 times more frequently (1, 15, 16).

As compensation imprisonment only exists in Germany, Austria and Switzerland, there are only a few representative medical studies on the prevalence of mental disorders of compensation prisoners. Four consecutive studies from 1999, 2004, 2010, and 2017, each consisting of 100 prisoners of the penal institution Berlin-Plötzensee, found a high rate of mental and behavioral disorders in compensation prisoners, mainly due to the abuse of alcohol and drugs (17–19).

In order to support the detainees during their detention and after their release to reintegrate into society, it is necessary to make a precise diagnosis of pre-existing mental illnesses. To this end, computer-assisted diagnostic systems are available for a standardized, independent, and reliable diagnosis. Unfortunately, a precise psychiatric diagnosis at detention start is often not carried out for reasons of time.The frequently used psycho-diagnostic system DIA-X exists as a long version that takes an hour to answer, and as a short version that can be answered within a few minutes.

The aim of this study was to assess the sensitivity and specificity of the short version of DIA-X using the results of the long version of DIA-X in a study population of 100 compensation prisoners.

STUDY POPULATION AND METHODS

Study Population

The study population consisted of 100 randomly selected inmates of the penal institution Plötzensee in Berlin, who served compensation imprisonment in spring 2017. The only inclusion criterion was a good knowledge of the German language. All study participants gave their informed consent to participate in this study.

Table 1 shows the sociodemographic characteristics of the study population. The inmates were exclusively male, on average 37.2 years old, mostly single and unemployed. Half of the inmates were convicted of fare evasion. The average number of daily rates was 106. The average penalty fee was1659 €. Thirty-eight inmates said they did not have a permanent home, and 41 inmates did not have any vocational training.

Study Approval

In January 2016, a comprehensive research proposal was submitted to the criminal services of the penal institutions in Berlin and to the social services of the penal institution Plötzensee, which were both approved in February 2016. In addition, the prison management of the penal institution Plötzensee approved the study in April 2016. Finally, the Berlin Commissioner for Data Protection issued a clearance certificate in May 2016.

TABLE 1 | Demographic characteristics of the study population in 2017 ($n = 100$).

Demographic parameter	Frequency
Mean age in years	37.2
Proportion of singles	92%
Proportion of inmates with no fixed address or in residential facilities	38%
Inmates without a school-leaving qualification	30%
Inmates without a vocational training	41%
Unemployment rate	85%
Convicted for fare evasion	49%
Convicted for other petty crimes	15%
Convicted for property crimes	21%
Convicted for personal injuries	7%
Convicted for road traffic offences	5%
Convicted for insulting others	3%
Nicotine dependency	58%
Cannabis abuse	33%
Opioid abuse	30%
Cocaine abuse	21%
Other stimulant abuse	20%
Hallucinogen abuse	12%
Sedative, hypnotic or anxiolytic-related abuse	6%

Diagnostic System DIA-X

For diagnosing psychiatric disorders, the computer-aided expert system DIA-X was used (20). DIA-X supports the user reliably and efficiently with the diagnosis according to ICD-10 (International Classification of Diseases) and DSM-IV (Diagnostic and Statistical Manual of Mental Disorders) (21).

For this investigation, we used to different versions of DIA-X:

1. A **screening procedure**, which captures fear, depression or mental disorders in general. The screening procedures are short questionnaires that either confirm or deny with high sensitivity and good specificity either the presence of any mental disorder (DIA-SSQ), anxiety disorder (DIA-ASQ), or depression (DIA-DSQ). If the suspicion of a mental disorder is confirmed, the structured interview should be used for further clarification. In addition, the screening questionnaires can also be used to measure change. The DIA-SSQ questionnaire has 17 questions, the other two 15 questions each. Each question is binary, i.e., it can only be answered with yes or no.
2. A **standardized interview** for measuring mental disorders in the last 12 months. The interview is available in two different versions: one to record the longitudinal symptoms (over the entire lifetime), the other centered on the cross-sectional symptoms (the last 12 months). Both versions are fully standardized and provide diagnoses of about 100 mental disorders according to ICD-10 and DSM IV. The modular structure and the possibilities of branching ensure that despite the standardization only the symptom constellation important for the respective subject is placed in the center of the interview becomes. In addition, some complexes can be selected. There is a supplementary booklet to the actual interview booklet, in which the examined person gives information on the symptoms, which are deepened in the interview. The information in the supplement also serves as a reminder.

Both variants of DIA-X were applied as computer versions. While it usually takes no more than 2 min to answer the screening questionnaires, the standardized interview takes about an hour to complete. In addition to the DIA-X components, the detainees were also asked questions of demographic nature.

The interviews were conducted by a general practitioner (in 1999), a criminologist (in 2004), a psychologist (in 2010), and by a social pedagogue (in 2017) (19).

Statistical Data Analysis

The recorded data were instantly anonymized and encoded. The prison did not receive any information whatsoever concerning data related to individual prisoners.

By comparing the two DIA-X versions—the short screening questionnaire vs. the long detailed standardized interview—the sensitivity and specificity of the DIA-X screening questionnaire were calculated for the individual diagnoses. The diagnoses obtained with the standardized interview were considered as gold standard.

The sensitivity of the screening questionnaire for a particular mental illness was the proportion of inmates, which were tested positive for this particular mental illness and that really suffered from that particular mental illness, of all the inmates that were actually diagnosed with a particular mental disorder. $Sensitivity = \frac{TP}{TP+FN}$, where TP, true positive; FN, false negative.

The specificity of the screening questionnaire for a particular mental illness was the proportion of inmates, which were tested negative for this particular mental illness and that really did not suffer from that particular mental illness, of all the inmates that were actually free of a particular mental disorder. $Specificity = \frac{TN}{TN+FP}$, where TP, true negative; FN, false positive.

Including the prevalence of diverse mental disorders in the study population as assessed with the long form of DIA-X, the positive and negative predictive values were calculated. To this end, the average prevalence of each mental illness was calculated from the frequencies of mental disorders in four study populations of 100 compensation prisoners each collected in the penal institution Plötzensee in 1999, 2004, 2010, and 2017 (19).

The positive predictive value (PPV) is the probability that detainees with a positive DIA-X screening test truly have the specific mental disease.

$$PPV = \frac{Sensitivity \cdot Prevalence}{\{Sensitivity \cdot Prevalence + (1 - Specificity) \cdot (1 - Prevalence)\}}$$

The negative predictive value (NPV) is the probability that detainees with a negative DIA-X screening test truly don't have the disease.

$$NPV = \frac{Specificity \cdot (1 - Prevalence)}{\{[Specificity \cdot (1 - Prevalence)] + [(1 - Sensitivity) \cdot Prevalence]\}}$$

RESULTS

Mental Disorders

Table 2 summarizes the average prevalence of mental disorders in four study populations, each consisting of 100 compensation imprisoners, from the years 1999, 2004, 2010, and 2017. Nearly half (45.5%) of the study population suffered from mental and behavioral disorders caused by the use of various drugs (**Table 2**). In fact, abuse of various psychotropic substances was detected in a large proportion of inmates (**Table 1**).

Nearly three-quarters (72.75%) of the inmates had mental health problems and behavioral problems initiated by alcohol abuse. Every third detainee who served compensation imprisonment suffered from phobic disturbances. In addition, depressive, somatoform, delusional and bipolar affective disorders as well as eating disorders and dysthymia were frequent diagnoses.

Sensitivity and Specificity of the DIA-X Short Form

Table 3 indicates the sensitivities and specificities of the DIA-X screening questionnaire as compared to the long form (interview form) of this diagnostic system. All mental disorders were detected with a sensitivity of 100%, i.e., all inmates suffering from a particular mental disorder were correctly classified as ill.

Low specificities were noted for nicotine addiction (23%), drug abuse (26%), and alcohol abuse (50%). However, since nicotine addiction as well as drug abuse and alcohol abuse occurred with high prevalence in compensation prisoners (**Tables 1**, **2**), the respective scales of the DIA-X screening method tended to overestimate.

High specificities (above 90%) were achieved for psychotic disorders, somatoform disorders, phobic anxiety disorders, and eating disorders. For these mental disorders, the ability to actually categorize healthy inmates as healthy was high.

Moderate specificities (between 56 and 87%) were achieved for hypomania, other anxiety disorders, post-traumatic disorders, mental and behavioral disorders due to the use of sedatives or hypnotics, dysthymia, and depression.

Negative and Positive Predictive Values

Table 4 shows the negative predictive values and the positive predictive values of the short form of DIA-X depending on the prevalence of the diagnosed mental illnesses. The positive predictive values varied between 60 and 80%, indicating that only 60–80% of inmates that were diagnosed with a specific mental disorder indeed suffered from this mental illness.

For nicotine addiction and drug dependence, the negative predictive values were ∼20%. Thus, only 20% of those inmates who, according to the short form of DIA-X, had neither dependency, were actually free of these addictions.

DISCUSSION

Mental Disorders

In this particular study population of compensation prisoners, the prevalence of mental disorders was well above that of the average population.

The average lifetime prevalence of alcohol-related mental illnesses in compensation prisoners ranges around 75% (18, 19), while Germany's general population shows a lifetime prevalence of 3–5% (22–26). For schizophrenia, the estimated lifetime

TABLE 2 | Overview of the average prevalence of mental disorders in four study populations of compensation imprisoners from the years 1999, 2004, 2010, and 2017 ($n = 400$). Multiple answers with respect to mental disorders were possible.

ICD-10	Diagnosis	Prevalence (%)
F10	Mental and behavioral disorders due to use of alcohol	72.75
F11, F12, F14–16	Mental and behavioral disorders due to use of opioids, cannabinoids, cocaine, or hallucinogens	45.5
F13	Mental and behavioral disorders due to use of sedatives or hypnotics	5.25
F17.2	Nicotine dependency	65.75
F20–F29	Schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders	3.75
F30	Hypomania	3
F32–F33	Depressive disorders	26.25
F34.1	Dysthymia	11.5
F40	Phobic anxiety disorders	35
F41	Other anxiety disorders	5.75
F43	Reaction to severe stress, and adjustment disorders	7
F45	Somatoform disorders	16
F50	Eating disorders	2.25

TABLE 3 | Sensitivity and specificity of the DIA-X short form as obtained by comparing its diagnostic results to those received from the DIA-X long form ($n = 100$).

ICD-10	Diagnosis	Sensitivity (%)	Specificity (%)
F10	Mental and behavioral disorders due to use of alcohol	100	50
F11, F12, F14–16	Mental and behavioral disorders due to use of opioids, cannabinoids, cocaine, or hallucinogens	100	26
F13	Mental and behavioral disorders due to use of sedatives or hypnotics	100	81
F17.2	Nicotine dependency	100	23
F20–F29	Schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders	100	99
F30	Hypomania	100	76
F32–F33	Depressive disorders	100	56
F34.1	Dysthymia	100	69
F40	Phobic anxiety disorders	100	91
F41	Other anxiety disorders	100	87
F43	Reaction to severe stress, and adjustment disorders	100	82
F45	Somatoform disorders	100	96
F50	Eating disorders	100	95

TABLE 4 | Negative predictive value (NPV) and positive predictive value (PPV) of the DIA-X short form, based on the average prevalence of the respective mental disorder in compensation prisoners ($n = 100$).

ICD-10	Diagnosis	NPV (%)	PPV (%)
F10	Mental and behavioral disorders due to use of alcohol	33.2	67.4
F11, F12, F14–16	Mental and behavioral disorders due to use of opioids, cannabinoids, cocaine, or hallucinogens	20.4	80.4
F13	Mental and behavioral disorders due to use of sedatives or hypnotics	39.8	60.7
F17.2	Nicotine dependency	18.6	82.2
F20–F29	Schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders	42.3	58.2
F30	Hypomania	33.9	66.7
F32–F33	Depressive disorders	35.2	65.4
F34.1	Dysthymia	38.9	61.7
F40	Phobic anxiety disorders	47.2	53.4
F41	Other anxiety disorders	42.1	58.5
F43	Reaction to severe stress, and adjustment disorders	41.5	59.0
F45	Somatoform disorders	47.6	52.9
F50	Eating disorders	34.8	65.7

prevalence for compensation prisoners was 4% (18), while in the German general population a lifetime prevalence of only 1.25% was observed (27). Similarly, dysthymia has been observed much more frequently in compensation prisoners (17, 18) than in the general population (28). The lifetime prevalence of bipolar disorder in the general population was also 0.5–5.0% (29), which was significantly lower than that of compensation prisoners (17–19). Only in the prevalence of depression did the compensation prisoners lie in the population average (28).

Apart from the work mentioned above (17–19), there is only a very sparse international data on mental illness among compensation prisoners due to the special legal situation in Germany, which otherwise exists only in Austria and Switzerland.

In the light of these results, it can be argued that compensation imprisonment is a punishment of the poor and mentally ill. Instead of enforcing the law, it rather deteriorates the situation of people at the edge of society. Therefore, a precise diagnosis of mental disorders at detention start could offer the possibility to treat the detainees as patients, and not just as criminals. With an appropriate treatment, the recurrence rate could be lowered and compensation imprisonment would indeed have an effect: a curative one, not an educative one.

Sensitivity and Specificity of the DIA-X Short Form

For the DIA-X screening questionnaire, a sensitivity of 86% was reported for screening for mental disorders, a sensitivity of 95% for screening for depression and a sensitivity of 96% for screening for anxiety disorders (20). In our study population, sensitivities for all ascertainable mental disorders were 100%.

For the DIA-X screening questionnaire, a specificity of 75% for screening for mental disorders, a specificity of 84% for screening for depression and a specificity of 82% for screening for anxiety disorders were published (20). In our study population, the specificities were much lower than the reported values.

Negative and Positive Predictive Values

For a physician performing a diagnostic test on a particular patient clientele, the sensitivity, and specificity of the test are less of a concern than the negative and positive predictive values, which are influenced by the prevalence of the disorder in a particular patient clientele. Since in detainees serving a compensation imprisonment, the prevalence of mental illnesses was significantly higher than that of the general population, the determination of the positive and negative predictive values was of great interest.

For nicotine addiction and drug dependence, the negative predictive values were ∼20%. Thus, only 20% of inmates in who, according to the short form of the DIA-X, neither dependency was present, were indeed free from these addictions. This value was surprisingly low at first glance, as the prevalence of addiction in the study population was very high. However, the short forms of DIA-X were not explicitly designed for the detection of these diseases, so that the low discrimination power of the short form of DIA-X is not surprising.

For depressive episodes, dysthymia, hypochondria, alcohol disorders, somatoform disorders, specific phobias, drug abuse, or dependence and social phobia, the negative predictive values were ∼30%. Thus, only 30% of inmates who, according to the short form of DIA-X, did not have any of the mental illnesses listed were actually healthy with respect to these conditions. The low discrimination power for depression is alarming, as this serious disease involves numerous compensation prisoners, which would not be detected correctly with the screening version of DIA-X.

Limitations

This study suffers from several limitations. First, we used the full version of the diagnostic system DIA-X as gold standard. However, the gold standard should be a diagnostic procedure, which in the given case represents the most proven and best solution. For psychiatric diagnosis, the gold standard is a consensus diagnosis involving all therapists, all available sources of information and interaction observations, as well as multiple interviews. Therefore, the use of a single measurement as gold standard can certainly be regarded a limitation. However, the long interview version of DIA-X has been used in many other studies assessing mental disorders (30–32) and it has been applied as validity criterion and even gold standard for evaluating newly developed diagnostic tools for mental health (33, 34).

In view of the numbers obtained for specificities, negative and positive predictive values, we conclude that the short version of DIA-X cannot be recommended for obtaining a quick and reliable diagnosis in compensation prisoners. Experienced diagnosticians would probably also immediately recognize those persons, who were diagnosed with DIA-X as mentally ill, because of their striking psychosis-related behavior.

CONCLUSIONS

The DIA-X's screening form proved to be highly reliable in correctly diagnosing psychosis and somatoform disorders in the special population of compensation prisoners. For depressive disorders, the specificity was 56%, so we have to assume that with regard to depression many patients would not be correctly diagnosed. Also for addictions, the predictive values were in a low range.

The main idea of our project was to evaluate the applicability of a simple and fast diagnostic screening tool for obtaining a rough, but reliable diagnosis of mental disorders in compensation prisoners. However, the main test quality criteria were so low, that we cannot recommend the application of the DIA-X screening form for obtaining a valid diagnosis.

However, as the brief imprisonment promotes social stigmatization and further threatens the basis of existence of this particular clientele, compensation prisoners need support to integrate well into society after detention. To this end, the use of the long form DIA-X would lead to the detection of the most serious cases of mental illness. Then, these prisoners could receive either therapy or special social training.

Based on the results of the epidemiological studies, which showed an extremely high prevalence of mental illnesses in compensation prisoners, and with respect to the low discrimination power of DIA-X screening form, we recommend a regular application of the DIA- X interview version in compensation prisoners. Although the use of the interview form of the DIA-X is time-consuming, it seems obligatory both for ethical reasons as well as for security reasons, since the society has a vital interest in a successful integration of compensation prisoners into a functioning social system.

AUTHOR CONTRIBUTIONS

CS conducted the literature search, collected and evaluated the data, performed the statistical analyses and wrote the article. SS conceived and prepared the study, wrote the research proposal, communicated with the authorities, recruited the patients, organized the data collection and supported CS with statistical analyses and writing the article.

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Beyond the Walls: An Evaluation of a Pre-Release Planning (PReP) Programme for Sentenced Mentally Disordered Offenders

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Background: Prison mental health services have tended to focus on improving the quality of care provided to mentally disordered offenders at the initial point of contact with the prison system and within the prison environment itself. When these individuals reach the end of their sentence and return to the community, there is an increased risk of morbidity, mortality, homelessness and re-imprisonment. New models of care have been developed to minimize these risks.

Objectives: The objective of this project was to establish a Pre-Release Planning (PReP) Programme with social work expertise, to enhance interagency collaboration and improve continuity of care for mentally disordered offenders upon their release. We aimed to evaluate the first 2 years of the programme by measuring its success at improving the level of mental health support and the security and quality of accommodation achieved by participants upon release in comparison to that reported at time of imprisonment. Additionally, we aimed to explore the impact of these outcomes on rates of re-imprisonment.

Methods: A process of participatory action research was used to develop and evaluate the first 2 years of the programme. This was a naturalistic prospective observational whole cohort study.

Results: The PReP Programme supported 43 mentally disordered offenders, representing 13.7%, (43/313) of all new assessments by the prison's inreach mental health service during the 2 years study period. When compared with that reported at time of reception at the prison, gains were achieved in level of mental health support (FET $p < 0.001$) and security and quality of accommodation (FET $p < 0.001$) upon release. Of those participants seen by the PReP Programme, 20 (46.5%, 20/43) were returned to prison during the 2-years study period. There was no significant relationship between re-imprisonment and gains made in mental health support (FET $p = 0.23$) or accommodation (FET $p = 0.23$).

Conclusions: We have shown that compared to that reported at time of reception at prison, the level of mental health support and the security of tenure and quality of accommodation both improved upon release following the intervention of the programme. Improved mental health support and accommodation were not associated with lower rates of re-imprisonment.

Keywords: prison, mental health, homeless, continuity of care, transition, participatory action research

INTRODUCTION

Prevalence rates for severe and enduring mental illnesses are significantly higher among sentenced prisoners than their peers in the general population (1–3). Mentally disordered offenders tend to have more complex health and social needs than non-mentally disordered offenders (4, 5).

Over the last decade, our service has developed a number of initiatives aimed at addressing the needs of mentally disordered offenders in remand (6, 7) and sentenced (8) prisons. These projects have been successful in improving the quality of care provided to these individuals at the initial point of contact with the prison system and within the prison environment itself.

The immediate post-release period however, is a time which poses increased risks for all prisoners, but especially those with a history of mental illness (9), including an increased risk of morbidity, mortality and homelessness (10–12). Moreover, in the context of the current homeless and housing crisis (13, 14) this vulnerable group are likely to be further marginalized and exposed to these adverse outcomes. Rates of re-imprisonment are high for all offenders both in Ireland (15) and worldwide (16). In relation to those offenders with a mental illness, rates of re-imprisonment are increased when compared with non-mentally disordered offenders (17).

When prisoners near the end of their sentence, a number of potential supports are available to them both internal and external to the prison. These are provided by the criminal justice and public health systems, as well as non-governmental organizations and the person's family network. These supports however, are typically fragmented and independent of one another, risking the individual falling through the gaps between services upon their release (18).

The World Health Organization has outlined a framework for patient-centered, integrated healthcare provision (19). This model emphasizes the need for collaboration between agencies and disciplines to improve patient outcomes and experiences, particularly for those with complex needs. These principles have been embedded in healthcare policy across the UK (20) and Ireland (21). Despite their complex healthcare needs, programmes for prison populations are conspicuous by their absence in these clinical strategies. It has been suggested that enhanced coordination between medical and mental health teams, and early identification of needs prior to release, can promote involvement of community based supports and assist in achieving continuity of care (22–24). These recommendations are echoed in Human Rights legislation. Of particular relevance is Rule 107 of the United Nations Standard Minimum Rules for the Treatment of Prisoners (The Nelson Mandela Rules), which highlights the importance of maintaining or establishing *"relations with persons or agencies outside the prison as may promote the prisoner's rehabilitation"* (25). However, efforts to establish and maintain relations with *"persons or agencies outside the prison"* can be challenging. The double stigma of being mentally ill and a convicted offender, along with high rates of substance misuse and homelessness (5, 26), can act as barriers to engagement with community based healthcare. It could also be argued that due to the complex social needs of mentally disordered offenders, that coordination of robust and holistic care plans should routinely be incorporated into prison inreach mental health services (27).

Various models have been proposed to overcome these challenges, most of which involve case management in the pre- and post- release periods for varying amounts of time (24). Assertive Community Treatment (ACT) has been utilized to provide intensive case management for up to 1 year in the post-release period (28). This intervention tends to be expensive and therefore more time limited approaches have been developed. Mckenna et al. have shown that a time limited intervention in the pre-release period based on the principles of ACT can improve engagement with community mental health services in the post-release period (29).

Critical Time Intervention (CTI) is a holistic approach to case management in the pre- and post-release period, which has demonstrated benefits in assisting mentally disordered offenders to engage with healthcare supports in the post-release period (22, 30, 31). CTI case managers aim to establish effective and trusting relationships with service users prior to their release from an institution in order to identify and ameliorate potential barriers to community reintegration (32, 33). Thereafter, they provide a time-limited period of support in the post-release period to help achieve transfer of care. In a randomized control trial of CTI within a prison setting, Jarrett et al. reported that the majority of the case manager's work in establishing support systems was performed within the prison, prior to the prisoner's release. Jarrett et al. also suggested that social workers may be best placed to fulfill the role of case manager due to the complex social problems faced by these individuals and the knowledge of local services and agencies needed to engage community supports (22).

Abbreviations: PReP, pre-release planning; CMHT, community mental health team; GP, general practitioner; CTI, critical time intervention; ACT, assertive community treatment.

The objective of this project was to establish a new Pre-Release Planning (PReP) programme involving case management by mental health social workers, to enhance interagency collaboration and improve continuity of care for sentenced mentally disordered offenders as they transition from prison to the community.

We aimed to evaluate the first 2 years of the PReP Programme by measuring its success at improving health and social outcomes for released mentally disordered offenders. In particular we aimed to explore for gains achieved in the level of mental health support and the security and quality of accommodation achieved by participants upon release in comparison to that reported at time of imprisonment. Finally, we aimed to explore the impact of these outcomes on rates of re-imprisonment.

METHODS

Setting

This study took place in Ireland's oldest penal institution, Mountjoy Prison, which was opened in 1850. Mountjoy Prison is a closed, medium secure prison for adult males, and is the main committal prison for sentenced prisoners in Dublin city and county. It has capacity for 630 prisoners. The prison complex consists of the main prison, a training unit and a 10-bed High Support Unit (8).

Study Design

A process of participatory action research was chosen to design and develop the PReP Programme. Action research is described as a process involving a spiral of steps, each of which is composed of a cycle of planning, action and critical reflection (34). This process can result in organizational change and development. The authors have previously used this method to develop prison inreach mental health services (7, 8).

The initial "planning" step involved a literature review and was followed by an iterative process of identifying and consulting stakeholders then drafting and re-drafting the new model of care until there was sufficient support for the change process to proceed. Stakeholders included managers from the National Forensic Mental Health Service (a specialist tertiary mental health service funded and managed by the state health service), the Irish Prison Service, Probation Services, community based homeless support agencies, service users (prisoners availing of the support of the existing prison inreach mental health service) and their families. This series of stakeholder meetings and consultations led to the interactive development of a protocol for case finding and engagement, multi-agency liaison and interventions including the need for an integrated approach to release planning for mentally disordered offenders. Given the complex mental health and social needs of these individuals, social work expertise was identified as a vital, yet missing component of the exisiting inreach mental health service.

Subsequently, in March 2015, a social worker was redeployed from inpatient services at the National Forensic Mental Health Service, and the PReP Programme was established. A second social worker was added in November 2015 providing a 1.5 full time equivalent resource. Although case management was led by social workers, the PReP programme was supplemented by other members of the existing Mountjoy Prison Inreach Mental Health Service, which included two full time community forensic mental health nurses, a visiting consultant forensic psychiatrist, and 1–2 visiting psychiatric trainees.

This was a naturalistic prospective observational whole cohort study. The intervention of the programme was provided to all individuals on the inreach mental health service caseload within 12 months of their earliest date of release. Since its inception, the key interventions of the programme have evolved based upon feedback received from service users and family members at pre-release planning (PReP) meetings held prior to an individual's release. In addition stakeholders were afforded the opportunity to participate in critical reflection at weekly multiagency meetings.

Interventions of the PReP Programme:

1. Establishing trusting professional relationships with mentally disordered offenders in the pre-release period.

2. Liaison with mental health and other support agencies—Establishing or maintaining relationships with community based mental health teams and other support agencies including: general practitioners, addiction services, intellectual disability services, accommodation providers, homeless support agencies and vocational programmes.

3. Advocacy—Addressing queries and concerns raised by community based mental health teams and other support agencies. In addition the programme advocated on behalf of participants to ensure social welfare payments and medical payment schemes were in place upon their release.

4. Family support—Providing information regarding diagnosis, treatment needs and relapse prevention. Exploring risks concerning the person on their return to the community including child protection issues and suitability of accommodation. This was of particular relevance for participants who planned to live with a family member on their release.

5. Release planning—Coordinating robust, holistic care plans prior to the person's release from custody. In most cases release plans were informed by multiagency, multidisciplinary pre-release planning (PReP) meetings held within 1 month of the person's release from prison. **Figure 1** displays examples of the various stakeholders invited to attend PReP meetings. There was no statutory requirement for any stakeholder to attend pre-release meetings. Written release plans containing details of all relevant supports, contact details of key persons in the community, and accommodation arrangements were provided to all participants supported by the programme.

6. Post-release support—Providing time limited telephone support for service users, family members and receiving services, to ensure adequate handover and aid transition of care.

7. Service evaluation through data collection and analysis.

Referral Process and Participants

During the study period, referrals to the Moutjoy Inreach Mental Health Service were received through multiple sources.

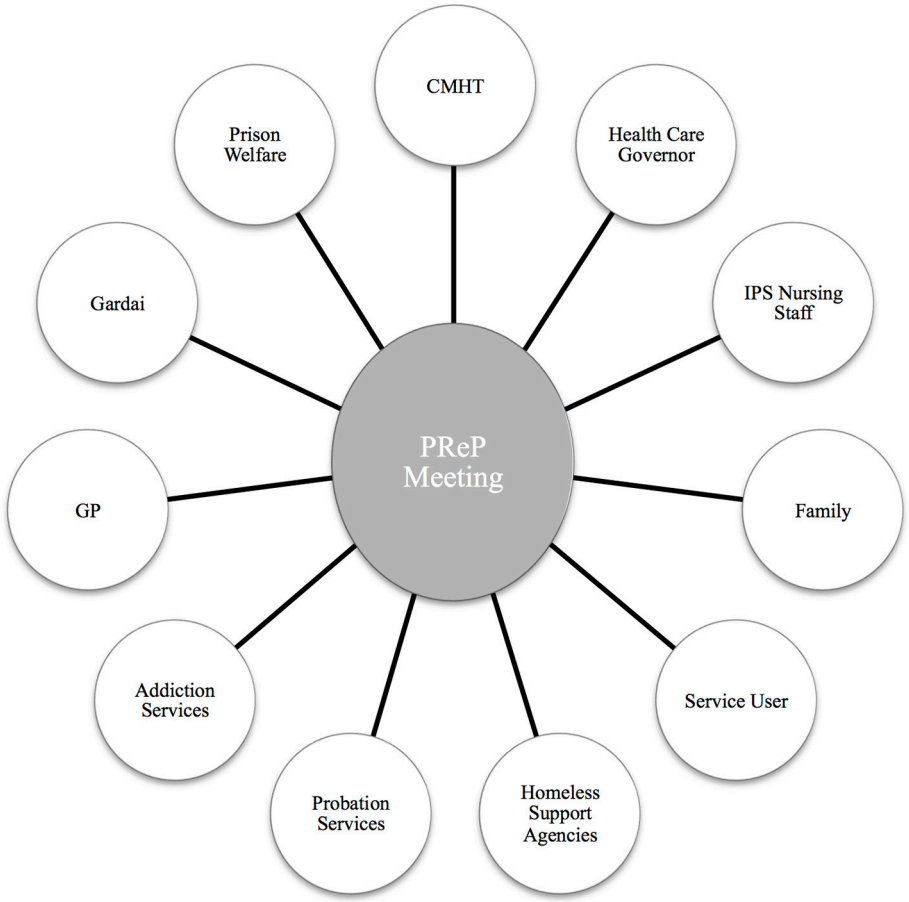

FIGURE 1 | Examples of stakeholders invited to attend Pre-Release Planning (PReP) meetings prior to the individual's release. CMHT, Community Mental health Team; IPS, Irish Prison Service; GP, General Practitioner.

Upon reception at the prison, all newly received prisoners were screened by prison general nursing staff for a history of mental illness, active signs of mental illness and risk of harm to self or others. If a need for increased levels of observation was identified, the prisoner could be placed directly in the high support unit. In the event of a prisoner being placed in the high support unit, members of the Moutjoy Prison Inreach Mental Health Service aimed to assess them on the following working day.

All new committals were assessed by a prison general practitioner (GP) within 24 h of reception, and a referral generated to the Moutjoy Prison Inreach Mental Health Service if deemed necessary. Referrals were also received from other sentenced or remand prisons in the event of a prisoner with identified mental health needs being transferred to Moutjoy Prison.

Additionally, referrals of prisoners already allocated within the prison were received at weekly multiagency meetings chaired by the visiting consultant forensic psychiatrist and attended by the healthcare prison governor, the prison chief nurse officer, general prison nursing staff, probation services, prison psychology, prison general practitioner, and chaplaincy. Finally, family members and prisoners themselves also initiated referrals.

In the first instance all new referrals were assessed by the inreach mental health service's community forensic mental health nurses then triaged at weekly multi-agency meetings and appropriate follow up arranged.

As the PReP Programme social workers were an integral part of the Moutjoy Inreach Mental Health Service no formal referral was required. They engaged with any patient on the inreach team's caseload within 12 months of their earliest date of release. Participants on the programme were all those individuals on the Moutjoy Prison Inreach Mental Health Service caseload who were released to the community within the 2 years study period from 1st March 2015 to 28th February 2017.

Variables, Data Sources and Measurements

For all participants demographic and clinical information was routinely collected by members of the PReP Programme based on assessment and information gathered from electronic prison

medical records and collateral sources. Binary measures were used when possible to aid with data analysis. Variables included age, nationality, offense type, homeless status, accommodation at time of reception to the prison, prior engagement with community mental health teams, lifetime history of self-harm, lifetime history of polysubstance abuse, lifetime history of psychosis, active psychosis at time of first assessment and ICD-10 (35) diagnosis at time of release. Diagnoses were documented by the Mountjoy Inreach Mental Health Service and PReP Programme based on serial clinical interviews and review of past medical and psychiatric case records from prison and community sources. All diagnoses were validated by a Consultant Forensic Psychiatrist.

Offense type related to the most serious index offense on reception at the prison and was classified as violent or non-violent. A violent offense was defined as an act of physical violence on a person and included homicide, assault, robbery, aggravated burglary, contact sexual offenses, false imprisonment, driving offenses involving injury to others and arson where there was a possibility of injury to others.

Homelessness was defined as rough sleeping or residence in homeless shelters reported at the time of committal. Rough sleeping was defined as sleeping outside on the street or in other open spaces. Those individuals staying with family or friends, or in long term placements were not included in the definition of homelessness for the purposes of this study. More detailed information about the security of tenure and quality of accommodation at time of reception and upon release was also captured.

Regarding outcome measures, the mental health/healthcare support and accommodation achieved on day of release was recorded. This information was gathered from interviews, collateral sources, electronic prison medical records and correspondence with receiving community based supports. In order to explore whether or not gains had been achieved following the intervention of the PReP Programme, in terms of level of mental health support and security of tenure and quality of accommodation, these outcomes were compared before and after the period of imprisonment. If a participant of the programme was re-imprisoned within the 2 years study period this was identified and recorded.

The DUNDRUM Toolkit (36) was used to assess the risk-appropriateness (whether transfer to a particular level of therapeutic security is necessary) of the mental health outcomes achieved upon release. DUNDRUM-1 (37) assesses level of security required. The DUNDRUM-2 (38) rates urgency of need for admission. The sum score of the DUNDRUM-1 is divided by the number of items to provide a mean score which is always between zero and four. A mean DUNDRUM-1 score >3 would guide a need for high therapeutic security, between 2 and 3 would guide toward medium therapeutic security and between 1 and 2 would guide toward acute low therapeutic security, often referred to as Psychiatric Intensive Care Unit. Scores lower than one indicate an open hospital ward or community setting would be appropriate. These scores are not binding but assist the clinical decision maker for individual cases. The mean scores for groups are useful guides to the appropriateness of patient placement from a risk-need appropriateness perspective to ensure proportionality and safety. The DUNDRUM-1 and DUNDRUM-2 have previously been used for this purpose in a remand prison setting (7).

DUNDRUM-1 and DUNDRUM-2 mean scores were calculated by members of the Moutjoy Prison Inreach Mental Health Service for all participants in the week prior to their release from custody.

Ethical Approval

The study protocol was approved by the National Forensic Mental Health Service Research, Audit, Ethics and Effectiveness Committee and by the Irish Prison Service Research Ethics Committee as a service evaluation project (39). In accordance with internationally recognized ethical principles, service evaluation studies do not require signed informed individual consent for all patients assessed and participating. Service evaluation is an ethical obligation in order to ensure appropriate use of resources, appropriate quality and standards for patients and continuous learning at the systems level. All patients therefore benefit. Nonetheless all participants gave written informed consent to participate in the programme. No randomization procedure was used for allocation to the PReP Programme. All data collected were anonymized and no individual patient data have been presented.

Data Analysis

Anonymized data were analyzed using IBM SPSS version 24. We used Chi-square tests to explore the relationship between categorical variables. A Fisher Exact test was used when there was an expected count of <5 in any of the groups. We used *t*-tests to compare continuous variable means between two groups and a one-way analysis of variance (ANOVA) when comparing means between multiple groups.

RESULTS

Figure 2 displays the pathway from point of reception at the prison to mental health outcome on day of release for all 3,010 committals to Mountjoy Prison, from 1st March 2015 to 28th February 2017. Of these, 2,697 committals (89.6%, 2697/3010) were deemed not to require psychiatric assessment following screening of referrals by the Mountjoy Prison Inreach Mental Health Service. The remaining 313 (10.4%, 313/3010) committals were taken onto the caseload; 43 (13.7%, 43/313) of whom were subsequently supported by the PReP Programme as they were expected to be released within 12 months. This represented 40 individuals as one participant was imprisoned at Mountjoy Prison twice and another three times, during the study period.

For this group, the median duration from date of initial reception at any prison during the relevant committal episode to date of release was 516 days ($N = 43$, mean 672.9 days SD 772.0), and from date of committal to Mountjoy Prison to date of release was 259 days ($N = 43$, mean 534.6 days SD 722.7). The median duration from date of committal at Mountjoy Prison to date of first assessment by the Inreach Mental Health Service was 6 days ($N = 43$, mean 54.8 days SD 164.7). The median duration from

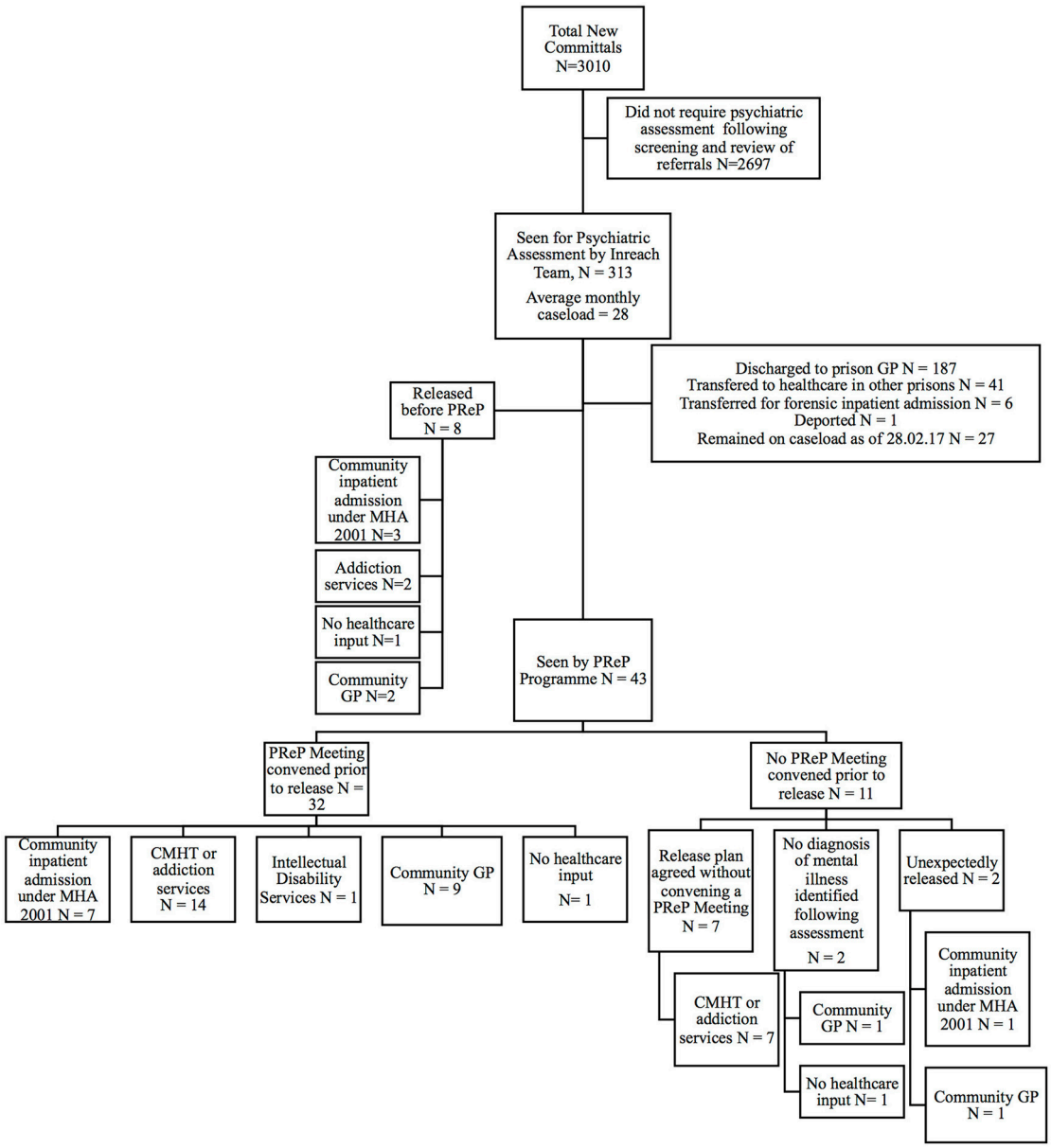

FIGURE 2 | Consort diagram displaying mental health outcomes on day of release for all those seen by the Mountjoy Prison Ireach Mental Health Service and PReP Programme from 1st March 2015 to 28th February 2017. PReP, Pre-Release Planning; CMHT, Community Mental Health Service; GP, general practitioner; MHA 2001, Mental Health Act 2001.

date of committal at Mountjoy Prison to date of first assessment by the PReP Programme was 124.0 days ($N = 43$, mean 380.1 days SD 696.3). The median duration from date first seen by the PReP Programme to date of release was 123 days ($N = 43$, mean 154.4 days SD 149.2).

Mental health outcomes for the eight individuals on the caseload who were released before being seen by the PReP programme are also displayed in **Figure 2**. For this group the median duration from date of committal to Mountjoy Prison to date of first assessment by the Mountjoy Prison Inreach Mental Health Service was 2.5 days ($N = 8$, mean 3.9 days SD 4.5). These individuals had a median duration in Mountjoy Prison of 5.5 days (mean 15.9 days SD 18.1). Despite spending only a brief period in Mountjoy Prison the majority (87.5%, 7/8) of this group were referred for healthcare follow up upon release by the inreach mental health service.

A pre-release planning (PReP) meeting was convened prior to release for 32 of those availing of the support of the programme (74.4%, 32/43). Ten (31.3%, 10/32) of these meetings were attended by community mental health teams, 17 (53.1%, 17/32) were attended by a family member/spouse, and nine (28.1%, 9/32) were attended by the patient themselves.

A meeting was not convened for the remaining 11 committals for the following reasons: a release plan had already been agreed by all parties ($N = 7$); the patient was unexpectedly released ($N = 2$); no severe mental illness (defined as major depressive disorder, hypomania, bipolar disorder and/or any form of psychosis including schizophrenia, schizoaffective disorder and any other non-affective, non-organic psychosis) was identified following serial assessments by the team ($N = 2$). The mental health outcomes for these 11 patients are shown in **Figure 2**. Ten of these individuals had healthcare support arranged on the day of their release despite no formal meeting having been held. No healthcare input was arranged for the remaining individual as they were found not to meet criteria for a severe mental illness.

All 43 committals seen by the PreP Programme were issued with a written release plan, the contents of which are described in the methods section of this article. In the event of healthcare follow up being arranged a written release plan was also forwarded to the receiving healthcare provider.

Case Description

Demographic, legal and clinical characteristics for those who availed of the support of the PReP Programme ($N = 43$) and those who did not ($N = 8$) are displayed in **Table 1**. Participants and non-participants did no differ significantly in relation to age, nationality, homeless status at time of reception or clinical variables. Participants however, were more likely to have been charged with a violent offense, to have been transferred from another prison and to have had a previous admission to a secure forensic psychiatric hospital.

Demographics

Of the 43 committals seen by the PReP Programme, all were male, and 41 (95.3%, 41/43) identified themselves as Irish, with the remaining two individuals identifying as Non-Irish Europeans. The mean age at time of first assessment by the Mountjoy Prison Inreach Mental Health Service was 36 years (SD 8.0, range 21–63).

Offense Type

Regarding the nature of the most serious index offense, of those seen by the PReP Programme 48.8% (21/43) were charged with a violent offense, that is one involving physical violence to another person. The remaining 51.2% (22/43) were charged with non-violent offenses. Thirty-one (31/43, 72.1%) of those supported by the PReP Programme were transferred from another remand or sentenced prison to Mountjoy Prison. Two were re-patriated from prisons abroad.

Contact With Children and Child Protection Issues

Sixteen of the 43 committals seen by the PReP Programme reported having children. Of these, 14.0% (6/43) reported that they had contact with their children prior to reception at prison.

TABLE 1 | Comparison of demographic, legal and clinical characteristics of participants and non-participants of the PReP Programme.

	Participants ($N = 43$)		Non-Participants ($N = 8$)		Statistical test of difference	*p*-value
	N (%)	Mean (SD)	*N* (%)	Mean (SD)		
Age		35.67 (8.02)		32.88 (7.75)	$t = 0.91$	0.37
NATIONALITY						
Irish	41 (95)		6 (75)		FET	0.11
Non-Irish	2 (5)		2 (25)			
HOMELESS ON RECEPTION						
Yes	21 (49)		2 (25)		FET	0.27
No	22 (51)		6 (75)			
OFFENSE TYPE						
Violent	22 (51)		0 (100)		FET	0.02
Non-violent	21 (49)		8 (0)			
TRANSFERRED FROM ANOTHER PRISON						
Yes	31 (72)		0 (0)		FET	<0.001
No	12 (28)		8 (100)			
PREVIOUS ADMISSION TO SECURE HOSPITAL						
Yes	18 (42)		0 (0)		FET	0.04
No	25 (58)		8 (100)			
PSYCHOTIC AT FIRST ASSESSMENT						
Yes	16 (37)		5 (62)		FET	0.25
No	27 (63)		3 (38)			
LIFETIME PSYCHOSIS						
Yes	33 (77)		6 (75)		FET	1.00
No	10 (23)		2 (25)			
HISTORY OF PSA						
Yes	39 (91)		7 (88)		FET	1.00
No	4 (9)		1 (12)			
HISTORY OF SELF-HARM						
Yes	26 (60)		4 (50)		FET	0.70
No	17 (40)		4 (50)			
PREVIOUS CONTACT WITH CMHT						
Yes	30 (70)		7 (88)			0.42
No	13 (30)		1 (12)		FET	

PSA, polysubstance abuse; CMHT, Community Mental Health Team; FET, Fisher's exact test.

As a result of concerns regarding risk posed to children in the event of release, a total of seven referrals were made to Tusla, Ireland's Child and Family Agency, by members of the PReP Programme in keeping with their obligations under Ireland's child protection legislation.

CLINICAL CHARACTERISTICS

Primary ICD-10 Diagnoses, Active and Lifetime Psychosis

Table 2 displays the primary ICD-10 diagnosis at the time of release for all those seen by the PReP Programme. Almost two thirds of those seen had primary ICD-10 diagnoses of Schizophrenia, Schizotypal and Delusional Disorders (58.1%, 25/43) or Bipolar Affective Disorder (2.3%, 1/43). An additional 16.3% (7/43) had a primary diagnosis of a drug induced psychotic episode. At the time of initial assessment by the Mountjoy Prison

Inreach Mental Health Service, 37.2% (16/43) of those seen following screening and referral were assessed as being actively psychotic. Based on information from interview and collateral sources, just over three quarters of individuals seen by the PReP Programme had a lifetime history of a psychotic illness (76.7%, 33/43).

Co-morbidity and Self-Harm History

Almost all individuals supported by the programme had a lifetime history of polysubstance abuse (90.7%, 39/43). Based upon collateral information, one quarter (25.6%, 11/43) had a co-morbid diagnosis of a personality disorder. Of all those seen, 60.5% (26/43) had a lifetime history of deliberate self-harm.

Previous Contact and Engagement With Community Mental Health Teams and Other Healthcare Supports

The majority of those seen by the PReP Programme (69.8%, 30/43) reported prior contact with a community mental health team at some point before their reception at the prison. Eighteen individuals (41.9%, 18/43) had previously been admitted to the Central Mental Hospital, the Republic of Ireland's only secure forensic hospital.

Regarding level of engagement with mental health supports prior to reception, 14 (32.6%, 14/43) had no contact with any mental health supports; six (14.0%, 6/43) were attending a general practitioner alone; 20 (47%, 20/43) were attending outpatient services (community mental health team, addiction services or intellectual disability services), one was in hospital (2.3%, 1/43) and two had been repatriated from international prisons (4.7%, 2/43).

Regarding compliance with prescribed psychiatric medications, of the 25 (58.1%, 25/43) committals prescribed such treatment prior to their imprisonment, 14 reported being fully compliant (56.0%, 14/25), seven (28.0%, 7/25) reported being partially compliant and four reported being non-compliant (16.0%, 4/25).

Outcomes Following the Intervention of the PReP Programme:

1. **Mental health outcomes:**

Mental health supports arranged on day of release for all those seen by the PReP Programme are displayed in **Figure 2**.

Of the 43 committals seen by the programme, 35 (81.4%, 35/43) were referred for community mental health team follow up upon release, of which 82.9% (29/35) were accepted. Fifteen (51.7%%, 15/29) of these accepted referrals, were initially declined. In these cases further efforts were made by the PReP Programme to liaise with the receiving service to address their concerns so that the referral process could be completed.

Table 3 displays a comparison between the level of healthcare support at time of reception at prison compared with that arranged on day of release following the intervention of the PReP Programme. A Fisher Exact Test indicated that the level of mental health support significantly improved upon release from prison, following the intervention of the programme (FET $p < 0.001$).

Regarding post-release engagement with arranged mental health supports, the PReP Programme confirmed that 89.7% of those accepted by community mental health teams (26/29) attended their first appointment in the post-release period. Of these, 27.6% (8/29) were admitted involuntarily to a general psychiatric hospital under the Mental Health Act 2001.

Receiving mental health services were then contacted in the post-release period to confirm if the referred individual remained engaged following attendance at their first appointment. The median duration of post-release follow up was 20.5 days (mean 61.31 days, SD 104.09). At time of

TABLE 2 | Primary ICD-10 diagnosis at time of release for all those seen by the PReP Programme ($N = 43$).

	Primary ICD-10 diagnosis	*N*	%
F00-09	Organic disorders	1	2.3
	- Alcohol related dementia		
F10-19	Substance use disorder		
	- Drug induced psychosis	7	16.3
	- Polysubstance abuse only	1	2.3
F20-29	Schizophreniform disorders		
	- Schizophrenia	18	41.9
	- Schizoaffective disorder	5	11.6
	- Delusional disorder	2	4.7
F30-39	Mood disorder		
	- Manic episode	1	2.3
	- Depressive episode	3	7.0
F60-69	Personality disorder		
	- Emotionally unstable personality disorder	3	7.0
F70-79	Mild intellectual disability	2	4.7
	Total	43	100

ICD-10, International Statistical Classification of Diseases and Related Health Problems, 10th Revision.

TABLE 3 | Comparison of level of healthcare support at time of reception to prison with that on day of release, following the intervention of the PReP Programme ($N = 43$).

	Healthcare support					Total
	None	GP	Outpatient services (CMHT, Addiction services, ID services)	Prison	Hospital	
Prior to reception at prison (*N*)	14	6	20	2	1	43
On day of release (*N*)	2	11	22	0	8	43

CMHT, Community Mental Health Team; ID, intellectual disability; GP, general practitioner.

follow up, 20 individuals (76.9%, 20/26) remained engaged with community mental health teams, of whom four were inpatients, and none had returned to prison.

Risk-appropriateness of arranged mental health supports: Mean DUNDRUM-1 triage security and DUNDRUM-2 triage urgency scores for those seen by the PReP Programme ($N = 43$) released to community inpatient ($N = 8$), outpatient services (community mental health team, addiction services, intellectual disability services) ($N = 22$), general practitioner ($N = 11$) and no healthcare follow up ($N = 2$) are summarized in **Table 4**.

Mean DUNDRUM-1 triage security scores (ANOVA $F = 1.99$, between groups df = 3, within groups df = 39, $p = 0.13$) and DUNDRUM-2 triage urgency scores (ANOVA $F = 1.87$, between groups df = 3, within groups df = 39, $p = 0.15$), although not significant, tended to be higher for those transferred to higher levels of mental health support.

2. **Accommodation outcomes:**
Twenty one (48.8%, 21/43) committals seen by the PReP Programme were homeless at the time of their reception to prison. This included five (23.8%, 5/21) who reported rough sleeping, 13 (61.9%, 13/21) who reported staying in emergency "night to night" homeless shelters and two (9.5%, 2/21) who reported staying in short term, "week to week" homeless shelters. The remaining individual (4.8%, 1/21) was an inpatient in a general psychiatric hospital prior to reception at prison, but had no regular accommodation before this and reported staying in emergency homeless shelters. Twenty-one participants (48.8%, 21/43) continued to meet the definition of homelessness at the time of release. No individuals were released to rough sleeping.

Table 5 displays a comparison between accommodation at time of reception at prison compared with that achieved on day of release following the intervention of the PReP Programme. A Fisher Exact Test indicated that the security of tenure and quality of accommodation significantly improved upon release from prison following the intervention of the PReP Programme (FET $p < 0.001$).

3. **Re-imprisonment:**
Of those participants seen by the PReP Programme, 20 (46.5%, 20/43) were returned to prison during the 2-years study period. The median duration from date of release to end of the study period was 274.0 days (mean 314.0 days SD 185.9 days). Fifteen individuals (34.9%, 15/43) were under the supervision of probation services when initially released, 7 (46.7%, 7/15) of who were re-imprisoned during the 2-years study period.

Table 6 displays rates of re-imprisonment for all those supported by the PReP Programme according to the level of mental health support and accommodation achieved on day of release. There was no significant relationship between re-imprisonment and gains made in level of mental health support (FET $p = 0.23$) or accommodation (FET $p = 0.23$) following the support of the PReP Programme, however the duration of follow up was relatively short (median 274.0 days).

TABLE 4 | Risk-appropriateness of mental health outcomes for all those seen by PReP Programme (N =43).

	N (%)	D-1 triage security score		D-2 triage urgency score	
		Mean (SD)	95% CI	Mean (SD)	95% CI
Psychiatric admission	8 (19)	2.11 (0.60)	1.61–2.62	2.05 (0.71)	1.46–2.64
Outpatient Services (CMHT, Addiction services, ID services)	22 (51)	1.64 (0.84)	1.27–2.01	1.45 (1.00)	1.01–1.89
GP	11 (25)	1.54 (0.80)	1.00–2.07	1.32 (1.16)	0.54–2.10
No healthcare follow-up	2 (5)	0.70 (0.57)	−4.38–5.78	0.35 (0.21)	−1.56–2.26

D-1, DUNDRUM-1; D-2, DUNDRUM-2; SD, standard deviation; 95% CI, 95% confidence interval; CMHT, Community Mental Health Team; ID, intellectual disability; GP, general practitioner.

Secondary Analysis

For the reasons outlined above, eleven participants availed of the support of the PReP Programme but did not have a pre-release planning (PReP) meeting prior to their release. A secondary analysis was performed to explore if a meeting was associated with any difference in outcome measures. There was no significant difference found between those who had a meeting ($N = 32$) and those who did not ($N = 11$) in relation to mental health outcomes (FET $p = 0.24$), security of tenure and quality of accommodation achieved upon release (FET $p = 0.74$) and rates of re-imprisonment ($X^2 = 0.38$, df = 2, $p = 0.72$).

DISCUSSION

We have followed a participatory action research design to introduce a new service for mentally disordered offenders as they transition from prison to the community. We have completed an evaluation of the first 2 years of the project to examine whether the goals of the service were achieved. In particular whether those referred to the PReP Programme had improved levels of mental health support and improved security of tenure and quality of accommodation upon their release in comparison to that reported at time of imprisonment. During the period of this study, there were no other major changes in the organization, management or delivery of prison in-reach services nor was there any major change in the organization, management or delivery of prison and criminal justice services.

Summary of Findings

We have shown that compared to that reported at time of imprisonment, the level of mental health support and the security of tenure and quality of accommodation both improved following the intervention of the PReP Programme. In the absence of a control group we cannot show that the PReP programme caused this effect, but we believe this is so. Higher levels of mental health support and improved accommodation were not associated with lower rates of re-imprisonment within

TABLE 5 | Comparison of accommodation at time of reception to prison with that on day of release, following the intervention of the PReP Programme ($N = 43$).

	Accommodation					Total
	Rough sleeping	Emergency/Short term hostel	Long term hostel, secure tenancy, living with family	Hospital	Prison	
Prior to reception at prison (*N*)	5	15	20	1	2	43
On day of release (*N*)	0	16	19	8	0	43

Emergency Hostel Accommodation, in a homeless shelter booked on a nightly basis; Short Term Hostel, accommodation in a homeless shelter booked on a weekly basis; Long Term Hostel, accommodation in a homeless shelter booked for 6 months or longer; Secure Tenancy, private rented accommodation or own home.

TABLE 6 | Impact of level of mental health support and accommodation outcomes on rates of re-imprisonment, following the intervention of the PReP Programme ($N = 43$).

Re-imprisoned?	Healthcare support on day of release				Total
	None	GP	Outpatient Services (CMHT, Addiction services, ID Services)	Involuntary Hospital admission under MHA 2001	
Yes (*N*)	2	4	12	2	20
No (*N*)	0	7	10	6	23
	Accommodation on day of release				
	Rough sleeping	Emergency/ short term hostel	Long term hostel, secure tenancy, living with family	Involuntary hospital admission under MHA 2001	
Yes (*N*)	0	10	8	2	20
No (*N*)	0	6	11	6	23

MHA 2001, Mental Health Act 2001; CMHT, Community Mental Health Team; ID, intellectual disability; GP, general practitioner.

the 2 years study period however the follow up period was relatively short. We were not able to further analyse relationships between variables and outcomes owing to lack of statistical power.

Strengths and Limitations

This project, the first of its kind in Ireland, embodies the principles of integrated and multidisciplinary healthcare provision. Post-release mental health and accommodation outcomes were mapped for all those seen by the PReP programme. Healthcare outcomes were also mapped and presented for eight patients on the inreach mental health team's caseload who were released prior to availing of the support of the PReP programme.

Prior to the development of the PReP Programme, release planning in the prison studied was performed by a medically focused inreach mental health service comprised of doctors and nurses. The addition of mental health social work expertise enhanced the ability of the team to develop robust release plans in collaboration with community based supports. As suggested by Jarrett et al. (22) social workers might be best placed to coordinate such care plans given their knowledge of local services and support agencies. The social workers of the Pre-Release Planning (PReP) Programme were based within the prison as part of the inreach mental health team. This allowed them to build trusting relationships with mentally disordered offenders in the pre-release period. Practical supports offered by the programme, including liaison with family members and assistance in accessing accommodation and social welfare may have acted as incentives for engagement before and after release. This may have been reflected by the high rates of engagement with arranged mental health appointments immediately after release (89.7%, 26/29).

The main focus of the programme was to improve pre-release planning and manage transfer of care to community based supports. Social workers from the programme subsequently offered time limited telephone support to service users, family members and receiving services. This correspondence revealed that the majority of those receiving mental health follow up from community mental health services remained engaged at a median duration of 3 weeks following their release (76.9%, 20/26). Unlike Assertive Community Treatment (ACT) and Critical Time Intervention (CTI), the programme did not provide case management in the post-release period. Although this may be viewed as a limitation of the PReP Programme, previous studies (22, 29, 40) and a recent systematic review (24), have highlighted the importance of pre-release planning in any intervention to aid the transition for mentally disordered offenders. We acknowledge that the less intense follow up provided by our programme results in difficulty determining the quality of

engagement with mental health and other supports in the post-release period. Future projects will focus on assessing whether or not the achievements of the PReP programme translate into long term sustained improvements in engagement with mental health supports, accommodation and legal outcomes.

Homelessness is one of the greatest challenges facing released prisoners (23) and may act as an impediment to engaging with healthcare supports (41). These individuals may be further marginalized losing out on available accommodation to family's and non-mentally ill persons experiencing homelessness. Although rates of broadly defined homelessness were not reduced following the intervention of the programme ($N = 21$ on reception vs. $N = 21$ on day of release), there was evidence of improvements in the security of tenure and quality of accommodation obtained upon release. Moreover, the fact that more individuals were not released to homelessness may represent an improved outcome, given that previous studies have highlighted an increased risk of homelessness and unstable housing upon release from prison (42). Despite improvements in both the level of healthcare support and accommodation achieved following imprisonment and the intervention of the PReP Programme, 46.5% (20/43) of those supported by the intervention were re-imprisoned within the 2 years study period. Although disappointing, this rate of re-imprisonment is consistent with that reported for general prison populations in our jurisdiction (15). Gains made in healthcare and accommodation outcomes were not associated with reduced rates of re-imprisonment during a relatively short follow up period. This finding may not be surprising as a number of more intensive post-release case management models have found an association with increased rates of re-imprisonment through the increased level of monitoring provided by these interventions in the post-release period (24). Regrettably, information was not available regarding the status of participant's mental illness and level of engagement with community mental health supports at the time of re-imprisonment.

A process of participatory action research was used to design, develop and evaluate the PReP programme. This design meant that the programme could be implemented without delay following the identification of a need by stakeholders within the prison. Although this creates practical advantages for service development, it may result in difficulty identifying the specific variables asscoiated with achieved outcomes.

At the planning stage of the project, a multidisciplinary, multiagency pre-release planning (PReP) meeting was envisaged to be a central component of the intervention provided by the PReP Programme. Despite this not all of those supported by the programme had a pre-release planning meeting. We have outlined reasons why meetings were not convened for eleven of the forty-three participants. We also performed a secondary analysis to explore if a meeting was associated with improved outcomes and found that it was not. We believe this is an interesting observation. It implies that the networking and liaison work carried out by PReP team members is as effective as a meeting arranged in addition to that liaison work, at least from a quantitative, outcomes point of view. It remains possible that better qualitative outcomes and experiences would result from the addition of a meeting as outlined in previous studies of this kind (40). This may be a focus of future research by our service.

In the event of a pre-release planning meeting being held, attendance by community mental health teams, families and service users was relatively poor. In Ireland, as in many developed countries, there is no statutory requirement for any agency to attend pre-release planning meetings. Unfortunately community mental health teams were often unable to attend due to scheduling problems and on occasion due to reluctance to accept the individual until late in the prisoner's sentence. Despite having the support of prison authorities it often proved difficult to transfer prisoners from their location in the prison to the site of pre-release planning meetings. This occurred mainly due to prison officer shortages or because the prisoner was too unwell to attend.

All mentally disordered offenders on the inreach mental health services' caseload released within the period studied were eligible for support by the programme. This inclusive approach did not permit the creation of a comparable control group, which would have allowed for more rigorous analysis regarding the effectiveness of the intervention. Additionally, the service has been operational for 2 years, therefore we were not able to further analyse relationships between variables and outcomes owing to a lack of statistical power. Also, the inclusive and real-world nature of this project resulted in some participants availing of the support of the programme despite not meeting criteria for a mental illness at the time of release.

This project was set in an all male sentenced prison and its findings may not be transferable to female prison populations. Future plans by our service include the establishment of a similar social work-led PReP Programmes in a number of Ireland's other sentenced prisons, including its main female prison.

CONCLUSIONS

We have shown that compared to that reported at time of imprisonment, the level of mental health support and the security of tenure and quality of accommodation both improved at time of release, following the intervention of the PReP Programme. Higher levels of mental health support and improved accommodation were not associated with lower rates of re-imprisonment within the 2 years study period.

DATA AVAILABILITY

The raw data supporting the conclusions of this manuscript will be made available by the authors, without undue reservation, to any qualified researcher.

AUTHOR CONTRIBUTIONS

DS completed the first and revised drafts of the manuscript, which were then edited by SHa, AF, SHe,

NQ, CC, DM and HK who also assisted with data analysis. The intervention was designed and developed by DM, SHa, AF, SHe and PG, with assistance from all stakeholders including prisoners and their families. All authors contributed to the participatory action research process. All authors read and approved the final manuscript.

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CASE REPORT
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Conflicting Priorities Between Risk Management and Treatment of Schizophrenia in Swiss Forensic Services—A Case Report

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The Swiss Criminal Code provides measures for mentally-ill offenders focusing on their need for treatment. This may lead to the deprivation of the patient's liberty up to several years. Under certain circumstances the mentally-ill offender can be sentenced to an indefinite incarceration. This case presentation we will describe a forensic psychiatric patient diagnosed with schizophrenia who was ordered an indefinite incarceration in Switzerland after he had been sentenced to 8 years of imprisonment for a deliberate killing. Initial presentation of symptomatology included formal thought disorders and negative symptoms such as affective flattening and alogia. Due to a scarcity of adequate treatment sites in the 90s and lack of scope for risk assessment and management, the patient could only be treated within highly regiment prison environments in the past. There, the patient's treatment concept primarily focused on short-term psychiatric care instead of providing an adequate treatment plan that would have been essential for the patient's improvement of chronic symptoms. This case description aims to present some of the fundamental issues observed in the forensic mental health system, where strong efforts are made to balance risk management and the treatment of severe mental health disorders. We will put the patient's own course of treatment and his progress within the penal system into context with ethical challenges in the forensic and correctional services and will provide potential recommendations for future research in the field of forensic psychiatry.

Keywords: forensic psychiatry, deprivation of liberty, ethics, therapeutic measures, incarceration, correctional psychiatry

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INTRODUCTION

The treatment of delinquent patients with schizophrenia is a challenging endeavor at the interface of the health and justice system (1). There is an increased risk for violent behavior in schizophrenic patients (2–4) requiring a secure treatment setting that neither psychiatric institutions nor prison environments could ensure in the past. This has led to significant changes within national treatment services in Switzerland, improving in-patient care for forensic psychiatric patients by allowing disorder-specific therapy of offenders in a high-secure setting (e.g., center for Forensic Psychiatry Rheinau).

In conformity with the Swiss Criminal Code (CC), an offender can be sentenced to a therapeutic measure by the Swiss court. This presupposes that the offender suffers from a mental health disorder associated with the committed felony and that further risks of such offenses can be prevented or reduced by the treatment itself [article 59 CC; (5)]. Release on parole, lasting between 2 and 5 years, can be ordered as soon as a decreased risk for violent or delinquent behavior at liberty is expected. After the expiry of the probationary period the offender is granted final release. If the treatment in accordance with article 59 [CC; (5)] does not promise significant treatment results and if the dangerousness of the mentally disordered offender is evaluated as too high a risk for others, an indefinite incarceration can be executed [article 64 CC; (5)], given that the offender carries a maximum sentence of 5 or more years. If during the execution of the indefinite incarceration the offender fulfills the requirements for an in-patient therapeutic measure, the sanction can be retrospectively modified and converted into a therapeutic measure [article 65 CC; (5)].

Here, we describe the case of a 56-year old forensic psychiatric patient who was initially sentenced to 8 years of imprisonment. On the basis of a severe schizophrenia and difficulties in the management of his security risk, he was sentenced to an indefinite incarceration in the 90s. After a duration of approximately 15 years, the patient's sanction was modified into an in-patient therapeutic measure according to article 59 [CC; (5)]. In this case presentation his course of treatment is analyzed and discussed. In addition, the patient's experiences within the penal system are put into context with ethical challenges within the forensic mental health system and prison environment.

CASE DESCRIPTION

With the verdict of a Swiss court in the late 1980s, the patient was sentenced to 8 years of imprisonment for a deliberate killing at the age of 26. Shortly after, his custodial sentence was partially suspended in order to take sufficient account of his culpability [article 43 CC; (5)]. According to a first forensic expert evaluation in 1989, the patient had been evaluated as impaired in terms of legal culpability due to a schizophrenic episode. Recommendations given included immediate in-patient treatment prior to the court trial.

After the patient had tried to escape multiple times and initial treatment attempts did not show any significant effects, the patient was ordered an indefinite imprisonment according to article 64 [CC; (5)], primarily for safeguarding purposes. This was accompanied by basic psychopharmacological and delinquency-oriented psychotherapeutic care.

In the late 2000s, the patient's sanction was modified [article 65 CC; (5)] and retrospectively converted into an in-patient therapeutic measure according to article 59 [CC; (5)] by the former court. Up to the conversion of the indefinite detention into a therapeutic measure, the patient had been receiving indefinite incarceration in various prison environments for more than 15 years. He was ordered another 8 years of sanction under article 59 [CC; (5)] and eventually received conditional release status for a probationary period of 5 years, until 2020.

Diagnoses and Course of Treatment

Our patient had grown up under socio-economically beneficial conditions. He was described as a quiet and self-effacing child with an above-average intelligence. At the young age of nine, he intentionally raised fire; further smaller offenses included simple thefts. Around his early twenties, he prematurely terminated his apprenticeship in Switzerland, showing initial psychopathological symptoms of a schizophrenic prodrome. A few years later he was admitted to a psychiatric unit with depressive symptoms, anxiety and comorbid substance abuse, just days prior to the index offense. According to the forensic expert evaluation at the time of the trial, the patient presented formal thought disorders, such as poverty of speech, illogicality and neologism. Furthermore, he showed early signs of negative symptoms including asociality, alogia, and affective flattening. The patient was diagnosed with a paranoid schizophrenia (ICD-10 F20.0) according to the International Classification of Diseases [(6); corresponding to schizophrenia, paranoid type, DSM-IV-TR 295.30 (7)] and comorbid substance use disorder, particularly alcohol abuse (ICD-10 F10.1; DSM-IV-TR 305.00) and cannabis abuse (ICD-10 F12.1; DSM-IV-TR 305.20) prior to the offense. There were no signs of dependence and substances were successfully withdrawn when the patient was first sentenced to prison without any known drug relapse.

In the initial course of the mental illness, the patient presented himself malcompliant. He irregularly refused psychopharmacological treatment and tried to escape multiple times. It was not until some years later, that he adapted his behavior while at the same time showing a progressing chronification of the illness around 1995. The complex psychopathological symptomatology was then dominated by the patient's negative symptoms and a drug-induced parkinsonism. This consequently led to the patient's severely impaired mimic and gestural expressiveness, reduced and quiet speech, limited eye contact and a reduced psychosocial level of functioning. Hence, psychotherapeutic approaches and psychosocial treatment and support did only show limited success, leading to aggravated treatment conditions. After the implementation of the therapeutic measure according to article 59 [CC; (5)], the therapeutic approach solely included the patient's physical and psychiatric support as well as relief in the management of daily challenges. After having spent almost 30 years in prisons and psychiatric institutions for interventional purposes, the patient did not have any relevant social contacts or relationships. In 2018, he passed away at the age of 56 from the consequences of a severe physical condition.

Evaluation of Therapeutic Efficacy

Despite the administration of therapeutics, the course of treatment only showed partial success. Due to the side effects caused by the long-term intake of conventional antipsychotic agents, the patient was significantly hindered in coping with everyday challenges. Initial attempts to escape and the associated higher risk of violence led to the execution of an indefinite

incarceration in 1990. Positive symptoms or malcompliance were no longer observed after 1995 and had been fully replaced with a negative symptomatology. This was interpreted in the context of the severe chronification of his mental illness with a poorer physical and mental state compared to the preceding years.

DISCUSSION

The present case describes a forensic psychiatric patient who spent almost 30 years under institutional control. The course of the indefinite incarceration and its subsequent conversion into an in-patient therapeutic measure was characterized and dominated by a severe chronic schizophrenia with a negative symptomatology and drug-induced parkinsonism. Due to his mental health disorder, the patient's character and behavior reflected the loss of normal functions such as losing interest, not being able to experience pleasure, and reduced social drive or action. Additionally, the patient was severely restricted in his movements due to extrapyramidal symptoms causing dyskinesia and symptoms similar to a Parkinson's syndrome.

In Switzerland, the court may sentence someone who committed a serious crime, such as murder, to indefinite incarceration [article 64 CC; (5)]. This sanction can be ordered, if the treatment of the offender is hardly accompanied by relevant success or if he is deemed untreatable. Another reason may be the protection of society from criminals with a high risk of relapse for further severe offenses. This poses noteworthy challenges to legal decision makers. Of utmost interest for the outlined case are the considerations pertaining to the dilemma of ensuring a suitable psychiatric and specialized treatment concept on the one hand while guaranteeing the safety of the public on the other hand. According to an early medical report by a psychiatric institution in 1993, the patient's case already then caused a "dilemma" to psychiatrists, because medical professionals recommended an in-patient treatment setting that could at that time not be implemented due to the suspected high risks. This resulted in the fact that our patient spent most of his past life years in correctional institutions, rather than receiving an adequate treatment concept in the management of a severe and chronic mental health disorder, such as schizophrenia. Thus instead of receiving a treatment according to the risk-need-responsivity model (8), the patient was merely incarcerated and only received little interventions that would have further reduced his risk to recidivate. This may have then allowed the patient to be released earlier or to be granted the opportunity for probation, respectively.

Although community and correctional facilities share similar mental health services, correctional settings tend to be more restrictive in terms of bureaucratic obstacles, to have less well instructed or trained employees and to show a slower execution of therapeutic steps in the management of a psychiatric crisis or psychotic episodes. Criminals sentenced under the aforementioned statute only receive scarce psychiatric care that does not focus on the treatment of the mental illness. It therefore remains unclear how continuous the treatment and intake of therapeutic antipsychotic agents was in the 1990s and how strong an effect it would have had on the patient's treatment course and outcome had it been administered in a professional clinical setting. Hence, a remitted psychopathological mental state may have led to a sooner release status due to adequate risk management. This could have prevented the patient from spending up to almost 30 years in the executional system of penal sentences and justice, compared to his initial sanction of 8 years of imprisonment.

These considerations lead to one of the fundamental problems that can be observed in forensic psychiatry, namely a scarcity of adequate treatment sites. The former lack of scope for managing the treatment of mentally ill and potentially violent offenders could only be combatted by falling back on prison environments. This "shifting" of delinquent patients with high treatment demands into regimented settings may have failed to prioritize effective mental health services. Prison environments bear defining difficulties for patients who may lack social competences and show deficient abilities to cope with the stresses of being imprisoned. Additionally, prison rules and regulations usually apply to all inmates equally, with treatment being subordinated to security procedures. Hence, the patient's treatment concept may only focus on the management of short-term psychiatric care in emergency situations, losing sight of long-term treatment outcomes within prison environments. In the patient's case his physical and psychopathological state in terms of a proceeded negative symptomatology should have generally led to an earlier relocation from the prison environment to an adequate psychiatric institution. If the patient had shown e.g., delusional symptoms or signs of verbal or physical aggression, one might have been more aware of his needs. Instead, the patient—due to his psychopathological symptoms such as psychomotor retardation and affective flattening—had shown a rather imperceptible behavior in contrast to other inmates that might have just not been perceived as a disturbing or "pathological" behavior. Hence, one of the reasons for the patient's long-lasting incarceration could be that he had simply been forgotten within the prison environments. Yet, personal data on experiences of mentally ill offenders in prisons are scarce and disadvantageous conditions only assumed, lacking the scientific information about what may generally and specifically matter to imprisoned patients dealing with mental health disorders.

Another ethical issue concerns whether or not our patient could really have been released earlier, reducing his deprived years of liberty. According to medical and legal documentation, the patient did not show any significant aggressive or impulsive behavior, especially after 1995. Then again, his mental health status was discussed to be an important key factor for not granting release. Additionally, the patient suffered from comorbid multiple substance abuse, affecting the threshold of aggression (9). Clearly, the patient's risk for relapse was high and so was the higher risk for associated violent behavior (10). Taking the manifestation of the patient's mental health disorder and the severity of his crime into account, this clearly shows how strongly the forensic mental health system suffers from balancing treatment on the one and security on the other hand.

Risk factors, such as a criminal record, severe mental health disorder and substance abuse, are essential for the determination of re-offense rates (11). Yet, the individual likelihood of re-offending should not be lost out of focus. In the case presented the assumption of a comparable risk compared to that observed re-offense rate in a research sample may have not met the patient's needs. In that case, the missing of an established and appropriate psychiatric institution might have contributed to the aggravation of negative symptoms and manifestation of the chronic illness, respectively.

Furthermore, risk evaluations are mainly required by others in order to serve their wishes for protection from the patient. The patient himself has little or no say at all in the outcome of the assessments that take place. When directly asked about it in a psychiatric evaluation in 2011, the patient stated, over a total of 25 years, that it was the justice system not having left any other possibilities open. In addition, the medical staff may morally justify the decision made, e.g., to restrict the autonomy of the patient because past events have clearly demonstrated the patient's competency to place his own needs ahead of those of others—as could be seen by the patient's index offense in the late 1980s. Hence, psychiatrists could be seen to be acting more in the service of their institutions.

Our case may stress the importance to comprehensively understand individual's needs for diagnostic and therapeutic options as well as the assessment of violence risk in the context of incarceration. Although our patient had not been in a state of torture, he had clearly been deprived of his liberty as well as from a continuous and appropriate psychiatric treatment, as formerly stated and suggested by psychiatrists in the early 1990s. This might only be justified by the lack of appropriate psychiatric institutions at that time, ensuring adequate and specialized in-patient treatment for schizophrenic patients and trained employees while at the same guaranteeing high security standards.

This former "shifting" of treatment places has experienced an improved infrastructural organization within the recent years. Yet, adequate treatment sites for offenders with mental health disorders are still scarce. Sustainable results in terms of a just distribution of treatment options and quality demand specialized care and the availability of appropriate treatment sites or psychiatric institutions with high security standards, respectively. In accordance with that, the offender's treatability should be assessed more regularly to avoid malpractice and improve the patient's mental health and physical status, potentially minimizing the time spent in a deprived setting. This may be implemented by allowing therapeutic measures to be less restrictive in terms of creating more broadly based regulatory options within the system of penal sentences and justice. Whereas, treatment in general psychiatry strives to ensure individualized therapy that goes beyond common guidelines, its subspecialty may even suffer to guarantee sufficient treatment standards for mentally ill offenders, most of whom are being treated for severe and chronic mental health disorders. Therefore, it seems essential to expand treatment availability in terms of capacity, positively contributing to a better treatment concept that meets today's medical and individual challenges in the therapy of e.g., chronic schizophrenia in a cohort of delinquent patients. Furthermore, it may be worth assessing patient experiences in both prison environments and adequate psychiatric institutions, as done scientifically for various health conditions with qualitative studies of people's experiences (12) in the UK (13) or Germany (14). Listening to patients' voices is accompanied by a growing recognition of personal experiences as a relevant source of information for both ethics in the health care system and policy debates. Obtaining narrative accounts and getting an insight into personal front row experiences, especially narratives of those patients living under regimented conditions, may enable a better responding to the needs of patients within the forensic mental health services and prospective outcomes. This, in turn, may serve to improve risk management and to reduce the number of cases in which mentally ill prisoners are merely incarcerated without adequate treatment options.

Limitations

The present case description tries to highlight potential issues that arise from the interface of forensic services and the penal system with special emphasis on ethical concerns. Yet, a challenge in evaluating old case files poses the varying degrees of documentation due to outdated quality assurance guidelines. The information given in the present case files, especially on therapeutic strategies, was sometimes vague and limited. Only occasionally, therapeutic concepts, such as the execution of a delinquency-oriented therapeutic approach, were mentioned, but more specific information about duration, content or adherence was missing. It therefore remains unclear to what extent psychotherapeutic concepts were actually implemented into the treatment plan, though it can be assumed that, at least, the initial treatment did not successfully target the patient's needs.

ETHICS STATEMENT

Written informed consent was obtained prior to the publication of this case report by a senior physician, who clinically assessed the patient's capacity to consent to participation. The patient then gave written consent on the basis that disclosed material would be anonymised and unidentifiable. Identifying details have therefore been removed from the report where necessary.

AUTHOR CONTRIBUTIONS

SS and NB contributed equally to the design and concept of the work, data analysis, interpretation, and drafted the manuscript. SS collected the data. US and NB-A contributed expertise and critical revision of the final manuscript. EH contributed to the concept of the work, the drafting of the article and revision of the final manuscript.

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Predicting Offenders' Institutional Misconduct and Recidivism: The Utility of Behavioral Ratings by Prison Officers

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Measures of current behavior are rarely incorporated into risk assessment. Therefore, the current study used a behavior rating scale to assess prison officers' observations of inmates prison behavior and examined the contribution of these ratings for risk assessment. Prison officers rated 272 sexual and violent offenders in three different correctional treatment facilities in Berlin, Germany. Factor analysis revealed three psychologically meaningful factors measuring externalizing, internalizing and adaptive prison behavior. The construct validity of the three factors was established through correlational analyses with standardized risk assessment instruments. Externalizing and internalizing behaviors were significant predictors of violent recidivism after release. In addition, externalizing was a significant predictor of institutional misconduct, whereas adaptive and internalizing behavior predicted whether an inmate was granted privileges (e.g., minimum-security confinement). Logistic regression analyses indicated that externalizing behavior ratings added incrementally to the Level of Service Inventory-Revised for the prediction of institutional misconduct and violent recidivism. The results indicate that prison officers observe important prison behaviors and that behavioral ratings can improve risk assessment.

Keywords: behavior rating scale, SWAP-200, prison behavior, behavioral observation, risk assessment, correctional treatment, prison officers

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INTRODUCTION

Forensic risk assessment requires collecting diverse information. Although the value of behavioral assessment has been recognized (1, 2), only few attempts have been made to systematically incorporate measures of current behavior into risk assessment. This paper investigates the validity of a behavior rating scale assessed by prison officers. The greater goal of this research question is to use these ratings to improve risk assessment in correctional treatment services.

Informed risk assessment should focus on individual risk factors that are theoretically and empirically linked to recidivism [e.g., (3)]. Risk factors have often been classified as either static (i.e., generally unchangeable) or dynamic (i.e., amenable to change). Mann et al. (4) proposed to adopt the concept of psychologically meaningful risk factors instead. Both static (e.g., criminal history) and dynamic risk factors (e.g., criminal attitudes) predict recidivism, because they are markers for the same underlying individual propensities (e.g., antisocial orientation). Propensities

are considered—like personality traits—to be relatively enduring offender characteristics that "may or may not manifest during any particular time period" [(4) p. 194]. Behavioral consistency is more likely to occur across situations when similar psychological characteristics are triggered (5).

Jones (2004)(6) recently introduced the framework of offense paralleling behavior (OPB) to identify risk-related current behavior. The central assumption is to identify behavioral patterns or sequences that share functional similarity to prior offense behavior. It has been suggested that propensities may reveal themselves through observations of offense paralleling behavior (7). Using a qualitative approach, Atkinson and Mann (8) found strong congruence between prison officers' observations (e.g., resistance to rules and supervision) and empirically established risk factors (e.g., antiauthority). The authors conclude that "these types of observations could, if utilized appropriately, improve the process of forensic psychological risk assessment; specifically in relation to focusing on current functioning to complement traditional forensic methods which tend to focus on past behavior" [(8), p. 152]. Consequently, it should be possible to identify risk-related behavior in prison with a rating scale assessed by prison officers.

Behavior rating scales are one of the most frequently used assessment measures in psychological research and practice. They provide a quick and reliable account of specific behaviors for diagnostic and intervention planning purposes. Behavior rating scales are considered objective measures with many advantages when administered to an informant who is familiar with the subject [see Merrell (9)]. For the purpose of the present study, we outline two specific advantages of behavior ratings scales for the use with incarcerated offenders. First, behavior rating scales can be used to address behavioral or personality characteristics of offenders who cannot (e.g., lack of insight) or do not want (e.g., impression management or malingering) to provide valid information about themselves. In this context, external ratings are not susceptible to "self-serving cognitive distortions" (10), which are considered as risk factors themselves for general (11) and sexual recidivism (4). For example, Milton et al. (12) compared staff and self-report ratings of interpersonal functioning and reported that, compared to staff ratings, offenders tended to underestimate their dominance and coerciveness, and overestimated their nurturance. Second, rating scales offer standardized means to what degree a specific behavior is present and allow for a "statistical aggregation of standardized clinical observations" [(13); p. 598]. Unlike checklists, behavior ratings scales assess the frequency of observed behavior on a Likert-type scale (e.g., never, sometimes, always). Therefore, they provide quantifiable and normative data, which can be used to compare ratings of different groups or across settings (14). They can also be used to track individual behavioral changes over the course of time, e.g., following treatment. Concerning offender treatment, observable changes of risk-relevant behaviors may serve as an indicator for reductions in reoffending.

Prison officers have the greatest amount of daily interaction with inmates and therefore know them quite well. They are more readily available than therapeutic staff and constitute important agents in crisis intervention and treatment delivery (15). Furthermore, Atkinson and Mann (8) proposed that prison officers are experienced behavioral observers and are a valuable but untapped source for risk assessment purposes. Few attempts have been made to examine observer ratings in offender populations. Quay (16) developed the Adult Internal Management System (AIMS) for internal classification to effectively deal with different types of prisoners. The system attempts to identify five different types of prisoners based on historical information and behavioral ratings by correctional officers: the aggressive-psychopathic, the manipulative, the normal (situational), the inadequate-dependent, and the neurotic-anxious prisoner. However, studies only found three distinct groups, the aggressive-manipulative, the normal, and the weak prisoner (17, 18). Subsequently, Cooke (19) developed the Prison Behavior Rating Scale (PBRS) to assess psychological features of disturbed behavior in prison. The PBRS consists of 36 items and 3 subscales: Antiauthority (e.g., aggressive toward staff), Anxious-Depressed (e.g., frightened of other inmates), and Dull-Confused (e.g., appeared sluggish and drowsy). While the evidence for the latter two scales was less compelling, the Antiauthority scale showed utility in the prediction of institutional misconduct (20).

The Chart of Interpersonal Reactions in Closed Living Environments [CIRCLE; (1)] is a staff rating scale (e.g., nurses in forensic hospitals) developed to assess an individual's social behavior according to the interpersonal circumplex (IPC). Briefly summarized, the IPC assumes that two orthogonal dimensions, status (dominance vs. submission) and affiliation (hostility vs. nurturance), define interpersonal behavior (21). The CIRCLE assesses eight interpersonal styles and is the most widely used behavior rating scale in offender samples. It is reported to have satisfactory psychometric and circumplex properties (22). Previous research with offenders has highlighted the theoretical and empirical importance of the interpersonal patterns denoted as dominant, coercive, and hostile. Specifically, these CIRCLE scales were predictive of institutional misconduct and violence in mentally disordered offenders in forensic hospitals (23–25) and prison (26). It was also suggested that the dominant, coercive, and hostile scales of the CIRCLE are linked to cluster B personality disorders, such as antisocial, histrionic, and narcissistic (27).

Only recently, Hausam et al. (28) reported preliminary results on behavioral ratings by prison officers in a small juvenile sample ($N = 62$). The scales were developed based on theoretical considerations and showed acceptable values of internal consistency and inter-rater reliability. Correlational analyses using different indexes (e.g., age and violent behavior in prison) and risk assessment instruments (e.g., HCR-20) attested to the construct validity of the scales. Furthermore, correctional officers' ratings were predictive of treatment attrition. For a smaller subsample, ratings at two time points (after 1 year) were available. Results indicated that prison officers are generally able to track positive and negative behavioral changes during treatment. The current study extends these findings taking the extensive research of the Shedler-Westen Assessment Procedure [SWAP-200; (29)] into account. The SWAP-200 allows for a comprehensive assessment of personality and personality pathology in psychiatric (30) and forensic

populations (31). Recent studies have shown that the SWAP-200 assessment is associated with institutional (mis-) behavior (as measured with the CIRCLE) in psychiatric patients (32) and personality-disordered offenders (27). The SWAP-200 was modestly predictive of inpatient violence (31).

We propose that prison officers with special training for correctional treatment are experienced observers and are likely to be a valuable supplement for forensic assessment. In Germany, correctional treatment units mostly follow a therapeutic community-based approach of rehabilitation. The prison officers are part of the therapeutic community to surveil, supervise, and support inmates on a daily basis. Consequently, prison officers' experiences and knowledge of inmates' behavior is often embedded in regular case management routines (e.g., parole release decisions). However, the units often use unsystematic behavioral checklists or rely on experience reports, which must be considered critical for two reasons. First, prison officers do observe risk-relevant behavior that may not be reported (8). Second, clinical observations are more beneficial if used systematically (13).

Purpose of Study

The aim of the present study was to investigate the applicability and validity of the SWAP rating scale (SWAP-RS) in three different correctional treatment samples. First, factor structure of the SWAP-RS will be examined. This is considered the most important step to establish construct validity (33). We hypothesized to find a factor structure similar to the factors of the SWAP-200 (34). Second, the construct validity of the factors thus identified will be tested by examining associations with standardized risk assessment instruments. Third, the predictive validity of behavioral ratings by prison officers will be investigated. Fourth, the incremental validity of the ratings in predicting institutional (mis-) conduct and recidivism beyond risk assessment instruments will be tested.

METHODS

Sample

The sample was composed of $N = 272$ male offenders of three different correctional treatment units in Berlin, Germany. Specifically, the subsamples were collected from social-therapeutic units for adults ($n = 145$) and juveniles ($n = 75$), as well as a preventive detention unit ($n = 52$). These units generally follow a group-based approach of rehabilitation and encompass a mix of individual and group therapy, social skills training, and educational or vocational training. Apart from therapeutic staff, specifically trained prison officers are part of these units to surveil, supervise, and support prisoners. Therefore, they largely define the field of social experience, know their inmates quite well, and are experienced observers of offender behavior in prison. At the point of rating, the inmates were 37.52 years old ($SD = 14.70$; Range = 16.91–81.97) and incarcerated for 59.36 months ($SD = 59.74$; Range = 1.64–364.32). $N = 30$ inmates (11%) were convicted of murder or manslaughter, $n = 99$ (36.4%) of robbery or assault, $n = 60$ (22.1%) of rape, $n = 71$ (26.1%) of sexual abuse, and $n = 12$ (4.5%) of other offenses. The inmates had an average sentence length[1] of 6.18 years ($SD = 4.56$; Range = 1.5–25) and on average six prior convictions ($SD = 5.62$; Range = 0–34).

Procedure

Data was collected between 2014 and 2016 as part of an on-going evaluation project. The evaluation project was carried out in accordance with the recommendations of the Senate for Justice, Consumer Protection and Anti-Discrimination of Berlin, Germany. Ethical approval for the study was sought and granted by the Ethics Committee of Charité—Universitätsmedizin Berlin (EA4/131/18). All participants gave written informed consent in accordance with the Declaration of Helsinki. The protocol was approved by the Official Data Protection Officer of Charité—Universitätsmedizin Berlin.

Prison officers were asked to rate all inmates admitted to one of the three units during that time (response rate: 80.1%). Group meetings with the prison officers at several time points during data collection were arranged to communicate general information about the study (e.g., that inmates should be rated by prison officers who are familiar with them, anonymization procedure, etc.). The officers did not receive special training in the assessment of the rating scale. A total of 76 prison officers rated on average three inmates ($M = 3.32$, $SD = 2.37$, Range = 1–12) they have known for $M = 18.76$ months ($SD = 23.03$, Range = 1–156).

Measures

SWAP Rating Scale

Inmate behavior was assessed using the SWAP rating scale (SWAP-RS). The SWAP-RS is a shortened adaptation of the items of the Shedler-Westen Assessment Procedure-200 [SWAP-200; (29); German version: (35)]. The SWAP-200 is a valid tool for personality assessment and consists of 200 personality-descriptive statements. It is a clinician-rated instrument with items that are suitable for external rating. The items are written in clear and jargon free language designed to assess, quantify, and compare clinical observations (29). The procedure allows for a categorical diagnosis based on the Q-sort method and a dimensional measurement of 12 factors based on a numeric value [see (34)]. A 5-point Likert-type scale was chosen to assess frequency of observed behavior (never, rarely, occasionally, frequently, and very frequently observed; scored 0 to 4). Prison officers were instructed to rate an inmates' behavior according to their observations. As mentioned before, we sought to assess risk-related propensities that manifest in current behavior. Based on empirical [i.e., factor loadings; (34)] and theoretical considerations (i.e., appropriateness for prison context), we included five items each of the following factors: Psychopathy[2],

[1]Eight offenders served a life sentence. In line with the International Criminal Court in the Hague, Netherlands, life sentences were generally coded as 25 years. In Germany, in 2015 $n = 59$ offenders serving a life sentence were released after $M = 19.3$ years (Range = 14.8 – 49.8).

[2]The authors termed this factor psychopathy and described it as a combination of antisocial personality disorder and psychopathy characteristics (34). Importantly, the SWAP-200 factor psychopathy is not eligible to assess the clinical construct of psychopathy (36).

hostility, narcissism, emotional dysregulation, dysphoria, and schizoid orientation. In addition, 10 items of the psychological health factor were included as well. The factors psychopathy (e.g., reckless and unlawful behavior), hostility (e.g., chronic anger and mistrust), narcissism (e.g, self-importance and arrogance), and emotional dysregulation (e.g., emotions tend to change rapidly and unpredictably) seem to be associated with the risk-related propensity of antisocial orientation [e.g., (11, 37)]. The factors dysphoria (e.g., feeling inadequate, avoids social situations) and schizoid orientation (e.g., lacks close relations and social skills) are composed of internalizing characteristics. Some of these features were identified being risk-relevant for general [e.g., (38)] and sexual recidivism [e.g., (4)]. Finally, the factor psychological health includes strengths and resources, or stated differently, they may refer to positive behaviors in prison (6). They may be considered as protective factors. A growing body of research emphasizes the complementary use of risk and protective factors in risk assessment (39).

Risk Assessment

Professionally trained psychologists independent of the treatment units completed ratings on the Level of Service Inventory—Revised [LSI-R; (38); German version: (40)] the Historical-Clinical-Risk Scheme [HCR-20; (41); German version: (42)], and the Psychopathy Checklist—Revised [PCL-R; (36)] based on file review. The LSI-R was selected as a measure of general risk of recidivism, the HCR-20 as a measure of risk of violent recidivism, and the PCL-R as measure of the psychopathy construct, which has shown to be a robust predictor of persistent delinquency. Predictive validity of the measures is well documented, also in German speaking samples [e.g., (43)].

Institutional Behavior

A follow-up review of inmate files was conducted after $M = 17.69$ months ($SD = 10.71$, Range = 3.65–57.53) by the members of the research group to collect data on different outcome measures of institutional behavior. These included the absence/ presence of violent (e.g., physical aggression) and non-violent disciplinary misconduct (e.g., possession of prohibited items). In addition, we assessed whether an inmate was granted privileges, such as temporary release, outside employment, or minimum-security confinement. Frequencies were 38% ($n = 102$), 59% ($n = 161$), and 39% ($n = 103$), respectively.

Recidivism

We obtained post-release recidivism rates for a smaller subsample of the juvenile and adult units ($n = 116$) based on police records. Six cases with a follow-up lower than 6 months were excluded, $n = 110$ offenders remained in the analyses with an average time at risk of $M = 22.34$ months ($SD = 7.72$, Range = 7.92–34.83). These records capture whether the police accused a person being a strong suspect of a crime. Therefore, they have a lower threshold compared to convictions of a criminal record. In addition, the records only cover crime accusations in Berlin, but not for the whole Germany. The research group coded whether a participant was accused of a non-violent crime (e.g., thievery, drug offenses, violations of instructions, or driving without a license), a violent crime (e.g., robbery, assault, or manslaughter), and a sexual crime (e.g., sexual abuse or rape). Recidivism rates were 38% ($n = 42$) for non-violent and 13% ($n = 14$) for violent recidivism. Due to the low recidivism rate of 4% ($n = 4$) sexual recidivism was excluded from further analyses.

Data Analysis

Statistical analysis was performed using SPSS 22 for Windows. Sample size was acceptable to perform factor analysis (44). Beforehand, parallel analysis (45) was employed to determine the appropriate number of factors to extract. The procedure is based on Monte Carlo simulations and has been proven to be accurate in determining the threshold for significant factors (46). The items were then subjected to principal axis factor analysis with oblique rotation. Common factor procedures with intercorrelated factors are preferably used to identify psychological meaningful constructs (47). Items were retained when primary factor loadings exceeded.32 and cross-loading differences were <0.20 (48). Bivariate Pearson correlations were calculated to examine associations with risk assessment instruments. Predictive validity of the SWAP-RS was examined using receiver operating characteristic (ROC) analysis. The use of the area under the curve (AUC) is the preferred measure of predictive accuracy in forensic assessment, and AUCs of 0.56, 0.64, 0.71 indicate small, moderate, and large effects, respectively (49). Finally, hierarchical block-wise logistic regressions were used to investigate incremental validity of the SWAP-RS. Unless otherwise stated alpha level was set at $p < 0.05$.

RESULTS

Factor Analysis

Parallel analysis indicated that three factors should be retained. The 40 items were subjected to principal axis factoring with oblique rotation. Both the Kaiser-Meyer-Olkin measure (KMO = 0.93; values for individual items ranged from 0.81 to 0.97) and Bartlett's test of sphericity ($\chi^2_{(780)} = 7077.88$, $p < 0.001$) verified sampling adequacy for the analysis. The three factors accounted for a substantial amount of variance (54.55%). **Table 1** presents factor loadings after rotation, eigenvalues, and percentage of variance for each factor. All the 40 items could be retained. The first factor accounted for 32.07% of the total variance and seems to represent all the items of the SWAP-200 factors psychopathy, hostility, narcissism, and emotional dysregulation. Noteworthy, the item "lacks social skills," which represents a feature of schizoid orientation according to the SWAP-200, showed highest loadings on the first factor. All these items are considered problematic behaviors that are directed toward the external environment. Therefore, the factor was labeled "Externalizing Prison Behavior" (EPB). The second factor accounted for 12.16% of total variance, corresponds to all the psychological health items of the SWAP-200, and was therefore labeled "Adaptive Prison Behavior" (APB). We defined adaptive behavior as a collection of social and emotional coping strategies to function in the prison environment, however, we do not refer to the extensive research field of mental

TABLE 1 | Summary of factor analysis of the SWAP-RS items; factor loadings after rotation ($N = 272$).

	I	II	III
Seeks to be the center of attention	0.85		
Has an exaggerated sense of self-importance	0.84		
Appears to feel privileged and entitled, expects preferential treatment	0.82		
Tends to be arrogant, haughty, or dismissive	0.79		
Seems to treat others primarily as an audience to witness own importance and brilliance	0.78		
Tends to hold grudges, may dwell on insults or slights for long periods	0.78		
Takes advantage of others, is out for number one, has minimal investment in moral values	0.78		
Tends to express intense and inappropriate anger that is out of proportion to the situation at hand	0.75		
Tends to be critical of others	0.75		
Expresses emotion in exaggerated and theatrical ways	0.75		
Tends to be hostile	0.74		
Emotions tend to change rapidly and unpredictably	0.71		
Tends to be deceitful, tends to lie or mislead	0.70		
Appears to experience no remorse for harm or injury caused to others	0.68		
Tends to become irrational when strong emotions are stirred up	0.65		0.33
Tends to show reckless disregard for the rights, property, or safety of others	0.64		
Tends to assume that others have bad and malevolent intentions	0.61		
Emotions tend to spiral out of control, leading to extremes of anxiety, sadness, rage, excitement, etc.	0.60		0.33
Lacks social skills; tends to be socially awkward or inappropriate	0.56		0.34
Is unable to soothe or comfort self when distressed, requires involvement of another person to help regulate affect	0.54		
Tends to be unreliable and irresponsible	0.46		
Is able to find meaning and satisfaction in the pursuit of long-term goals and ambitions		0.74	
Enjoys challenges, takes pleasure in accomplishing things		0.73	
Is capable of sustaining a meaningful love relationship characterized by genuine intimacy and caring		0.68	
Is capable of hearing information that is emotionally threatening		0.65	
Is empathic, is sensitive and responsive to other peoples' needs and feelings		0.64	
Is able to use his talents, abilities, and energy effectively and productively		0.63	
Tends to be conscientious and responsible		0.63	
Appears comfortable and at ease in social situations		0.49	
Appreciates and responds to humor		0.49	
Is able to assert himself effectively and appropriately when necessary		0.36	
Tends to feel he is inadequate, inferior, or a failure			0.83
Tends to feel empty or bored			0.74
Appears to find little or no pleasure, satisfaction, or enjoyment in life's activities			0.74
Tends to feel life has no meaning			0.74
Tends to feel like an outcast or outsider, feels as if he does not truly belong			0.73
Tends to feel listless, fatigued, or lacking in energy			0.53
Lacks close friendships and relationships			0.51
Tends to be shy or reserved in social situations.			0.51
Appears to have little need for human company or contact, is genuinely indifferent to the presence of others			0.45
Eigenvalue	12.83	4.87	2.90
% of variance	32.07	12.16	7.25

Factor loadings <0.32 are not displayed.

retardation. Finally, the third factor accounted for 7.25% of the total variance and was comprised of the items assigned to the dysphoria and schizoid orientation factors of the SWAP-200. Accordingly, it was labeled "Internalizing Prison Behavior" (IPB).

Internal consistencies (as indicated by Cronbach's alpha) of the factors EPB, APB, and IPB were 0.96, 0.87, and 0.89, respectively. Nunnally (50) suggested internal consistencies of 0.90 as the minimum in applied settings, which was (almost) achieved by the three factors. Corrected item-total correlations of the factors ranged from 0.54–0.79, 0.41–0.71, to 0.47–0.76, respectively. Interrater reliability of the ratings was examined in a subsample randomly selected from the juvenile unit. Two prison officers independently rated $n = 23$ inmates within $M = 1.02$ months ($SD = 0.81$; Range = 0–2.60). Significant agreement was found for the factor EPB, single measure intraclass correlation

coefficient (ICC) was.48, $p < 0.01$, 95% confidence interval (95% CI) [0.09, 0.74], and APB, ICC = 0.55, $p < 0.01$, 95% CI [0.18, 0.78], indicating moderate rater agreement (51). However, this was not the case for IPB, ICC = 0.33, $p = 0.059$, 95% CI [0.09, 0.65]. The SWAP-RS factors showed moderate intercorrelations. As expected, APB was negatively associated with EPB and IPB, and EPB was positively associated with IPB. **Table 2** summarizes the psychometric properties of the SWAP-RS factors. Unit-weighted mean scores were calculated for each factor for further analyses.

Construct Validity

To examine construct validity correlations were calculated between the SWAP-RS factors and a risk measure for general recidivism (LSI-R), a measure for violence risk assessment (HCR-20), and a rating scale for the clinical construct of psychopathy (PCL-R; see **Table 3**). As hypothesized, the convergent validity of EPB was evidenced by small significant relationships with the total scores of the LSI-R ($r = 0.23$, $p < 0.01$), HCR-20 ($r = 0.23$, $p < 0.01$), PCL-R ($r = 0.24$, $p < 0.01$). A more differentiated analysis of the LSI-R revealed significant associations between EPB and the scales Criminal History ($r = 0.13$, $p < 0.05$), Education and Employment ($r = 0.13$, $p < 0.05$), Financial ($r = 0.17$, $p < 0.01$), Leisure and Recreation ($r = 0.12$, $p < 0.05$), Companions ($r = 0.12$, $p < 0.05$), Emotional and Personal ($r = 0.14$, $p < 0.05$), and Attitudes and Orientation ($r = 0.22$, $p < 0.001$). Correlations between EPB and HCR-20 subscales were highest for the Clinical subscale ($r = 0.24$, $p < 0.01$). Regarding the PCL-R, EPB showed stronger correlations with Factor 2 ($r = 0.25$, $p < 0.01$) than with Factor 1 ($r = 0.16$, $p < 0.05$). In contrast, the APB scale did not show any relationships with the total scores of the risk measures. However, as expected, all the (non-significant) relationships had a negative trend. Only PCL-R Factor 2 was negatively related to APB ($r = -0.14$, $p < 0.05$). The IPB scale did not show any significant relationships with the total scores. However, on a scale level IPB was associated with the LSI-R subscales Financial ($r = 0.17$, $p < 0.01$), Family and Marital ($r = 0.20$, $p < 0.01$), and Emotional and Personal ($r = 0.24$, $p < 0.001$). Furthermore, there was a small positive association between IPB and the risk management subscale of the HCR-20 ($r = 0.14$, $p < 0.05$)

TABLE 2 | Summary of psychometric properties of the SWAP-RS factors.

	EPB	APB	IPB
Externalizing Prison Behavior (EPB)	–		
Adaptive Prison Behavior (APB)	**−0.25****	–	
Internalizing Prison Behavior (IPB)	**0.45****	**−0.39****	–
Mean (*SD*)	1.11 (0.84)	1.70 (0.68)	1.24 (0.75)
Range	0–3.52	0–3.40	0–3.90
# items	21	10	9
Internal consistency[1]	0.96	0.87	0.89
Interrater reliability[2]	**0.48****	**0.55****	0.33

*$p < 0.05$, **$p < 0.01$; [1]Crohnbach's alpha; [2]Intraclass correlation coefficient.

Predictive Validity

The area under the curve (AUC) values of the SWAP-RS factors are presented in **Table 4**. EPB was predictive of violent recidivism (0.78), as well as violent and non-violent institutional misconduct (both 0.62). APB and IPB were significant predictors of granted privileges (0.64 and 0.61). Importantly, the correlation between IPB and granted privilege was negative ($r = -0.18$, $p < 0.01$), therefore the value of the state variable in the ROC analysis was set to 0. This means that inmates with high ratings of internalizing behavior were less likely to receive privileges. Finally, IPB was a significant predictor of violent recidivism (0.69). In comparison, for example, the AUCs of the LSI-R for violent misconduct, non-violent misconduct, violent and non-violent recidivism were 0.63 (95% CI [0.56, 0.70]),0.64 (95% CI [0.57, 0.71]),0.71 (95% CI [0.58, 0.85]), and 0.66 (95% CI [57, 0.78]), respectively. AUCs of the HCR-20 and PCL-R were predominantly significant but somewhat lower with values between 0.48–0.60 and 0.50–0.56, respectively.

Incremental Validity

To test incremental validity of the SWAP-RS hierarchical block-wise logistic regression was used. For each regression analysis, the LSI-R, HCR-20, and PCL-R were entered into the first block of the model. To test which SWAP-RS factor added incremental validity to the risk measures, if any, a forward-method (i.e., likelihood ratio method) was employed for block 2. In block 1 of the hierarchical regression model for violent misconduct ($\chi^2_{(3)} = 15.76$, $p < 0.01$), accounting for 8% (Nagelkerke) of the variance, the LSI-R was a significant predictor ($B = 0.06$, $p < 0.05$; see **Table 5**). In block 2, EPB was the only predictor ($B = 0.50$, $p < 0.01$) to add incremental validity to the model ($\chi^2_{(4)} = 25.52$, $p < 0.001$). The latter model accounted for 12% of the variance, which is a significant increase from block 1 ($\chi^2_{(1)} = 9.77$, $p < 0.01$). The AUC for block 1 was 0.64 (95% CI [0.57, 0.71]), and 0.67 (95% CI [0.61, 0.74] after adding EPB in block 2.

The logistic regression model predicting non-violent misconduct was found to be significant in block 1 ($\chi^2_{(3)} = 17.28$, $p < 0.01$), accounting for 8% (Nagelkerke) of the variance (see **Table 5**). Again, the LSI-R was a significant predictor ($B = 0.09$, $p < 0.001$). In block 2, EPB ($B = 0.62$, $p < 0.01$) and IPB ($B = -0.50$, $p < 0.05$) were found to be significant predictors to the model ($\chi^2_{(5)} = 29.68$, $p < 0.001$). The final model accounted for 14% of the variance, which is a significant increase ($\chi^2_{(2)} = 12.40$, $p < 0.01$). The AUC for block 1 was 0.62 (95% CI [0.55, 0.69]), and 0.67 (95% CI [0.61, 0.74] after including EPB and IPB (block 2). An additional regression analysis was carried out to investigate a possible interaction between EBP and IPB. We ran the same model adding an interaction term (EBPxIPB) in block 2, however, the interaction term did not add incrementally to the model.

The logistic regression model predicting whether an inmate was granted a privilege was not significant in block 1 ($\chi^2_{(3)} = 6.37$, $p = 0.10$; see **Table 5**). After adding the SWAP-RS factors in block 2, a significant model was produced ($\chi^2_{(4)} = 19.65$, $p < 0.01$), accounting for 10% of the variance, with APB being the only single significant predictor ($B = 0.72$, $p < 0.01$). The increase was found to be significant ($\chi^2_{(1)} = 13.28$,

TABLE 3 | Pearson correlations between SWAP-RS factors and actuarial risk measures.

	LSI-R	HCR-20				PCL-R		
	Total	Total	Historical	Clinical	Risk	Total	Factor 1	Factor 2
EPB	**0.23****	**0.23****	**0.18****	**0.24****	**0.15***	**0.24****	**0.16***	**0.25****
APB	−0.08	−0.11	−0.08	−0.09	−0.08	−0.10	−0.05	**−0.14***
IPB	0.05	0.10	0.05	0.10	**0.14***	0.05	0.08	0.04

*$p < 0.05$, **$p < 0.01$. LSI-R, Level of Service Inventory—Revised; HCR-20, Historical-Clinical-Risk Scheme; PCL-R, Psychopathy Checklist—Revised. EPB, Externalizing Prison Behavior; ABP, Adaptive Prison Behavior; IPB, Internalizing Prison Behavior.*

TABLE 4 | Predictive accuracy of the SWAP-RS factors for institutional behavior and recidivism (AUC).

	Misconduct		Conduct	Recidivism	
	Violent	Non-violent	Privilege	Violent	Non-violent
EPB	**0.62** [0.55,0.69]**	**0.62** [.55,0.69]**	0.46 [0.39,0.53]	**0.78** [0.66,0.91]**	0.56 [0.44,0.67]
APB	0.44 [0.37,0.51]	0.51 [.44,0.58]	**0.64*** [0.57,0.70]**	0.37 [0.24,0.51]	0.52 [0.41,0.63]
IPB	0.51 [0.44,0.59]	0.49 [.42,0.56]	**0.61** [0.54,0.68]**[a]	**0.69** [0.56,0.83]**	0.45 [0.34,0.56]

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. [a]The association was negative and the state variable set to 0. AUC, Area under the curve; 95% confidence interval in brackets. EPB, Externalizing Prison Behavior; ABP, Adaptive Prison Behavior; IPB, Internalizing Prison Behavior.*

$p < 0.001$). The AUC for the block 1 model was 0.59 (95% CI [0.52, 0.66]) and 0.66 (95% CI [0.35, 0.49]) after including APB.

The logistic regression model predicting post-release violent recidivism was found to be significant in block 1 ($\chi^2_{(3)} = 13.60$, $p < 0.01$), accounting for 21% (Nagelkerke) of the variance (see **Table 6**). The LSI-R ($B = 0.22$, $p < 0.01$) and HCR-20 ($B = -0.31$, $p < 0.05$) were significant predictors, however, the negative sign of the HCR-20 was unexpected[3]. In block 2, again EPB ($B = 1.63$, $p < 0.01$) added incrementally to the model ($\chi^2_{(4)} = 27.49, p < 0.001$), which was a significant increase ($\chi^2_{(1)} = 13.90$, $p < 0.001$). The AUC of the block 1 model was 0.78 (95% CI [0.65, 0.91]) and 0.89 (95% CI [0.82, 0.96]) after including EPB. Finally, the regression model for non-violent post-release recidivism was found to be significant in block 1 ($\chi^2_{(3)} = 12.87$, $p < 0.01$), accounting for 15% of the variance (see **Table 6**). Again, the LSI-R ($B = 0.14$, $p < 0.01$) was the only significant predictor in the model. Block 2 revealed that none of the SWAP-RS factors were found to be significant predictors. The AUC of the block 1 model was 0.70 (95% CI [0.60, 0.81]).

DISCUSSION

The purpose of this study was to investigate the applicability and validity (construct, predictive, and incremental) of a behavior rating scale assessed by prison officers, the SWAP rating scale (SWAP-RS). The first part addressed the construct validity of the SWAP-RS. The leading questions were (a) do prison officers observe behaviors that map onto psychologically meaningful factors, and (b) do these observations correspond to standardized risk measures. In the second part we examined predictive validity of the factors thus identified. Here, the questions of interest were (a) are ratings of observed prison behavior useful for predicting institutional (mis-) conduct and recidivism, and (b) do they incrementally improve predictive accuracy of established risk assessment procedures.

Based on empirical and theoretical considerations, a shortened set of SWAP-200 items was selected to assess prison officers' observations of inmate behavior. Factor analysis suggested a psychologically meaningful three-factor solution. The first factor (Externalizing Prison Behavior [EPB]) appears to represent behavioral characteristics related to psychopathy, hostility, narcissism, and emotional dysregulation. The second factor (Adaptive Prison Behavior [APD]) seems to represent characteristics of psychological health and resources. Finally, the third factor (Internalizing Prison Behavior [IPB]) seems to represent characteristics related to dysphoria and schizoid orientation. The factor structure strongly resembles higher-order dimensions referring to externalizing and internalizing behavior (30). For example, Westen and colleagues found that psychopathic and narcissistic characteristics form an externalizing dimension, and dysphoria and schizoid orientation an internalizing dimension. Additionally, the psychological health items were represented on a distinct dimension termed adaptive personality strengths. Krueger et al. (53) also support the notion of two broad dimensions positing externalizing and internalizing features. Krueger et al. (53) stated that externalizing behavior is linked to a lack of constraint (e.g., to engage in risky behavior, to act on impulse, to endorse non-traditional values), and internalizing to negative emotionality (e.g., to experience anxiety, alienation from others). Furthermore, externalizing

[3]Since there was a significant correlation between violent recidivism and the LSI-R ($r = 0.21$, $p < 0.05$), but not with the HCR-20 ($r = -0.05$, $p = 0.56$), and a strong positive relationship between the LSI-R and the HCR-20 ($r = 0.70$, $p < 0.001$), the HCR-20 appears to be a suppressor in the model [i.e., it removes irrelevant variance of the LSI-R; (52)]. A similar regression model was produced after removing the HCR-20 ($\chi^2_{(3)} = 20.33$, $p < 0.001$). As expected, the explained variance (Nagelkerke = 0.32) was somewhat lower, but both LSI-R ($B = 0.14$, $p < 0.05$) and EPB ($B = 1.52$, $p < 0.01$) remained significant predictors of violent recidivism.

TABLE 5 | Incremental validity of the SWAP-RS factors in relation to actuarial risk measures predicting institutional behavior.

	Violent misconduct[a]		Non-violent misconduct[b]		Privilege[c]	
	B (SE)	**Exp b [95% CI]**	**B (SE)**	**Exp b [95% CI]**	**B (SE)**	**Exp b [95% CI]**
BLOCK 1						
Constant	−2.67 (0.56)		−0.96 (0.53)		−0.89 (0.63)	
LSI-R	**0.05*** (0.03)	1.05 [1.00, 1.11]	**0.08**** (0.03)	1.09 [1.03, 1.15]	0.01 (0.05)	1.01 [0.96, 1.06]
HCR-20	0.06 (0.05)	1.06 [0.97, 1.16]	−0.02 (0.05)	0.98 [0.89, 1.07]	−0.05 (0.05)	0.95 [0.87, 1.04]
PCL-R	−0.05 (0.21)	0.95 [0.88, 1.02]	−0.02 (0.04)	0.98 [0.92, 1.05]	−0.01 (0.04)	0.99 [0.92, 1.06]
BLOCK 2						
EPB	**0.50**** (0.16)	1.65 [1.20, 2.28]	**0.62**** (0.19)	1.86 [1.28, 2.71]		
APB					**0.72***** (0.20)	2.05 [1.48, 3.06]
IPB			**−0.50*** (0.20)	0.61 [0.41, 0.90]		

[a] $R^2 = 0.12$ (Nagelkerke). Model $\chi^2_{(4)} = 25.52$, $p < 0.001$. Hosmer-Lemeshow test $\chi^2_{(8)} = 2.04$, ns.
[b] $R^2 = 0.14$ (Nagelkerke). Model $\chi^2_{(3)} = 29.68$, $p < 0.001$. Hosmer-Lemeshow test $\chi^2_{(8)} = 6.94$, ns.
[c] $R^2 = 0.10$ (Nagelkerke). Model $\chi^2_{(3)} = 19.65$, $p < 0.001$. Hosmer-Lemeshow test $\chi^2_{(8)} = 13.16$, ns.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. LSI-R, Level of Service Inventory—Revised; HCR-20, Historical-Clinical-Risk Scheme; PCL-R, Psychopathy Checklist—Revised. EPB, Externalizing Prison Behavior; ABP, Adaptive Prison Behavior; IPB, Internalizing Prison Behavior.

TABLE 6 | Incremental validity of the SWAP-RS factors in relation to actuarial risk measures predicting recidivism.

	Violent recidivism[a]		Non-violent recidivism[b]	
	B (SE)	**Exp b [95% CI]**	**B (SE)**	**Exp b [95% CI]**
BLOCK 1				
Constant	**−5.23**** (1.66)		**−2.39**** (0.92)	
LSI-R	**0.23**** (0.08)	1.25 [1.08, 1.45]	**0.14**** (0.04)	1.15 [1.06, 1.26]
HCR-20	**−0.37*** (0.16)	0.69 [0.51, 0.96]	−0.07 (0.07)	0.93 [0.82, 1.07]
PCL-R	0.11 (0.12)	1.12 [0.89, 1.41]	−0.03 (0.06)	0.97 [0.85, 1.10]
BLOCK 2				
EPB	**1.63**** (0.47)	5.09 [2.01, 12.87]		
APB				
IPB				

[a] $R^2 = 0.42$ (Nagelkerke). Model $\chi^2_{(4)} = 27.49$, $p < 0.001$. Hosmer-Lemeshow test $\chi^2_{(8)} = 7.97$, ns.
[b] $R^2 = 0.14$ (Nagelkerke). Model $\chi^2_{(3)} = 12.36$, $p < 0.01$. Hosmer-Lemeshow test $\chi^2_{(8)} = 11.06$, ns.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. LSI-R, Level of Service Inventory—Revised; HCR-20, Historical-Clinical-Risk Scheme; PCL-R, Psychopathy Checklist—Revised; EPB, Externalizing Prison Behavior; ABP, Adaptive Prison Behavior; IPB, Internalizing Prison Behavior.

behavior is associated with substance dependence and antisocial behavior, whereas internalizing behavior is associated with anxiety disorders and depression [e.g., (54)]. Noteworthy, the first factor appears to capture a broad range of socially aversive behaviors (55). Only recently, a growing body of research on the so-called "Dark Triad," a constellation of psychopathic, narcissistic, and machiavellistic personality features, has highlighted the empirical overlap of these constructs in non-pathological samples (56). Although research indicates that the Dark Triad constructs are conceptually distinct, they share characteristics such as callousness, hostility, and impulsivity (57), and were found to be associated with aggressive and criminal behavior [for overview see Furnham (58)]. The EPB factor seems to tap into some features of the Dark Triad.

The psychometric properties of the SWAP-RS were generally satisfactory. Internal consistencies of the scales were appropriate for applied settings (50). In contrast, the results of interrater reliability were less strong. Whereas interrater reliability of the factors EPB and APB was moderate (51), the prison officers showed less agreement about internalizing behaviors. One explanation may be that behaviors related to the EPB and APB factors are rather directed toward the external environment, whereas items of the IPB factor are directed toward the "self" and thus harder to be externally identified. Cooke (19) further argued that prison officers may be more experienced observers of disruptive behavior because it is closely related to safety concerns and suggested to train prison officers. Training may not only lead to improved agreement, but also deepen the awareness, knowledge and acceptance of certain behaviors. Noteworthy, many prison officers commented positively on the SWAP-RS. Amongst other things, they stated that the assessment has led to more intense engagement with the prisoners and their behavior.

Differential associations with established risk assessment measures further evidenced construct validity of the SWAP-RS. As expected, the EPB factor was significantly associated with the LSI-R, HCR-R, and the PCL-R, whereas APB and IPB were

almost unrelated to the instruments. The correlations indicated that the EPB factor may capture behavioral characteristics that are associated with antisocial orientation (37). For example, EPB was significantly related to the attitudes and orientation subscale of the LSI-R. Furthermore, items such as "appears to experience no remorse," "takes advantage of others," and "has an exaggerated sense of self-importance" are reminiscent of characteristics of the construct of psychopathy (36). Accordingly, the results indicated that the EPB is correlated with the PCL-R. Interestingly, EPB ratings were stronger associated with the lifestyle antisociality dimension of the PCL-R. This may correspond to the notion that Factor 2 of the PCL-R highlights the behavioral correlates of psychopathy (36). Some research suggests that Factor 2 of the PCL-R outperforms Factor 1 in predicting institutional misconduct and recidivism [e.g., (59)]. In line with Cooke (19) these findings indicate that prison officers may be able to assess behavioral characteristics related to the psychopathy construct. Similarly, the significant associations between EPB and HCR-20, and in particular the clinical subscale show that items such as "emotions tend to change rapidly and unpredictably" and "emotions tend to spiral out of control" may tap the construct of impulsivity, which is among the strongest individual predictor of recidivism [e.g., (11, 60)].

The APB factor consists of items such as "tends to be conscientious and responsible" and "enjoys challenges and takes pleasure in accomplishing things" and refers to psychological strengths and resources (34). As expected, we found no associations between APB and the total scores of the risk assessment measures. Therefore, these behaviors may not constitute a risk factor *per se*. In contrast, they may rather capture individual skills and coping strategies that are needed to deal with the psychological effects of imprisonment (61). Finally, the IPB factor consists of items such as "tends to feel he is inadequate" and "tends to feel empty or bored." Correlational analyses indicated rather weak associations between internalizing behavior and the risk measures. However, construct validity of the factor was evidenced by meaningful associations with the emotional subscale of the LSI-R and the R-scale of the HCR-20. For example, the LSI-R subscale assesses an individual's ability to respond to life stressors and psychological signs of anxiety and depression (37).

Prison officers' ratings of inmate behavior were not only predictive of misconduct and conduct within the prison setting, but also of recidivism after release. Foremost, ratings of externalizing behaviors were predictive of violent and non-violent misconduct and violent recidivism. Predictive accuracy was moderate for both criteria of misconduct in prison and large for violent recidivism after release. Notably, prison officers' ratings of externalizing behaviors predicted violent recidivism better than the LSI-R. These findings further indicate that the EPB factor taps risk-relevant behaviors. Comparable results were provided by previous research on the predictive validity of behavioral ratings by staff (20, 26, 28).

The APB factor significantly predicted whether an inmate was granted privileges or not. This finding emphasizes that it may be beneficial to assess behavioral strengths and resources in offender rehabilitation. Recent research suggested that the quality of release planning added incremental validity to the prediction of recidivism over and above standardized risk measures (62). In Germany, privileges (i.e., day release, outside employment, or minimum-security confinement) are acknowledged as central methods for treatment and prisoner reentry. Accordingly, Suhling and Rehder (63) reported that sexual offenders in minimum-security confinement have lower rates of recidivism. Therefore, it may be possible that adaptive behavior in prison has a moderator effect on future recidivism (i.e., inmates showing high levels of adaptive behavior in prison are more likely to receive privileges, which in turn has an effect on future recidivism). Clearly, future research is needed to investigate this relationship. Finally, the IPB factor was also predictive of violent recidivism. This corresponds to a large body of research suggesting that emotional distress and psychopathology (e.g., depression) are considered minor risk factors for criminality (37). Interestingly, inmates with high ratings of internalizing behaviors were less likely to receive any kind of granted privileges.

While the above findings support the predictive validity of the SWAP-RS, it would be inappropriate to use prison officers' observations alone for risk assessment purposes. As mentioned before, the rating scale is intended to be a supplement to established risk scales. To our knowledge, the present study is the first to investigate the incremental validity of a behavior rating scale assessed by prison officers. The SWAP-RS significantly improved prediction beyond standardized risk assessment instruments. Specifically, prison officers' ratings of externalizing behavior added incremental validity to the LSI-R for the prediction of violent misconduct and violent recidivism, whereas both EPB and IPB added incrementally to the LSI-R for non-violent misconduct. Especially for violent recidivism, the inclusion of the EPB factor lead to a substantial increase in predictive accuracy. These findings suggest that observations of current behavior provide information for the prediction of violent misconduct and violent recidivism, which does not seem to be captured by established risk assessment instruments. This emphasizes the importance of including measures of current risk-relevant behavior into risk assessment procedures. Noteworthy, whereas higher levels of externalizing behavior were positively associated with non-violent misconduct, the model revealed negative associations for internalizing behavior. That may imply that inmates with high ratings of internalizing and low ratings of externalizing behaviors are less likely to show misconduct in prison. Cooke (20) reported similar findings for the prediction of institutional misconduct, suggesting improved prediction after combining the Antiauthority and Dull-Confused scales of the PRBS. However, such an interaction could not be confirmed in the present study.

Notably, prison officers' ratings on adaptive behavior remained the only significant predictor of granted privileges. This is somewhat surprising since prior research has shown that, for example, the LSI-R is a robust predictor of security-level placement in prison (38). An explanation may be that the outcome variable in the present study included too many kinds of privileges or the sample was too heterogeneous. For example, inmates under preventive detention receive usually less privileges

and are therefore hardly comparable with inmates of the two correctional treatment units.

Several limitations of the present study merit consideration. The inmates were assessed by many prison officers. Therefore, a large variance is to be expected, which is particularly problematic given the weak to moderate rater agreement. To reduce variability brief training sessions are suggested in future studies. In addition, it seems important to consider the influence of prison officers' individual factors (e.g., work motivation and attitude) and personal closeness to inmates as a source of variation. In a similar manner, potential rater biases (e.g., leniency or severity effects) require investigation. The sample of the present study was quite heterogeneous regarding age and offense type. For example, the relationship between age and externalizing behavior (e.g., aggression) in prison is a consistent finding in the literature [e.g., (61)]. Therefore, future research should also investigate whether institutional factors affect prison officers' ratings (e.g., prison officers at a juvenile unit may be more habituated to aggressive behaviors and therefore have different rating thresholds). The factors showed meaningful associations with the risk assessment measures albeit the relationships were rather small. Therefore, farther construct validation with risk-related measures (e.g., self-report) is desirable. Finally, it is important to mention that the current approach differs from the offense paralleling framework (6). One specific assumption is that offense paralleling behavior must be understood in terms of functionality, not simply appearance. For example, reckless behavior in prison may be considered as an indicator of a risk-related propensity. However, the behavior may only be triggered by the environment (e.g., as an adjustment strategy in prison) and therefore may not be indicative of such a propensity. Consequently, the framework requires a complex process of analysis that could not be realized in the current study (8).

In conclusion, there is consensus that forensic risk assessment benefits from including a variety of information, inter alia, crime scene analysis (64) and standardized risk measures which incorporate static and dynamic risk factors [e.g., (3)]. The assessment of current behavior, however, was predominantly disregarded for risk assessment purposes (65). In line with previous research [e.g., (20)], the present study has shown that the supplemental use of prison officers' ratings of inmate behavior can improve risk assessment. Although the validity of the EPB factor was most convincing, it may be advisable to assess various characteristics of prison behavior to fully understand behavioral changes (6). Pragmatically, the SWAP-RS allows prison officers to systematically rate inmates' behavior in a quick and reliable manner and can be easily implemented into regular case management routines. We conclude that prison officers' observations, if assessed systematically, can be a valuable complement for treatment evaluation and risk assessment.

AUTHOR CONTRIBUTIONS

JH, RL, and K-PD contributed conception and design of the study. JH organized the database and performed the statistical analysis and wrote the first draft of the manuscript. RL wrote parts of the manuscript and revised the first draft. All authors contributed to manuscript revision, read, and approved the submitted version.

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Implementation of a Suicide Risk Screening Instrument in a Remand Prison Service in Berlin

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In the present study, we examined the effects of implementing the suicide risk screening instrument SIRAS in a pre-trial detention facility for men in Berlin. Within a period of 3 months, all newly arriving prisoners were screened ($n = 611$) by social workers or prison officers. Cases of elevated suicide risk were immediately referred to a psychologist or medical staff the same day. Follow-up over a 6-month period showed that 14% of all incoming prisoners were classified as high-risk individuals. These individuals received significantly more psychological and psychiatric treatment and were significantly more likely to be accommodated in crisis intervention rooms and emergency community accommodation (shared prison cells). In addition, it was found that despite the increased amount of treatment in the high-risk group, the number of specific measures did not increase significantly compared to the pre-implementation phase ($N = 1,510$).

Keywords: suicide prevention, suicide screening, penal institution, pre-trial detention, prison suicide

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BACKGROUND

Prevalence of psychiatric disorders among prisoners is many times higher and suicide is one of the leading causes of death in prison (1–4). The exact rate of suicide varies widely according to the study design, with values most frequently reported at 2- to 10-times higher rate compared to the general population (5, 6). Different studies use different suicide-rate calculations, sometimes with major methodological problems (7, 8). Thus, for example, the presumably large number of unreported and hence unofficial numbers of suicides in the general population is not sufficiently taken into account as a comparison group whereas the number of unreported cases in prison settings is relatively low due to close monitoring. The arising problem is the difficulty to compare the suicide rates of those two groups. In addition, statistics can be distorted as well by varying definitions of suicide; some studies include the overdose of drugs or are unable to include suicidal intentions covered as traffic or household accidents (9).

Despite methodological issues, it can generally be claimed that suicide is a real problem in prison and prisoners face an elevated number of risk factors. Konrad (10) found a 6.5 times higher suicide rate among male prisoners compared to the age-and sex- matched general population (11). Lohner and Konrad (12) found that the characteristics of suicides in pre-trial detention appear relatively homogenous as opposed to detention where those risk factors are more heterogeneous.

For example, a census conducted by the criminologists in the Lower Saxony prison on 1067 cases between 2000 and 2013 ($N = 1,067$) shows that among detained prisoners suicide risk among prisoners increased in several age ranges, younger age groups having a higher risk as opposed to remand prisoners where high risk group prisoners were mainly in the over-40s age group. Similarly, the timing of the suicidal act showed differences between sentenced and remand prisoners (13).

It is widely known that within the prison system, suicides are more common among remand prisoners. Especially in the first days of detention, an increased suicide is generally found (5, 14). A possible explanation is the so-called "confinement shock" (2, 15–17). First incarceration experiences, social deprivation, loss of control and uncertainty characterize the period of pre-trial detention and therefore require stable and pronounced coping skills (18).

With regards to suicidal development according to Plödinger (19), 3 phases can be observed. At deliberation stage (Phase 1), suicidality is considered as a possible solution to the problem. The stage of ambivalence (Phase 2) is characterized by a struggle between life-sustaining and self-destructive impulses, direct and indirect suicide announcements can appear. At the decision-making stage (Phase 3), the decision to take one's life is already made and expressed to the environment in form of apparent relaxation and calmness and should not be misunderstood as improvement (20). Hence, the identification of individuals at risk of suicide requires a lot of attention and sensitivity and is even a greater challenge in daily routine.

One option to deal with this problem is the use of screening tools to be able to detect prisoners at high risk of suicide faster and transfer them to specialized staff accordingly. By identifying risk factors highly associated with suicide screening procedures can be used for all prisoners and detect vulnerable individuals. It is important to emphasize that screening procedures are not designed to replace a professional judgment. In fact it can facilitate to transfer high-risk prisoners for further assessments (21) since when assessing the risk of suicide not only the presence of certain risk factors must be considered but suicidality should also be clarified in a direct, empathetic and open face-to-face conversation (22).

If we want to measure the effects of suicide prevention, we face the problem of small absolute numbers in prison settings. To capture the impact of introducing a screening instrument it is therefore only possible to measure parameters that, according to established literature (1, 2, 8, 23–27) are associated with acute crises and suicidal behavior such as frequency of psychological interventions, psychiatric consultation, referral to inpatient psychiatric wards, use of antidepressant medication and other psychotropic drugs, transfer to high-secure-cells due to acute suicidal tendencies, arrangement of special observations and placement in emergency community accommodation i.e., shared prison cells.

Some of these associated parameters are well-documented in the context of the German prison system in the established literature.

In Germany, prison sentences are usually served in single accommodation. Research shows that most suicides are committed between 7:00 p.m. and 7:00 a.m. (28) and in single accommodation (8). Therefore, in Germany, in the case of suspected suicidality, a so-called "emergency community accommodation" is ordered as a preventive measure to reduce suicide risk. When an "emergency community accommodation" is ordered, the detainee is moved to a community cell with two detainees each. This reduces social isolation and facilitates interpersonal exchange with a roommate. Another measure in the case of suicide suspicion is the order of special observation, in which the staff visits the detainees at regular intervals. Liebling (29) found that people preferred to share a detention room before their suicide attempt, that they experienced isolation and were more frequently in crisis intervention space. An extensive study of 423 suicides (9) found that about two-thirds of the prisoners were in solitary confinement at the time of the suicide.

Although the use of antidepressant medication in the treatment of depression and suicide prophylaxis is controversial in the literature and the media (30), it is assumed, according to status quo in medicine, that antidepressant medication counteracts feelings of tension, insomnia, and depression. Studies indicate a prevalence of 14–95% of mental illnesses in suicide cases in prisons (16, 17, 31, 32). In particular, depressive and psychotic disorders show a strong association with suicidality (33), so it can be assumed that these changes act in the sense of suicide prevention (2).

In the study we used the associated parameters mentioned in this section to follow up the usefulness of the modified suicide screening method SIRAS (11).

AIMS AND HYPOTHESES

The present study aims at examining the impact of the implementation of a suicide risk screening tool in Berlin remand detention. The study continues the work by Dahle et al. (11) using the screening instrument SIRAS and—by measuring the impact on the number of specific interventions during the study period and its targeting to the identified high-risk-group—testing the usefulness of implementing a short suicide risk screening instrument in practice. The screening was implemented with an Experimental Group (EG) of prisoners arriving to the prison facility over a certain timeframe and compared with a Comparison Group (CG) of prisoners arrived prior to the implementation. Both groups were followed up for the subsequent 6 months to test the hypothesis.

The following research hypotheses were examined:

Hypothesis 1: The screening instrument reliably predicts suicide risk.

Hypothesis 2: High-risk inmates receive a significantly higher amount of interventions compared to the non-high-risk group.

2.1 High-risk inmates will receive significantly more psychological interventions.

2.2 High-risk inmates will receive significantly more psychiatric examinations.

2.3 High-risk inmates will receive significantly more often psychopharmacological treatment.

2.4 High-risk inmates will be transferred more frequently in the Crisis Intervention Room (CIR).

2.5 High-risk inmates will be referred significantly more often to inpatient psychiatric treatment.

2.6 Specialized observations are ordered significantly more often in the case of high-risk inmates.

2.7 For high-risk inmates, emergency community accommodation (i.e., shared cells) will be ordered significantly more often in the future.

Hypothesis 3*:* In the Experimental Group (EG) the interventions are more targeted as in the Comparison group (CG). There is no significant difference in the number of interventions between the Experimental Group (EG) and Comparison group (CG).

Through the structured introduction of the screening, our aim was to expand the skills of employees in dealing with suicidality and thus relieve the staff.

METHODS

Materials

The suicide screening procedure (SIRAS) was used for a period of 3 months between March and May in Berlin pre-trial detention for men.

The instrument is based on the Dutch instrument Screening of Suicide Risk of Prisoners by Blaauw et al. (25). By analyzing the files of 95 detainees who died of suicide, the research group identified 8 risk factors that could be replicated both in UK and US prison settings (34).

Aiming at simplifying the application of the instrument for clinically untrained personnel in German prison settings Dahle et al. (11) conducted a retrospective file analysis of 30 prisoners who died of suicide in the Berlin pre-trial detention. The instrument was validated, optimized and translated in German. For non-clinical use, the two items "Psychosis or Axis II Disorders (DSM-IV)" and "Past Psychiatric Treatment" were removed from the original version. Although these clinical factors are of great relevance, the assessment of these items in the screening process by non-clinical staff is difficult.

In addition, the evaluation process was simplified by recoding. The new threshold of 3 points was determined using an ROC analysis (AUC 0.881, $p < 0.001$, 95% CI from 0.793 to 0.969). The modified version of the screening sheet had a sensitivity of 70% and a specificity of 93%. (11).

The final version of the German Scale for Initial Risk Assessment (SIRAS) contains the weighted items presented in **Table 1**: age, pre-detention, drug use, previous attempted suicide or self-harming behavior, current suicidal statements, or suicide attempts (35).

Procedure

Before the key date of the implementation, the users, namely social workers and prison officers were informed about the theoretical background of the screening and received training for the instrument.

As can be seen in **Table 1**, the data included in the screening instrument are basic data that are usually collected during the admission process. Thus, the novelty is not the collection itself but the structured form the tool been used and the obligatory presentation to a psychologist or medical staff when a certain cutoff (3 or more points) is reached. From 01.03.2016 to 31.05.2016 the screening was carried out with each new arrival to the prison facility. A group of prisoners who entered the prison during the 3 months prior the study period (01.12.2015–29.02.2016) served as comparison group. Both groups were followed up for the subsequent 6 months. The experimental group was additionally divided according to the screening results into a high-risk group (sum of 3 or more) and the non-high-risk group.

TABLE 1 | Description of screening items and rating.

Items	Description	Yes	No
Age 40+	Aged 40 years or more	1	0
No permanent residency	No permanent residency prior to incarceration	1	0
None or one previous incarceration	None or one previous incarceration	1	0
Multiple misuse of drugs	Biographical consumption of serious drugs (at least one a week) combined with regular consumption of weaker drugs and/or consumption of a greater amount of alcohol and/or medication.	1	0
Known previous suicide attempts or self-harming behavior	Biographical suicidal attempts or intentional self-harming behavior (cuts, intoxication, etc.) are known.	1	0
Suicidal expressions or suicide attempt	Suicidal ideation is expressed during current incarceration or suicide attempts have taken place already.	3	0
Sum			

With a sum score of three or more the individual should immediately be transferred to a psychologist or medical staff.

In the Berlin pre-trial detention each newly admitted person goes through a reception routine. As part of a regular admission interview which is carried out by a social worker or prison officer when prisoners arrive outside of office hours, the SIRAS sheet was completed and the result recorded in the digital documentation system. In the case of a positive screening result of three points or more, the person had to be presented to a psychologist or medical staff the same day, who would initiate adequate interventions in case of indication.

Participants

The sample consisted of all arrivals to Berlin remand prison between March and May 2016. Two exclusion criteria were defined (1) transport prisoners were excluded who, because of their status, did not undergo the routine procedure of pre-trial detention and probably spend only a short time in the prison; (2) those detainees who had been admitted prior to the study period but were temporarily transferred to the prison hospital for health reasons.

The final sample included data from 1,510 male volunteers, the mean age in the comparison and experimental group was 35 years. All the subjects participating were admitted and located in remand prison. Majority were in remand although some of the inmates were already convicted. **Table 2** shows descriptive results. The majority of subjects were accused of theft (40.07%), drug offenses (15.43%), and fraud (13.77%).

TABLE 2 | Descriptive of study sample.

Variable	Study period	*N*	Remand custody	Age min–max	Mean age
Comparison group	01.12.15–29.02.16	899	70%	20–97	35.2
Experimental group	01.03.16–31.05.16	611	69%	21–73	35.3

Data Analysis

Data entry and analysis was performed by the first author who was not associated to the prison but present on-site as a point of contact every week during the study period. The analysis was carried out using SPSS (36). The variables were tested for normal distribution using the Kolmogorov–Smirnov test. In the absence of a normal distribution, non-parametric methods (Kruskal–Wallis test and Chi-squared test) were used, which do not have the assumption of a normal distribution or a similarly large group size. The significance level was set at 5%.

RESULTS

During the implementation phase, $n = 834$ detainees were admitted to the remand prison facility. In $n = 223$ cases data on suicide screening was missing, resulting in a total sample of $n = 611$ collected screening data, of which $n = 605$ were reliably completed and could be considered in the evaluation. In order to avoid any damage, the questionnaires which were not completely filled out but reached a sum score above three (crucial cut off) were considered for inclusion into the high-risk group, leading to a sample of $n = 611$.

Sum score ranged from 0 to 7 point, mean score was 1.56, standard deviation was 1.10. The overall result is that 14.21% ($n = 86$) of the subjects met the screening criteria as a person at high-risk of suicide. Thus, 14.21% ($n = 86$) of newly arrested detainees were presented to a psychologist or medical staff on the day of arrival. Looking at the scores in detail (**Figure 1**), it can be noted that 9.32% ($n = 56$) of the experimental group reached a score of 3 points, 2.50% ($n = 15$) a score of 4 points, 1.33% ($n = 8$) a score of 5 points and <1% reached 6–7 points ($n = 3$, $n = 2$) (37).

No clear pattern can be identified when comparing the SIRAS score to allegedly committed offense. It can however be established that 39% ($n = 22$) of the detainees with a SIRAS score of 3 and 33% ($n = 5$) of the detainees with a SIRAS score of 4 were detained for alleged theft, while 38% ($n = 3$) of the detainees with a SIRAS score of 5 were detained for alleged drug offenses. Detainees with a SIRAS score of 6 were detained in equal ratios either for alleged causing of bodily injuries, drug offenses, or theft (33% each, $n = 3$). Detainees with a SIRAS score of 7 were detained in equal parts for alleged sexual assault or theft (50% each, $n = 2$).

Hypothesis 1. During the study period, there was no suicide reported in the facility. In $n = 4$ individuals enforceable arrangement was documented (e.g., emergency community accommodation, special observation, crisis intervention room).

Hypothesis 2.1. There were significant differences in the number of psychological interventions ($N = 605$, Kruskal–Wallis test, $p \leq 0.01$) between the high-risk group and the non-high-risk group. There were no psychological interventions in 31.4% ($n = 27$) high-risk prisoners, instead they received medical attention, potentially because they were admitted after 5 p.m. In 45.30% ($n = 39$), a single psychological intervention was conducted. Two or more psychological interventions were conducted with 23.20% ($n = 20$), with 2 and 4 interviews being most frequent ($n = 5$, $n = 7$) (**Figure 2**). Looking at the non-high-risk group, it can be observed that 86.30% ($n = 448$) did not receive a single psychological interview, 7.70% ($n = 40$) a single and only 6.00% received 2 or more subsequent interventions (**Figure 2**).

Furthermore, significant differences in the frequency of the psychiatric consultation ($N = 605$, Kruskal–Wallis test, $p \leq 0.01$) were observed (Hypothesis 2.2).

Looking closer at the psychopharmacological treatment, 40.70% ($n = 35$) of the high-risk group and 20.62% ($n = 107$) of the non-high-risk group did receive any type of psychopharmacological medication. 22.09% ($n = 19$) of the high-risk group and 8.67% ($n = 45$) of the non-high-risk group received neuroleptic or sedative medication. 23.26% ($n = 20$) of the high-risk group and only 12.91% ($n = 67$) of the non-high-risk group received antidepressant medication.

Data confirms significantly more prisoners in the high-risk group received antidepressant medication (hypothesis 2.3) as opposed to the non-high-risk group ($N = 605$, Pearson chi-squared test = 6.414, $p < 0.05$).

Hypothesis 2.4 could also be confirmed, high-risk individuals were placed significantly more often in the crisis intervention rooms ($N = 605$, Kruskal–Wallis test, $p = 0.000$) (**Table 3**).

Differences between the high-risk and non-high-risk groups regarding admission to inpatient psychiatric treatment (Hypothesis 2.5) did not exist ($N = 605$, Pearson chi-squared test = 4.229, Exact $p = 0.099$).

Hypotheses 2.6 and 2.7 could be confirmed. The number of special observations ($N = 605$, Kruskal–Wallis test, $p < 0.01$) and emergency community accommodation ($N = 605$, Kruskal–Wallis test, $p < 0.01$) were significantly different between the high-risk group and the non-high risk-group.

Following section presents retrospective analysis of the comparison group (admission between 01.12.2015 and 29.02.2016) to the experimental group. Results confirm Hypothesis 3:

Overall, there were no significant differences given the frequency of psychological interventions ($N = 1{,}510$, Kruskal–Wallis test, $p = 0.185$) and psychiatric consultations ($N = 1{,}510$, Kruskal–Wallis test, $p = 0.881$).

Also, there were no significant differences ($N = 1{,}510$, Pearson chi-squared test = 6.414, $p = 0.880$) in the antidepressant drug prescription. 14.68% ($n = 132$) of the subjects in the comparison group and 14.40% ($n = 88$) in the experimental group received antidepressant medication. 11.34% ($n = 102$) of the subjects in the comparison group and 10.47% ($n = 64$) in the experimental group received neuroleptic or sedative medication.

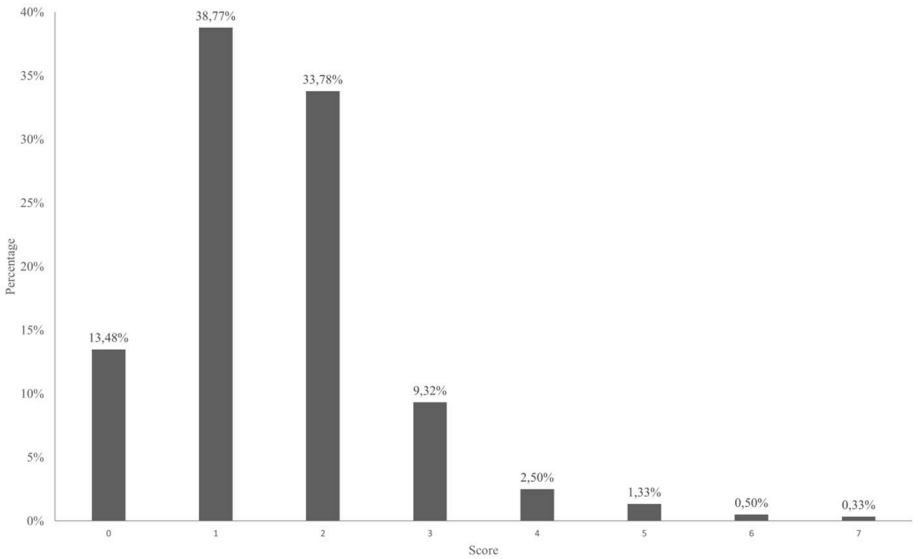

FIGURE 1 | Distribution of sum scores in screening tool for new arrivals during study period.

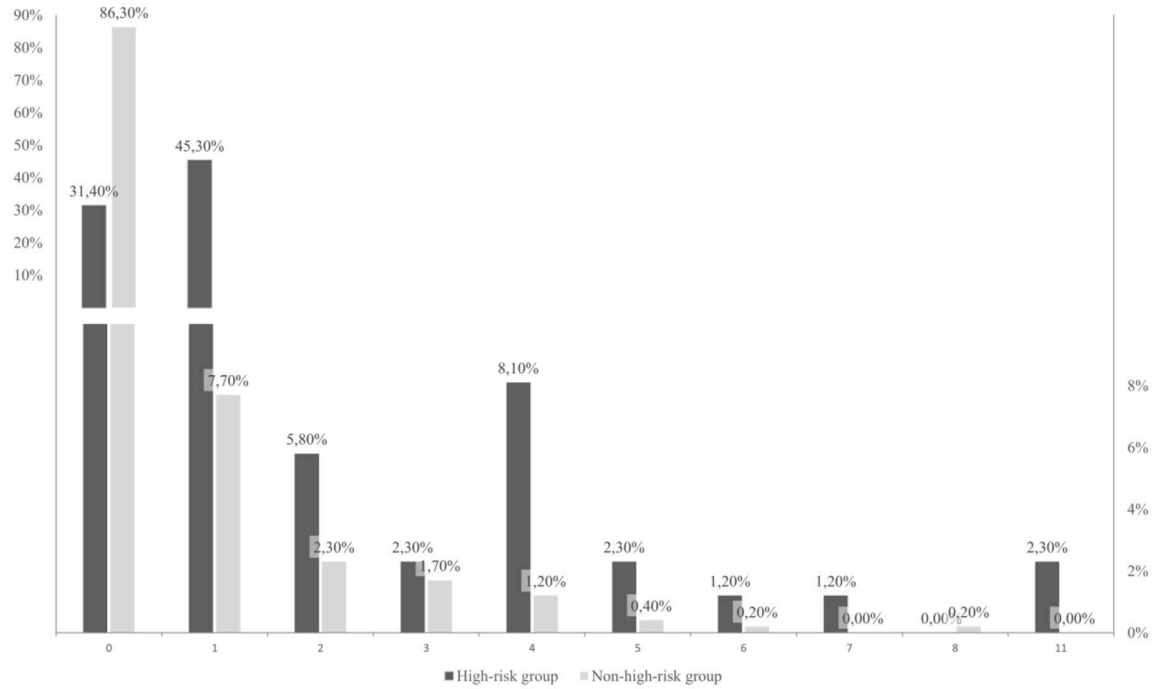

FIGURE 2 | Percentage distribution of psychological interventions between the experimental groups (high-risk and non-high-risk). The chart is using a finer scaling until 10% to display smaller percentages.

Significant difference (N = 1,510, Pearson chi-squared test = 13.844, $p < 0.01$) was found with regards to admission to inpatient psychiatric treatment. In the comparison group, $n = 33$ out of $N = 899$ people (3.7%) and in the experimental group, $n = 4$ out of $N = 611$ people (0.6%) required inpatient treatment.

There were no significant differences in the arrangements of emergency community accommodation (N = 1,510, Kruskal–Wallis test, p = 0.747) and specific observations (N = 1,510, Kruskal–Wallis test, $p = 0.280$).

DISCUSSION

By introducing the screening, our aim was to implement a structured course of action for the deliberate handling of

TABLE 3 | Rank mean scores of accommodation in crisis intervention cell.

Variable	*N*	Mean rank
Non-high-risk group	519	299.19
High-risk group	86	325.97

suicidality in the remand prison system, without generating a significant, unreasonable additional effort.

In order to test effectiveness of suicide handling we set up the study to analyze the number of suicide related treatments between the risk groups. The dimension of additional effort was analyzed comparing the overall number of treatments before and after the implementation phase of the screening tool.

14.21% ($n = 86$) of the experimental group scored with 3 points or more and were thus classified as high-risk individuals. The comparison of the experimental (EG) and comparison group (CG) showed that there was no significant additional effort during the study period compared to the period before introducing the new screening tool. However, a significant effect was the shift in focus of interventions in favor of the high-risk group. This indicates a more effective use of resources after implementation of the screening tool.

Most interesting is the distribution of the need of psychological interventions and antidepressant medication. It is assumed that a psychologist is able to assess the function and the limits of a screening tool and examine the indication for further intervention. Significantly more subjects in the high-risk group received 2 or more psychological interventions on the basis of clinical criteria and not only because of an elevated screening score. The results from analyzing the experimental group and the comparison group support this hypothesis, since the general number of interventions in the implementation phase (study period) did not increase significantly. One possible explanation for this result is that individuals who were actively requesting psychological interventions or who were very vocal and exposed are often screened before the screening. However, this approach often overlooks individuals who are at risk of suicide. It is probable that the introduction of the screening tool enabled the psychologists to address another clientele, the silent endangered (38).

It was found that high-risk individuals were more likely to be accommodated in an emergency community, crisis intervention cell or to receive specific observations. The accommodation in the crisis intervention room is sometimes necessary to isolate individuals from external stimuli. However, it is also critical to note here that isolation in a phase of acute suicidal tendencies does not always work in the sense of suicide prevention and is sometimes used as a disciplinary measure even for prisoners with pronounced behavioral problems (38). It can only be claimed that it is an indicator that the detainee has become exposed in any way. Nevertheless, the comparison of the comparison- and the experimental group showed that before implementing the screening, more frequent accommodation in the crisis intervention room and in-patient psychiatric accommodation were necessary. One possible explanation could be the early receipt of psychological and psychopharmacological support during the study period of implementing the new tool.

This supported by the results showing that antidepressant drug prescription and other psychopharmacological medications were increased in the high-risk group, but generally no more prescriptions were recorded during the implementation period compared to the period before implementation.

CLINICAL IMPLICATIONS

Suicide in jail is influenced by the combination of individual and institutional risk factors (1). Since specific prisons differ widely in terms of various aspects affecting suicidality (type of detention, level of overcrowding, number of professionals, structural conditions, management style, etc.) it is important to emphasize that any transformation or modification of the screening sheet should be accompanied in advance by statistical knowledge. Lohner (39) propose that each institution should set up a risk profile with regards to its individual circumstances or, in view of the scarcity of resources, use at least one screening instrument which, in the developmental sample, resembles that of its own institution.

Future studies should also consider the salutogenic model by Antonovsky (40), and include the nature and the relation of stressors and risk factors and generalized resistance resources (protective factors) in the risk assessment of suicidality.

Also, since the inclusion of interpreters on the day of admission seems to be relatively difficult future studies should target how conducting a suicide screening with non-German-speaking prisoners can be managed.

STRENGTHS AND LIMITATIONS OF THE STUDY

The main advantage of the study is the prospective design. Collecting pre-defined variables tailored to the requirements of the study is less prone to bias errors and uncovers additional knowledge as opposed to a retrospective design studies (18).

An additional strength of the study is the large sample size and the nature of the sample as a cohort of admissions.

Most research in suicide prevention follows a retrospective design and can thus measure suicidality with fixed outcome events (8). The key limitation of this study comes from the use of associated parameters to measure the risk of suicide. As we opted to gain additional knowledge in comparison to the various retrospective file analyzes (18), the prospective design of this study lacked focus on the outcome event of suicide. In the future, further validation of the suicide screening tool using outcome measures of suicide should be undertaken.

Another limitation of the study comes from its naturalistic design. Some factors (e.g., staffing and prison regimen) are hard to keep stable during the length of the study.

CONCLUSION

Finally, with implementing a simple and short screening, various changes in the handling of suicidality in remand prison system were noticeable. There has been a shift in specific interventions toward the high-risk group, while the number of interventions

in the period before and during the implementation phase did not significantly increase. In addition, it can be stated with reservations that fewer psychiatric decompensation levels were recorded during the implementation of the tool. Through a structured process, the psychologists were more involved in the admission procedure and could use its expertise more effectively. The screening fulfilled the goal of establishing a structured and cost-efficient course of suicide prevention and thus can support staff in the long run.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of the Charité's Ethics Committee (Berlin) and in accordance with the Declaration of Helsinki. Since the study relied on basic data already collected by the institution, no separate written consent was necessary by the subjects. The study was conducted in full compliance with the predefined terms of and under the prior approval of the Ethics Commitee of the Charité University Hospital Berlin.

AUTHOR CONTRIBUTIONS

DD, AO-W, and NK designed the study. DD collected the data. DD, AO-W, and NK analyzed and interpreted the data. DD and AO-W wrote the initial draft of the manuscript. DD and AO-W had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of data analysis. KS translated and proof read the manuscript. All authors have contributed to read, and approved the final version of the manuscript.

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SYSTEMATIC REVIEW
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The Costs of Healthcare in Prison and Custody: Systematic Review of Current Estimates and Proposed Guidelines for Future Reporting

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Aims: We aimed to review prison healthcare expenditure internationally.

Objectives: To systematically review healthcare spending on prisoners worldwide, examine comparability between countries, and develop guidelines to improve reporting.

Methods: Five bibliographic indexes (International Monetary Fund, ProQuest: Statistical Abstracts of the World, PubMed, Google Scholar, and JSTOR) were searched for the costs of prison and prison healthcare, supplemented with country-specific searches for the 20 countries with the highest prison populations. Information on overall healthcare costs, their breakdown by categories, and their proportion to overall prison expenditure was extracted. PRISMA guidelines were followed.

Results: Prison healthcare expenditure data was identified for 10 countries, and overall operating costs were reported for 12 countries. The most commonly reported healthcare cost was for primary medical care. Healthcare costs reporting varied widely, and few countries were comparable. We developed a set of guidelines for consistent and transparent reporting of healthcare costs.

Conclusions: Few countries report the costs of healthcare services in prison. When reported, there is a lack of clarity and consistency as to what is included. Using the proposed reporting guidelines would enable national trends and international comparisons to be investigated, and any recommended benchmarks to be monitored.

Keywords: prison, custody, detention, costs, expenditure, guidelines, healthcare services

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INTRODUCTION

Healthcare in prison varies widely across countries, and differences in service provision contribute to morbidity and mortality outcomes inside custody (1) and on release (2). Many studies have examined disease prevalence rates, and prevention, care, and treatment in prison (3, 4), but the current evidence base lacks information on the costs of healthcare services. Combined with information on the prevalence of healthcare problems, international comparisons of prison health expenditure could better inform decisions on the levels of appropriate funding, enable benchmarks to be monitored, and allow for planning of service provision.

Information on the costs of operating prisons have been published since the 1950s (5), including a 2004 report of international costs (6). However, no review of prison healthcare costs across countries currently exists. Government and other reports of healthcare costs in prisons have been published, but it is not clear in reporting what particular services are included, which examine variously "medical care" (7), "prison hospitals" (8), or "prisoner health" (9). Furthermore, what is included within these categories is not clear. Scotland, for instance, lists mental health and dental care as prison healthcare expenditures (10), while Australia provides only a single overarching figure for prisoner health (9).

In this systematic review, we have aimed to provide an international overview of the annual costs of prisoner healthcare, what healthcare services are included in the identified reports, and calculate the proportion of overall prison operating budgets allocated to health. In addition, we develop and propose reporting guidelines.

METHODS

Search Strategy

We searched IMF, ProQuest: Statistical Abstracts of the World, Google Scholar, JSTOR, and PubMed databases. We performed non-country specific searches, with a combination of keywords: "prison" OR "justice," AND "expenditure," "spending," OR "costs" (**Table 1** for details). Then, additional targeted searches on Google Web and government databases (e.g., Statistics Canada) were conducted for the 20 countries with the largest prison population (11) and countries included in a previous review of recidivism rates (12), with a combination of keywords: country name AND "prison healthcare cost," country name AND "ministry of justice," country name AND "prison" AND "expenditure" OR "service." No language or publication date restrictions were set, and the most recent and relevant cost report was identified. When necessary, correctional services were contacted to clarify data. A review protocol [CRD42018102534] was submitted and published on the PROSPERO register of systematic review during data extraction.

Per-prisoner estimates for each country were calculated as follows:

1) Identifying total expenditures from the included reports (excluding the US and Germany, which reported per-prisoner expenditure based on all state prison populations)
2) Calculation of per-prisoner cost (using the prison population from World Prison Brief statistics) (13). If the prison population was not available for the same year as the cost report, the following year's prison population was used;
3) Conversion of per-prisoner cost estimate into inflation-adjusted 2016 International US dollars (using "CCEMG-EPPI-Center Cost Converter" external database). Stage 1 and 2 computational values (GDP deflator and PPP) of the validated conversion tool were obtained from IMF World Economic Outlook Database. Costs were first adjusted for inflation within original economy [using GDP deflator values], and then to purchasing power parity/price level between countries (14).

TABLE 1 | Database Search Strategies.

Database	Search terms	Additional criteria
IMF datasets	"prison" AND "expenditure" OR "prison" AND "costs"	Time series datasets (no Filters used) (classified as "Budgetary Central Government" OR "Extrabudgetary Central Government" OR "General Government" OR "Local Governments" OR "Social Security Funds" OR "State Governments" OR "Central Government" + in "Domestic Currency" OR "Percent of GDP" + "Expenditure on Prisons"
ProQuest: Statistical Abstracts of the World	"prison" AND "expenditure" OR "justice" AND "expenditure" OR "prison" AND "health"	No Applied Filters
JSTOR	"prison spending" OR "prison expenditure" OR "prison costs"	No restrictions
Google Scholar	"prison expenditure" OR "prison service spending"	No restrictions
PubMed	("prisons"[MeSH Terms] OR "prisons"[All Fields] OR "prison"[All Fields]) AND ("health expenditures"[MeSH Terms] OR ("health"[All Fields] AND "expenditures"[All Fields]) OR "health expenditures"[All Fields] OR "expenditure"[All Fields])	No restrictions

The cost conversions in this review may be limited by using purchasing power parities for Gross Domestic Product, which cover a broader array of goods and services than context-specific purchasing power parities (e.g., healthcare or technology purchasing power parities). However, based on the heterogeneity of costs and inventories reported by countries, purchasing power parities for Gross Domestic Product appeared to be more fitting for this review than context-specific conversion factors (14).

Study Design

Geographical

Official national and regional data were extracted from search engines. Unofficial regional data was found for one country (15), but was not included.

Data Items

The measurements and descriptions of economic costs were limited to direct prison operating costs and/or healthcare costs. Studies reporting indirect costs to prisoners (e.g., productivity loss) were excluded. The most recent information was used. Most countries presented financial accounts for the 2015–16 or

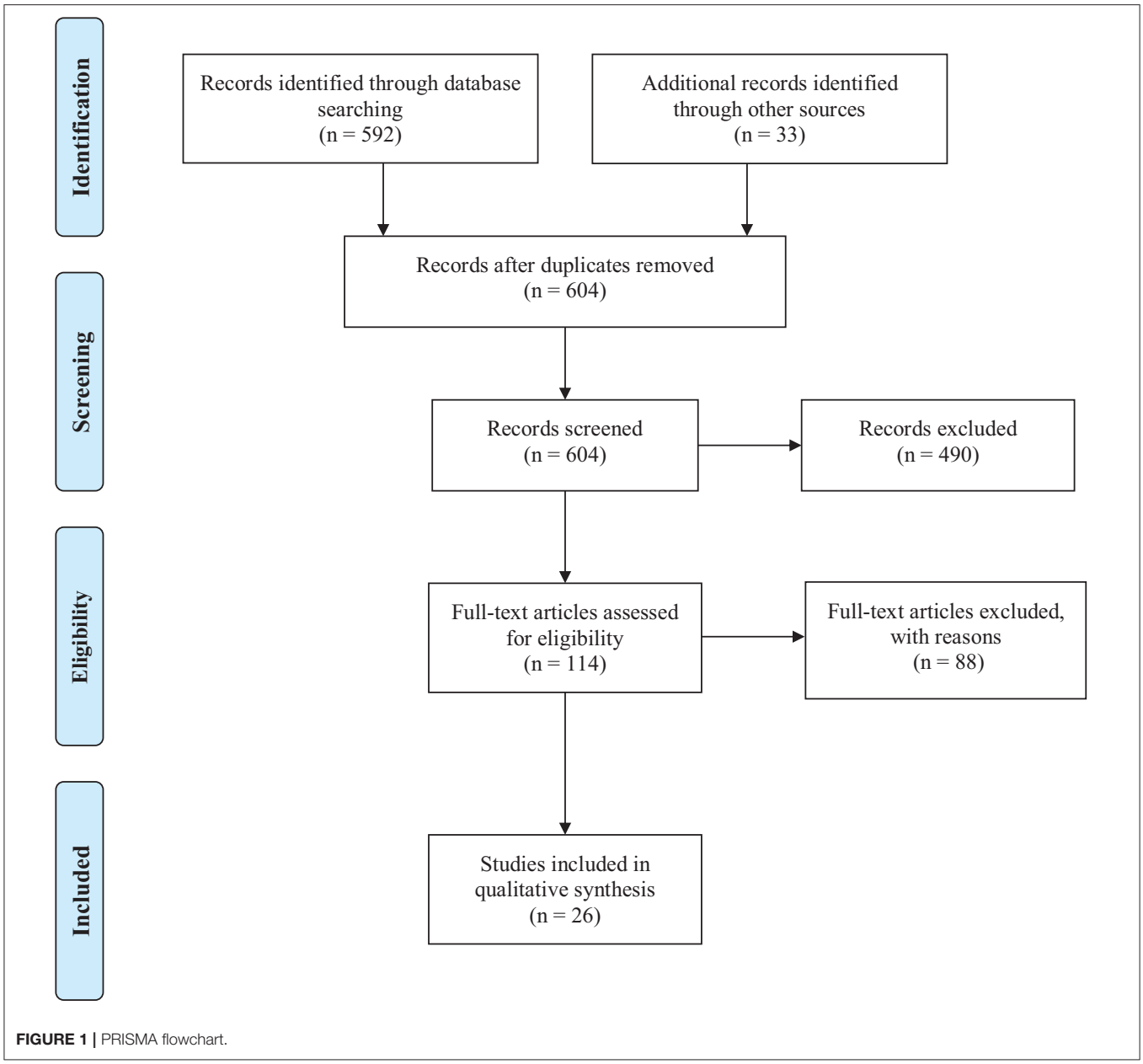

FIGURE 1 | PRISMA flowchart.

2016–17 periods, so all cost outcomes were indexed to 2016 International US dollars.

Data Sources

Financial reports on prisons/correctional services solely were included. Datasets which did not specify relevant outcome measurements (i.e., prison operations, healthcare) or the population (i.e., whole country, adult prisoners) were excluded. Expenditure reporting on police, courts, or other services affiliated with Ministries of Justice was excluded, as were assessments of prisoner health services separate from expenditure data (16). Governments typically separate prison expenditures into capital and operating costs. Capital costs refer to fixed, one-time investments on buildings, equipment, or land. Operating costs of prisons refer to day-to-day running costs, accommodation-related costs, and staff costs (17). Ideally, prison healthcare broadly refers to the services in place to address health needs and reduce health risks. It can include primary and psychiatric care, and specialized services. Information for two other countries (Greece and Switzerland) were available but not used. They were not from official governmental sources, did not specify constituent elements of costs, and are likely to be underestimates (7, 15). Costs for Sweden did not include infrastructure costs and were also not included (18).

Data Extraction

One of the authors (SS) screened and extracted the data, excluding publications and data points that did not report costs, and determined the remit of the data (e.g., national, regional).

TABLE 2 | Country reports.

Country	Publisher	Source	Year of reporting	Expenditure category	Sample
Sri Lanka	Ministry of Health, Nutrition and Indigenous Medicine	National Health Accounts	2013	Health	National prison hospitals (central government-financed)
Romania	Ministry of Justice	Ministry of Justice	2016	Health	National Penitentiary System
India	Ministry of Home Affairs	National Crime Records Bureau State/UT Prison Headquarters	2015	Health and Operating	State Prisons/Jails ("prisons" and "jails" used interchangeably)
South Africa	Department of Correctional Services (DCS)	Annual Report of Department of Correctional Services	2016–17	Health and Operating	DCS National Facilities
Ireland	Irish Prison Service	Irish Prison Service	2013	Health	National - All prisons (open, closed, and high security), including pre-trial detainees
	Irish Prison Service	Irish Prison Service	2015	Operating	National - All prisons (open, closed, and high security), including pre-trial detainees
Belgium	Belgian Health Care Knowledge Centre (KCE)	KCE Report 293Cs	2015	Health	National - All Belgian prisons (35 prisons recorded in 2015)
Australia	Productivity Commission	Productivity Commission for the Steering Committee for the Review of Government Service Provision	2015–16	Health and Operating	National - Department of Correctional Services
UK: Scotland	The Scottish Parliament	Health and Sport Committee	2016–17	Health	National - Scottish Prison Service (15 prisons)
	Scottish Prison Service	Audit Scotland	2015–16	Operating	National - Scottish Prison Service (15 prisons)
United States	PEW Charitable Trusts	PEW, Vera Institute of Justice, and state officials	2015	Health	State prisons (and jail populations of five states)
	Bureau of Justice Statistics	Department of Justice	2001	Operating	State Prisons
UK: England and Wales	National Audit Office	Comptroller and Auditor General	2016–17	Health	National
	Ministry of Justice	Ministry of Justice and HM Prison and Probation Services	2016–17	Operating/Direct	National
France	Ministry of Justice	Directorate of Prison Administration	2015	Operating	National
Singapore	Ministry of Home Affairs	Ministry of Home Affairs	2016 FY	Operating	National
Canada	Statistics Canada	Statistics Canada	2016–17	Operating	Provinces and Territories
Germany	The Berlin Senate Department for Justice and Consumer Protection	The Berlin Senate Department for Justice and Consumer Protection	2013	Operating	All German States
New Zealand	Department of Corrections	Department of Corrections	2015–16	Operating	National
UK: Northern Ireland	Northern Ireland Prison Service (NIPS)	NIPS	2016–17	Operating	National

Data Analysis

Meta-analysis was not conducted due to heterogeneity in definition and measurement of cost outcomes.

Subgroup Comparison

We compared healthcare cost descriptions by country to account for differences in categorization of expenses. Descriptions for the most recent period are included. PRISMA guidelines were followed (**Table S1**, **Figure 1**). SS and SF assessed primary outcome measures of healthcare service costs and summary descriptions.

RESULTS

We identified official country reports of prison healthcare costs for 10 countries (**Table 2**).

Annual healthcare expenditures per prisoner ranged from approximately $34 per year to $6,714 per year (**Table 3**). There was also wide variation in the percentage of operating costs attributable to healthcare, ranging from 2 to 18% (**Table 4**).

Seven countries described the constituent elements of healthcare spending, but these were not comparable (**Table 5**). The most commonly reported cost outcome was "primary medical care," followed together by "medical supplies" (mostly medication) and "mental health services." In the three countries (Sri Lanka, Ireland, Australia) that did not clarify expenditures, categorization varied from "curative care" (8) to "medical care" (22) to "prisoner health costs" (9). Most countries did not clarify how expenditure was allocated across services.

DISCUSSION

In this systematic review, we identified 10 countries that have reported healthcare costs in prisons. In addition, we were able to calculate the proportion of overall operating expenditure

TABLE 3 | Reported annual healthcare expenditure per prisoner.

Country	Per prisoner cost (2016 US$)	Year of reporting
Sri Lanka (8)	$34	2013
Romania (19)	$103	2016
India (20)	$109	2015–16
South Africa (21)	$1,001	2016–17
Ireland (22)	$2,932	2013
Belgium (23)	$4,748	2015
Australia (9]	$5,096	2015–16
UK: Scotland (10)	$5,288	2016–17
United States (24)	$5,720	2015
UK: England and Wales (25)	$6,714	2016–17

TABLE 4 | Annual overall prison operating costs and healthcare expenditure as percentage of operating expenditures.

Country	Annual operating expenditure per prisoner (indexed to 2016)	Healthcare expenditure as % of operating expenditure
India (20)	$5,900	2%
South Africa (21)	$22,412	4%
United States [State Prisons] (24, 26)	$29,978	18%
France (27)	$44,410	N/A
Singapore (28)	$48,406	N/A
Canada [Provincial, State, Territorial] (29)	$49,251	N/A
UK: England and Wales (25, 30)	$50,675	13%
Australia (9)	$56,786	9%
Germany (31)	$57,380	N/A
UK: Scotland (10, 32)	$60,943	9%
New Zealand (17)	$65,336	N/A
Ireland (22, 33)	$68,019	4%
Northern Ireland (34)	$76,516	N/A

allocated to healthcare in 7 countries. Among the 20 countries with the highest prison populations (11), only 4 reported operating and healthcare expenditures on prisoners (20, 21, 24, 25). There were large variations in how healthcare costs were defined across countries, and consistency and transparency is required to enable international comparison. We have sought to address this by developing guidelines for future reporting.

One other finding was that only two countries reported spending more than 10% of their overall prison operating budgets on prison health (24, 25). Additionally, we did not find any clear links between overall spending and the proportion on healthcare. Notably, Ireland had the highest overall operating expenditure per prisoner among the countries reporting healthcare costs, but only 4% of its budget was allocated toward healthcare, which put it among the countries with the lowest proportion (22, 33).

Seven of the 10 countries that reported on healthcare expenditure provided specific detail on the services provided.

TABLE 5 | Healthcare expenditure descriptions.

	Primary medical Care	Medical supplies (incl. medicines)	Mental Health services (incl. visiting psychologists/ psychiatrist)	Staff (incl. doctors, nurses, pharmacists)	Diagnostic Tests (incl. lab services and screening)	Dental	Substance abuse treatment	Consultants (incl. External psychiatric, gynecological, dental, optical)	Nursing care	Hygiene	Other*
Sri Lanka (8)											×
Romania (19)		×								×	×
India (28)	×		×	×	×						×
South Africa (21)	×	×			×					×	×
Ireland (22)											
Belgium (23)	×	×	×	×		×		×	×		×
UK: Scotland (10)	×	×	×	×	×	×	×	×	×		
Australia (9)											×
United States (24)	×	×	×	×		×	×				×
UK: England & Wales (25)	×		×				×				

*see ***Table S2*** *for full inclusion and exclusion details.*
In India, health services include "visiting psychologists/psychiatrists."

TABLE 6 | Prison healthcare expenditure reporting checklist.

COUNTRY		
Time Period:	-For which financial year(s) are you reporting?	
Prisons Operating Expenditure:	-Does this include depreciation, financial payments on capital assets, fixed assets, and/or transfers/subsidies? *(Recommendation: exclude these costs)*	
Prisons Health Expenditure:	-What was the annual expenditure on physical and mental healthcare?	
% Operating Budget allocated to Medical Care:	-What percentage of the overall budget allocated to prisons went toward prisoner medical/healthcare?	
PRISONER POPULATION		
I. Context/Demographics:		**Guidelines**
a. Geographical	Are you reporting prison expenditures for the whole country, or a particular region?	Report whole country
b. Sample size	Which prison population(s) are being sampled and accounted for in expenditure reporting?	Include *all* adult (18 and older) private, public, and remand /detainees/unconvicted prisoners Include federal and provincial/regional prison institutions
c. Characteristics	Age, gender, ethnicity, health insurance status	Report age distribution in 10-year increments, natal gender, white vs. non-white ethnicity and health insurance status of incarcerated persons
d. Length of current sentence	Distribution of offense types and sentence length (35)	Categories: violence (including robbery), sex offense (contact vs. non-contact), burglary/theft, drug offense, other Report sentence length in following bands: <1 year, 1–3 years, 4–9 years, >10 years, life sentence
II. Exclusion Criteria		
a. Other samples	Which samples are not included in financial accounting?	Exclude prisoners under 18 years of age, and those in immigration detention centers and police custody, and persons in *external* secure mental health facilities
COST OUTCOMES		
I. Priority Areas		**Guidelines**
a. Medical Supplies	How much money was allocated to medical supplies for prisoners? List goods included.	Include expenditures on pharmaceuticals/drugs, disability aids, vaccines, and equipment *maintenance* (separately if possible)
b. Healthcare Personnel	How much was spent on payroll services?	Report total amount spent on salaries of doctors, nurses, pharmacists, and technicians
	How much was spent on non-payroll services?	Report expenditures on visiting psychiatrists and external consultants
c. Diagnostic: Screenings and Tests	How much was spent on screenings for diseases in prisons? What types of diagnostic tests are offered?	Report expenditures on TB/AIDS/other screenings and laboratory/imaging tests separately
d. Primary Care	How much was spent on primary care services for prisons?	Report expenditures on GP Medical care and Nursing care separately
e. Psychiatric	How much money was allocated to psychiatric services in prisons?	Report expenditure on mental health programs and services
f. Rehabilitation	Is rehabilitative *healthcare* included in prison expenditure? If yes, how much was spent?	Report expenditure on substance abuse treatment *only*
g. Dental	Are dental services included in prison expenditure? If yes, how much was spent?	Report expenditure on dental services (e.g., general cleaning, orthodontics)
h. Optical	Are optical services included in prison expenditure? If yes, how much was spent?	Report expenditure on optical services (e.g., eye exams, glasses)
i. Maternal and Child	Are maternal and child health services included in prison expenditure? If yes, what services are provided and how much was spent?	Report expenditure on maternal and child health services (e.g., nutrition)
j. Surgical Procedures	Are any surgical procedures included in prison expenditure? If yes, how much was spent?	Report expenditures on any surgical procedures
k. Specialized Services	Are any other specialized *on-site* services included in prison expenditure? If yes, how much was spent?	Report expenditures on Gynecological, Palliative, Physiotherapy, Chemotherapy/Radiation, Occupational health services (if offered in prison)
l. Other	Are there any other health-related expenses?	Example: Hospitalizations, Hygiene

(Continued)

TABLE 6 | Continued

II. Exclusion Criteria		**Guidelines**
a. Capital Costs	Medical Equipment, Depreciation, Payments on assets	Example: How much was spent on procedural equipment, lab/imaging equipment, or payments on assets?
b. Social Services	Spiritual and social work services	Example: Religious ministry
c. Transport	Transport costs	Exclude ambulatory stay costs (i.e. emergency hospital stays following use of an ambulance)
d. Off-Site	Specialized outpatient care	Exclude care unavailable on-site
e. Other	Are there any other costs excluded from calculation?	
FUNDING SOURCES		
I. Funding Agencies		
a. National Prison Service/Department of Justice	What amount or percent of healthcare expenditures in prisons is allocated by prison services/justice departments?	
b. National Health Services	What amount or percent of healthcare expenditures in prisons is allocated by national health services?	
c. Other	Are there any other systems of financing prison healthcare in your country (e.g., private insurance)?	

The breakdown of these services varied between countries. It was not clear in some cases whether staff expenses included salaries of allied health professionals such as pharmacists, technicians, dentists, and visiting doctors (23), or whether "medical supplies" included medicines and medical equipment (21). Dental services lacked sufficient detail (10, 24), and mental health services were defined inconsistently across countries, with some countries integrating addiction care into mental health services (10, 24, 25), but another not (20).

One main implication of these findings is that international comparisons of healthcare expenditures on prisoners are currently not possible due to lack of consistency and transparency in reporting. To address this, we have developed a brief checklist covering definitions, inclusion, and exclusion criteria, and sources of funding that contribute to prison healthcare (such as national health services or ministry of justice) (**Table 6**). This checklist follows the structure of existing national financial audits, and is based on examples of good practice based on the current review, those categories that appear to be most consistently reported, and previous context-specific reporting guidelines (12, 15, 24, 36). The current proposed checklist would enable international comparison of overall healthcare expenditure in prisons, and provide country specific breakdowns as to how resources are allocated. Consistent international reporting would assist in monitoring whether countries meet basic standards for prisoner health, and allow for examination of links between adverse health outcomes in prisoners and variation in services provided. It would also help to develop and monitor recommended levels of appropriate funding. Different governments are likely to have competing additional priorities of healthcare need (20, 21), which will be reflected in how resources are spent and be reported in this checklist. Systematic reporting of expenditure may lead to improved health outcomes for prisoners by, for example, targeting specific areas of need in future service provision. They could also lead to increased efficiency and a greater focus on prevention. We recommend that prison services include the checklist information in annual accounts, where expenditures are often separated by service category and funding source (37). We have sought to streamline these guidelines to assist in feasibility of completion, standardization, and integration into national financial audits.

LIMITATIONS

Using percentage allocations of overall operating expenditure allocated to healthcare does not necessarily allow for cross-country comparison. For example, Australia and Scotland made similar allocations, of ∼9% (9, 10). However, due to the different descriptions of services provided, it is unclear whether the two countries provide equivalent healthcare services for prisoners. Some country estimates were based on limited data. For example, calculations for the US and Canada were limited by exclusion of federal prisons, constituting 19.9% of Canadian adult institutions and 7.9% of combined American state and federal institutions (13). There were variations in American prisons with regard to sources of funding, which may have underestimated costs in some states. For example, inpatient hospitalization costs were being met by insurance companies in some cases, but borne by the prison directly in others. Similarly, in some states, community mental health services covered some of the cost of prisoner treatment (24).

There are additional sources of information on healthcare services provided in prisons which we have not included in this review, as they do not provide detail on expenditure (16). Future work may look at such reviews of prison healthcare (for non-financial purposes) to provide a more detailed assessment of what services are provided, in conjunction with examining financial reporting.

AUTHOR CONTRIBUTIONS

SF and SS conceived and designed the experiments. SF and SS performed the experiments. SS analyzed the data. SF, SS, and RC wrote the paper. SF supervised the project.

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SUPPLEMENTARY MATERIAL

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SYSTEMATIC REVIEW
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The Role of Oxytocin in Antisocial Personality Disorders: A Systematic Review of the Literature

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Background and aims: Antisocial personality disorder is an enduring mental disorder associated with significant disease burden and treatment difficulties. This is apparent within forensic populations. There is growing evidence to suggest that treatment with oxytocin could have some benefit in treating a range of psychiatric disorders. There are no reviews studying the use of oxytocin for patients with ASPD. We aim to present the first literature review on the use of oxytocin in patients with ASPD.

Method: We searched relevant databases for original research on effect of oxytocin upon persons with a diagnosis of ASPD or healthy participants with symptoms seen in ASPD. Studies were included if they included healthy participants that evaluated the effect of oxytocin on symptoms relevant to ASPD, including empathy, inhibitory control, compliance, conformity, aggression, violence, and moral responsibility.

Results: Thirty-six studies were included. There were a range of study designs, including randomized controlled trials, double blinded, single blinded, and unblinded controlled trials. The sample sizes in studies ranged from 20 to 259 participants. Studies looked at participants with a diagnosis of ASPD and participants with symptoms relevant to ASPD, including empathy, inhibitory control, compliance, conformity, aggression, violence, and moral responsibility. Oxytocin was found to demonstrate diversified effects, in most cases being associated with socially positive or non-criminogenic behaviors. However, some studies found opposite, and non-desirable, effects, e.g., an increase in violent inclinations to partners. The two studies looking at participants with ASPD had a number of limitations and had conflicting results on the impact that OT has on aggression in ASPD.

Conclusions: This is the first systematic literature review exploring the potential use of oxytocin in managing ASPD and the symptoms of ASPD. It is apparent that there is a body of evidence addressing related symptoms in healthy individuals. There were diversified effects with oxytocin showing some benefits in promoting positive effects on symptoms of ASPD, but there were also studies showing non-desirable effects. It is difficult to draw any direct inferences from healthy control studies. Further high quality large sample studies are required to explore the effects of oxytocin in those with ASPD

Keywords: antisocial, ASPD, dissocial, antisocial personality disorder, personality, personality disorder, oxytocin

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INTRODUCTION

Personality disorders are a group of enduring mental disorders characterized by maladaptive patterns of behavior, cognition, and inner experience. These traits are relatively stable across time and situations (1).

Personality disorders are relatively common mental disorders. An epidemiological study of the prevalence of personality disorders in a random sample of 626 British households found that the prevalence of any personality disorder was 4.4% (2). In treatment settings, both primary care and general psychiatric settings, the prevalence of personality disorders is significantly higher. In a sample of 859 psychiatric outpatients in America 31.7% had a diagnosis of a personality disorder (3). A systematic literature review identified that the prevalence of personality disorder in community secondary psychiatric care in Europe was between 40 and 92% (4).

Personality disorders are a source of distress and suffering for patients and those around them. People with personality disorders have been found to use mental health services more than those with major depressive disorders (5). In addition, patients with personality disorders have been found to have greater social dysfunction than those with many other mental disorders (6). In addition, the costs of personality disorders are high. An economic study of patients with personality disorders in the Netherlands found that treatment-seeking patients with personality disorders pose a high economic burden on society at a mean cost of €11,126 per year (7). A study in England found that the cost to the NHS and prison service of those with a personality disorder before treatment was £13,966 per year (8).

Individuals with antisocial personality disorder (ASPD) are of particular concern as they may cause harm to others. Symptoms include a failure to conform to social norms, repeated deceitfulness, impulsivity, irritability, and aggression, consistent irresponsibility, disregard for their own safety or the safety of others and a lack of remorse (1). The prevalence of ASPD in the community has been estimated at 0.6% (2). In a study of psychiatric inpatients aged between 18 and 37 in the UK, the prevalence of ASPD was 14% (9). An Office of National Statistics (ONS) survey of prisoners in England and Wales found a prevalence of any personality disorder of 78% for male remand, 64% for male sentenced, and 50% for female prisoners, the majority of which accounted for by ASPD (10). A review of the international literature found a prevalence of ASPD within custodial settings of 47% (11).

There are a number of theories on the etiology of ASPD. These include genetic, neurobiological and environmental models (12). More recently studies have also looked at specific neurobiological factors, such as the role of the hormone oxytocin and polymorphisms in the oxytocin receptor gene (13).

Oxytocin is a neuropeptide produced in the supraoptic and paraventricular nuclei of the hypothalamus. It is involved in a wide range of bodily reactions via interactions with sex organs and hormones and the Hypothalamic Pituitary Axis (HPA). As such Oxytocin is involved in a range of physiological processes including sexual activity, pregnancy, lactation, social bonding, pain regulation, and maternal behavior (14, 15). Oxytocin is also central to various aspects of human behavior such as social cognition, affectivity, stress response, affiliation, and prosocial behavior (15, 16). Manipulation of oxytocin levels has been shown to alter social cognition in healthy individuals, e.g., increase social interaction, empathy and trust, and reduce stress (17). In a double blind placebo controlled crossover trial of intranasal oxytocin, those given oxytocin performed better on a fear recognition task compared with those given placebo (18); they also demonstrated more positive communication and had lower salivary cortisol levels in response to conflict (19).

Due to these attributes oxytocin and its potential clinical applications have been studied in relation to a number of mental disorders, including autistic spectrum disorders, schizophrenia, depression, and anxiety. In a randomized controlled double blind placebo controlled trial of 33 adult men with high functioning autism subjects were given intranasal oxytocin and their performance on a social psychological task was assessed. The authors concluded that oxytocin has a beneficial effect on the socio-communicational deficits in autism, as patients were able to make non-verbal judgments more quickly compared with those in the placebo condition (20).

A double-blind placebo-controlled crossover study of 21 patients with schizophrenia found an improvement in emotional facial recognition following administration of intranasal oxytocin (21). In another randomized control trial, 20 patients with schizophrenia demonstrated a significant reduction in Positive and Negative Syndrome Scale (PANNS) scores and an improvement in several social cognition measures (22).

The potential application in personality disorders of oxytocin have not yet been explored. The current guidance on the treatment of ASPD highlights that the evidence base for both pharmacological and psychological interventions is limited and recommends that "Pharmacological interventions should not be routinely used for the treatment of antisocial personality disorder or associated behaviors of aggression, anger and impulsivity" (23). A Cochrane systematic review on the use of psychological and pharmacological interventions in ASPD also highlight the limited evidence base and insufficient evidence to support either pharmacological or psychological therapies (24).

As noted above, individuals with ASPD display a number of symptoms, which, based on the evidence in healthy controls as well as individuals with other disorders, may be positively affected by oxytocin. These symptoms include lack of empathy, one of the diagnostic features for a diagnosis of ASPD. Whilst deficits in empathy can be present in a number of psychiatric disorders, including other personality disorders, psychotic disorders, and autistic spectrum disorders, these deficits do not form part of the diagnostic criteria in any other condition. Other potential target symptoms include lack of conformity and compliance and lack of moral reasoning (1, 25).

The aim of this review is therefore to provide an overview of the literature on the use of oxytocin in ASPD as well as targeting key symptoms of the disorder.

METHOD

In conducting this review, we have followed the PRISMA guidelines for reporting systematic reviews (26).

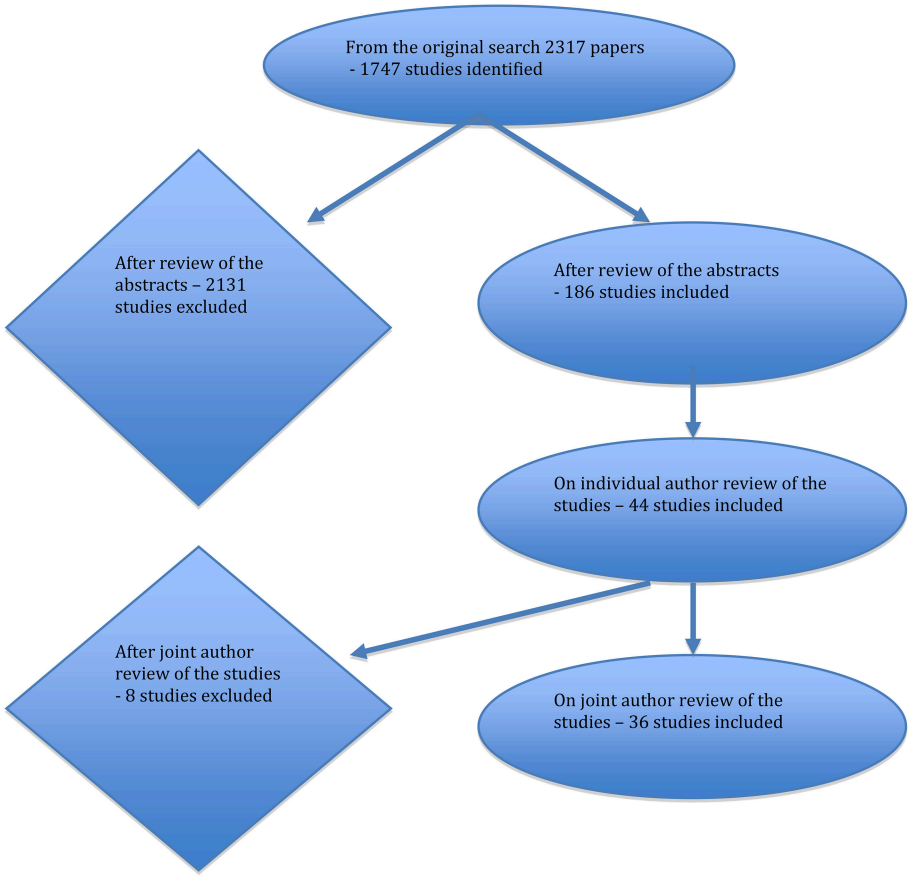

FIGURE 1 | Flow of literature search results.

Search Strategy

We undertook a systematic literature search of publications up until March 2018. The search was undertaken with the assistance of an information specialist of the Nottinghamshire Healthcare NHS Foundation Trust Library Service and included the electronic databases MEDLINE, EMBASE, PsycINFO CINAHL, Cochrane Library, ASSIA, Sociological Abstracts, BIOSIS, Web of science. In addition, the EU Clinical Trials Register (www.clinicaltrialsregister.eu), the clinical trials register of the U.S National Institute of Health (www.clinicaltrials.gov) and dissertation abstracts were searched for any ongoing trials relevant to our review. The search terms used related to the DSM V classification for ASPD and various terms relating to oxytocin. The full search strategy is included in **Appendix 1** in Supplementary Material.

Results of the searches were reviewed independently by authors JP and TG for suitability for inclusion in the review against the criteria set out below. This was initially undertaken through inspection of titles and abstracts. A second review appraising the full papers was then undertaken as required. In the event of a difference of opinion over a paper's suitability for inclusion a third author (BV) was consulted. Additionally, authors JP and TG searched reference lists from both included and excluded studies for further suitable papers for inclusion.

In- and Ex-clusion Criteria

Studies of any type of design were included if they met the following criteria:

- Original research
- Studies where oxytocin was administered as the primary intervention
- Studies where participants had a diagnosis of ASPD
- Studies with healthy participants that evaluated the effect of oxytocin on symptoms relevant to ASPD, including empathy, inhibitory control, compliance, conformity, aggression, violence, and moral responsibility
- Human participants over the age of 18
- Male and female participants
- All study sizes
- Studies in all languages and from all countries
- Studies were excluded if participants had a comorbid major mental illness due to the potential for the confounding impact that these disorders may have upon any treatment effect. This was defined as having any presence of any comorbid mental

disorder, specifically; organic, developmental, addictive, neurotic, affective or psychotic disorders as categorized by DSM V.

RESULTS

Search Results

The initial searches returned 2,317 potentially relevant titles. Following inspection of titles and abstracts 186 full text papers were obtained and assessed against our inclusion criteria of which 36 were deemed relevant and were included in this review. A flow chart of search results is set out in **Figure 1**. Details of the studies are shown in **Table 1**.

Study Design

All studies were placebo controlled trials. Twenty five of the included studies were randomized (27, 29–37, 39, 41, 45–53, 57–59, 61). Thirty one studies were double blinded (27, 29–37, 39–42, 44–49, 51–56, 58–62). In addition there were two single blinded studies (28, 43). Three studies were not blinded (38, 50, 57).

Sample Size

The total number of participants in all of the included studies was 2,615 with study sizes ranging from 6 (28) to 259 participants (54).

Participants

Fourteen of the studies included male and female participants (27, 29, 33, 37, 40–42, 46, 48, 54, 56, 59, 60, 62). Two studies included only female participants (31, 47). The remaining 20 trials only included male participants (28, 30, 32, 34–36, 38, 39, 43–45, 49–53, 55, 57, 58, 61).

Oxytocin Administration

All study participants received a single dose of either intranasal (IN) OT or placebo except for one study in which participants were given three doses of intranasal OT at 5-min intervals (54). Doses ranged from 12 to 48 IU per dose.

Outcome Measures

Included studies used a variety of experiments to assess for different outcomes. These outcome measures included: intuitions about free will and moral responsibility, compliance, memory, social conformity, empathy, facial empathic recognition, inhibitory control, in-group favoritism, aggression, and violence. The experimental paradigms and means of measuring these outcomes varied between studies. These are detailed in **Table 1**.

STUDIES IN PARTICIPANTS WITH ASPD

There were two studies that looked at the effects of OT in participants with ASPD (27, 28).

Timmerman and colleagues conducted a randomized, controlled, double blind, placebo crossover trial. They included 22 adults with ASPD (14 males, 8 females) and 29 healthy controls (11 females, 18 males) in the study. Both before and after IN OT and placebo participants were shown images of faces showing various emotions and assessed on their ability to accurately identify the emotion displayed and the time delay for this. The study found that there were relative deficits in the ASPD group recognizing fearful and happy faces. It was found that following OT administration these effects were no longer observable (27).

Alcorn and colleagues conducted a single blind placebo controlled trial with 6 male participants with ASPD in a community setting. Participants took part in the PSAP (point subtraction aggression paradigm). This is a well-established a validated laboratory measure of state human aggression. Participants were informed that they were anonymously paired with another (fictitious) individual. In their pairs they had a choice to press one of 3 buttons which corresponded to monetary reinforced, aggressive and escape responses. The purpose was for participants to earn as much money as possible. Participants were observed for shifts in their response times on the aggressive response options when having had IN oxytocin or placebo. This study found that there were no specific effect of OT on the aggressive responding. However, there effects were impacted upon by some significant individual differences in responses. There were some individuals who demonstrated a large increases in aggressive responses to the PSAP when given OT but some who demonstrated the opposite effects. The authors concluded that the effects were also not systematically related to dose and that there were no trends between OT and aggressive responses (28).

STUDIES IN HEALTHY PARTICIPANTS

There was a great degree of heterogeneity in the studies in healthy participants. There were differences in which aspects of the outcome measures were being assessed and how these were assessed. For convenience we have grouped these studies together under the outcome measures highlighted above.

Description of Study Findings by Outcome Measure

Studies in Empathy

Thirteen studies looked at the effect of OT on empathy (29, 30, 32–42). Empathy was assessed using a variety of tasks.

Hubble and colleagues conducted a randomized, controlled, double blind, placebo within subject trial with 40 healthy males. Participants completed questionnaires which provided empathy scores after being shown video clips that were designed to elicit emotional responses. In addition the eye tracking of the participants was assessed. OT was associated with an increase in time spent fixating upon the eye region of the protagonist's face across emotions. OT also selectively enhanced self-reported affective empathy for fear but not for other emotions. There was no positive relationship between eye gaze patterns and affective empathy (30).

Human and colleagues conducted a randomized, controlled, double blind placebo controlled trial with 116 healthy participants (46 men 70 women). Participants were randomized to receive either IN OT or placebo and completed a series of tasks either with the help from a computer or a confederate human

TABLE 1 | Summary table of included studies.

References	Study type	Participants	Intervention	Outcome measures	Findings
STUDIES IN PARTICIPANTS WITH ASPD					
Timmerman et al. (27)	Randomized, controlled, double blind, placebo crossover trial	22 adults with ASPD (14 males 8 females) and 29 healthy controls (11 females, 18 males)	IN OT (24 IU) or placebo	Participants were shown images of faces showing various emotions and assessed on their ability to accurately identify the emotion displayed and the time delay for this	Relative deficits in the ASPD group recognizing fearful and happy faces were no longer observable under OT
Alcorn et al. (28)	Single blind placebo controlled trial	6 male participants with ASPD	IN OT (12, 24, 48 IU) or placebo	Performance on a validated laboratory task of human aggression (point subtraction aggression paradigm—PSAP)	There were few differences between those on placebo and those with OT in performance on the PSAP
STUDIES IN HEALTHY PARTICIPANTS					
Studies in empathy					
Human et al. (29)	Randomized, controlled, double blind placebo controlled trial	116 healthy participants	IN OT (40 IU) or placebo	Following being helped on a task participants affect and social perceptions were rated	In the context of being helped by a stranger oxytocin fostered more positive affective and social responses
Hubble et al. (30)	Randomized, controlled, double blind, placebo within subject trial	40 healthy males	IN OT (24 IU) or placebo	Participants completed questionnaires which provided empathy scores after being shown emotion eliciting video clips. In addition the eye tracking of the participants was assessed	OT was associated with an increase in time spent fixating upon the eye region of the protagonists face across emotions. OT selectively enhanced self-reported affective empathy for fear but not other emotions. There was no positive relationship between eye gaze patterns and affective empathy
Hecht et al. (31)	Randomized, double blind, placebo controlled trial	28 healthy females	IN OT (24 IU) or placebo	Neural responses on fMRI to participants being shown animations of geometric shapes depicting social interactions	Lower social processing at baseline at baseline predicts a more positive response to OT
Li et al. (32)	Randomized, controlled, double blind, placebo within subject trial	30 healthy fathers of 1-2 year old children	IN OT (24 IU) or IN AVP (20 IU) followed by placebo	Brain function was measured with fMRI with the participants viewing images of their children, unknown children and unknown adults as they listened to a crying stimulus	OT but not AVP increased the participants responses to images of their own children
Luo et al. (33)	Randomized, controlled, double blind placebo controlled trial.	86 healthy participants	IN OT (24 IU) or placebo	Brain function was measured with fMRI with the participants viewing a range of images of emotional faces	Oxytocin produces sex dependent effects even at the early stages of social processing
Strang et al. (34)	Randomized, controlled, double blind placebo controlled trial	132 healthy male participants	IN OT (24 IU) or placebo	Performance on a social discounting task as a measure of generosity	The effect of oxytocin on generous behavior is modulated by trait empathy. In those who were administered oxytocin there was a positive correlation between trait empathy and their generosity
Hi et al. (35)	Randomized double bind cross over study	41 healthy males	IN OT (24 IU) or placebo	Performance on the "HelPun" task to examine the altruistic decision making of participants to help or punish others in the task. fMRI scanning before and after OT or placebo administration	In the OT group there was a trend to accelerate altruistic decision making. In the OT group there was enhanced activity in the left temporo parietal junction during observation of others being helped by the computer. These results indicated that OT enhances prosocial revelant perception by increasing theory of mind related neural activities
Korb et al. (36)	Randomized, double blind, placebo controlled, between subject trial	60 healthy male participants	IN OT 24 IU or placebo	Performance on the Offset and Intensity facial mimicry tests as assessed compared with baseline facial EMG	Facial mimicry was increased in the OT group. These effects were strongest for angry infant faces

(Continued)

TABLE 1 | Continued

References	Study type	Participants	Intervention	Outcome measures	Findings
Palgi et al. (37)	Double blind, within subject placebo randomized controlled trial	30 male and female participants	Single dose IN OT (24 IU) or placebo	Participants listened to recording of mixed gender protagonists describing distressing emotional conflicts and were then asked to provide compassionate advice	In male and female participants OT enhanced compassion toward females but not males
Perry et al. (38)	Randomized double blind placebo controlled trial	54 male participants	Single dose IN OT (24 IU) or placebo	Online questionnaire assessing empathy Experiment involved participants indicating their preferred interpersonal distance	Among highly empathetic individuals OT promoted choice of closer interpersonal distances while the opposite effect was found in individuals with low empathetic traits
Gallup and Church (39)	Randomized double blind placebo control trial	60 male healthy participants	Single dose IN OT (30 IU) or placebo	Exposure to a continuous yawning video	OT did not increase contagious yawning but modulated expression indicative of awareness of social stigma associated with this behavior
Abu-Akel et al. (40)	Double blind placebo controlled crossover trial	29 male and female participants	Single dose IN OT (24 IU) or placebo	Self-perspective empathy vs. other perspective empathy in painful and non-painful situations	OT but not placebo, increased other perspective empathy
Cardoso et al. (41)	Randomized double blind placebo control trial	82 male and female participants	Single dose IN OT (24IU) or placebo	Perceiving and understanding emotion components of MSCEIT.=	OT led to participants rating emotion in facial stimuli as expressing greater emotional intensity than those on placebo. Accurate identification of type of emotion in faces impaired in OT group. =
Fischer-Shofty et al. (42)	Double blind placebo controlled crossover trial	62 male and female participants	Single dose IN OT (24 IU) or placebo	Interpersonal perception task	OT improved accurate perception of social interactions. OT also had sex specific impacts—improved kinship recognition within women but not men; performance of males was only improved on competition recognition
Studies in inhibitory control					
Hirosawa et al. (43)	Single blind placebo controlled crossover study	20 male participants	IN OT (24 IU) or placebo	Paradigm 1: Facial cognition. Paradigm 2: attentional-inhibitory control using a modification of the speeded flanker task.	No significant behavioral effects of OT. However, the enhancement of attentional inhibitory control after OT administration significantly correlated to the positively valenced effects of the interpretation of uncertain facial cognition
Ma et al. (44)	Double blind placebo controlled between subject design	150 Male participants	IN OT (24 IU) or placebo	Task of in-group favoritism where cognitive processing was experimentally manipulated. Participants were also assessed for intuition or reflection in daily life	OT increased in-group favoritism in intuitive participants but decreased it in those who rely on reflective style
Studies in compliance and conformity					
Aydogan et al. (45)	Randomized, double blind, placebo controlled trial	120 healthy males	IN OT (24 IU) or placebo	Performance on a competitive and noncompetitive coin tossing task, where participants would self-report in order to win a monetary prize. This task was to measure conformity to the widely accepted norm of honesty under the pressure of competition in the OT group compared with the placebo group	Conformity was enhanced by oxytocin and this enhancement had a detrimental effect on honesty in a competitive environment but not in a noncompetitive environment

(Continued)

TABLE 1 | Continued

References	Study type	Participants	Intervention	Outcome measures	Findings
Gross and De Dreu (46)	Randomized, controlled, double blind, placebo within subject trial	139 healthy participants	IN OT (24 IU) or placebo	Performance on a test of conformity to instructions. In the test, participants had a binary choice and were given an arbitrary rule that would mean that they would receive a lesser financial benefit	Under oxytocin participants violated the rule more often. This was most apparent in individuals who had a high need for structure
Lambert et al. (47)	Randomized, double blind, placebo controlled trial	30 healthy females	IN OT (24 IU) or placebo	Participants performance on 2 social dilemma games was measured whilst participants were also shown social cues in the form of pictures of neutral or angry faces. During the tasks, an fMRI scan was conducted	OT significantly increased the activation of the nucleus accumbens during an assurance game that rewards mutual cooperation. OT significantly attenuates the amygdala
Ten Velden et al. (48)	Randomized, controlled, double blind, placebo within subject trial	65 healthy males and 129 healthy female participants	IN OT (24 IU) or placebo	Participants were placed in groups and given tasks to test the levels of cooperation with the in-group. The task involved the group deciding to make an within group contribution or a between group contribution, Prior to the decision to contribute participants undertook a Stroop Interference task that was either cognitively taxing or not	Participants receiving placebo contributed more to the within group when they were cognitively taxed. The OT group contributed to the within group regardless of cognitive taxation
Hertz et al. (49)	Randomized, double blind, placebo controlled trial	90 healthy male participants	IN OT (40 IU) or placebo	Performance in paired dyads on a visual search task	Compared to the placebo group there was a greater collective benefit over time in the OT group. In the OT group, the more competent member of each dyad was less likely to change his mind during disagreements
Edelson et al. (50)	Within subject randomized control cross over design	92 male healthy participants	Single dose IN OT (24 IU) or placebo	Overt compliance Lasting changes to memory	OT enhanced compliance with erroneous opinions of others, and decreased influence of others on long term memories
Huang et al. (51)	Randomized double blind placebo controlled trial	85 male participants	Single dose IN OT (24 IU) or placebo	Facial attractiveness judgment scale rating unfamiliar Chinese female faces; subsequently participants were informed of ratings given by peers from an in-group (Chinese) and out-group (Japanese) simultaneously and then were asked to re-rate the same faces	OT increased conformity to both in and out group opinions.
Lane et al. (52)	Two double blind randomized control trials	1st trial-–95 male participants 2nd trial-–61 male participants	Single dose IN OT (32 IU) or placebo	Both trials employed an envelope task exploring trust, compassion and openness	There was no significant effect of in either of the trials
Ruissen et al. (53)	Randomized double blind between subject controlled trial	63 healthy male participants	Single dose IN OT (24 IU) or placebo	Performance individually and on joint completion of the Simon task and EEG recordings during individual and joint performance on the Simon task	There was an enhanced Simon effect in the social context after administration of OT. Oxytocin enhanced self other integration compared with placebo on the N2 component of the EEG

(Continued)

TABLE 1 | Continued

References	Study type	Participants	Intervention	Outcome measures	Findings
Declereck et al. (54)	Double blind control trial	259 male and female participants	3 doses, at 5 minute intervals of IN OT (24 IU) or placebo	Participants played a range of mixed emotive games (prisoners dilemma); one group was subject to a social cue prior to completion	OT and social cues interact to alter the behaviors of individuals with a pro self-value orientation; after prior contact with the game partner, OT enhances cooperative behavior compared to anonymous conditions where it exacerbates intrinsic self-interest behavior
Shalvi and De Drue (55)	Double blind placebo controlled trial	60 male participants	Single dose IN OT (24 IU) or placebo	Coin toss prediction task; participants were able to report their performance levels dishonestly to benefit their group	Healthy males in OT group lied more to benefit their group and did so faster than placebo group. Treatment effects emerged when lying had financial consequence
Yao et al. (56)	Double blind between subject placebo controlled trial	104 male and female participants	Single dose IN OT (24 IU) or placebo	Revised version of a trust game with 5 players (1 truster, 4 trustees). The participant was always the truster and the trustees were not real	Although OT had no effect on modulating trust restoration, it did have a gender specific effect, with females showing less evidence for trust repair in OT vs. placebo groups
Israel et al. (57)	Randomized placebo control trial	84 male participants	Single dose IN OT (24 IU) or placebo	Clips using an adaptation of the prisoner's dilemma task. Participants' financial awards were contingent on their own and their partner's decisions	OT participants were less accurate than those on placebo at predicting participants' decisions
Rilling et al. (58)	Randomized double blind placebo control trial.	91 male participants	IN OT (24 IU) or Placebo or IN vasopression (140 IU)	Iterative prisoners dilemma game looking at behavioral and fMRI responses.	fMRI results showed that OT, relative to both vasopressin, and placebo increased caudate nucleus response to reciprocated cooperation and left amygdala activation to reciprocated cooperation. Behaviorally OT was associated with increased rates of cooperation
Studies in aggression and violence					
Ne'eman et al. (59)	Randomized, double blind, placebo controlled within subject trial	48 healthy adults participants (28 men and 20 women)	IN OT (24 IU) or placebo	Performance on a Social Orientation Paradigm (SOP) to measure for real time aggressive behavior in response to provocation	In those naive to the SOP, oxytocin increased the aggressive response in comparison with placebo
DeWall et al. (60)	Double blind placebo controlled between subject experiment	93 male and female participants	Single dose IN OT (24 IU) or placebo	Participants took part in 2 provocation tasks with participants rating the probability that they would engage in various aggressive behaviors with an intimate partner	OT increased interpersonal violence inclinations but this effect was limited to participants prone to physical aggression
Studies in moral responsibility					
Goodyear et al. (61)	Randomized double blind placebo controlled, between subject design	84 male healthy participants	Single dose IN OT (40 IU) or placebo	Intuitions about free will and moral responsibility using ratings of vignettes in deterministic and indeterministic universes	Placebo group held offender more morally responsible compared to OT group
Scheele et al. (62)	Counter balanced, within subject double blind trial	157 male and female participants	Single dose IN OT (24 IU) or placebo	Rating of intensity of own emotional arousal to pictures of faces during fMRI scanning.	OT facilitated cortical midline responses during the self processing of disgust and selectively promoted self interest moral judgments in men. In women OT increased the reaction time difference between accepted and rejected moral dilemmas.

interaction partner. Prior to the main task, the participants undertook a help manipulation task. This was a "tedious" task where participants had to sort letter strings as words or non-words as quickly as possible. During the task, the computer needed fixing and the help manipulation group received input from a technician. Following this help manipulation, the participants undertook two interactive, cooperative tasks. One was a "touch task" (a designed tactile American Sign Language task) which was developed in order to facilitate interpersonal closeness between participants. The second task was a "taboo game" which was similar to an executive functioning tasks that requires response inhibition. The affect and social perception of participants was assessed using a PANAS and participants were asked to rate themselves and their partners. OT administration buffered against the negative subject responses to receiving help that were seen in the placebo group. Those who received oxytocin also expressed greater happiness and gratitude in response to receiving help (29).

Hecht and colleagues conducted a randomized, controlled, double blind placebo controlled trial with 28 healthy female participants. Participants were randomized to receive either 24 IU of intranasal OT or placebo. Participants were then shown animations of geometric shapes depicting social interactions such as playing, chasing, fighting or random movements. Their responses as to whether the shapes represented "friends" or "not friends" were measured, as were their neural responses on fMRI. OT reduced activation in early visual cortex and dorsal-stream motion processing regions. The authors concluded that this indicated that reduced activity was related to social attention. OT also reduced endorsements that shapes were "friends" or "not friends," and this significantly correlated with reduction in neural activation. Furthermore, participants who perceived fewer social relationships at baseline were more likely to show OT induced increases in a broad network of regions involved in social perception and social cognition, suggesting that lower social processing at baseline may predict more positive neural responses to OT (31).

Li and colleagues conducted a randomized, controlled, double blind, placebo within subject trial with 30 healthy fathers of 1–2 year old children. Participants were randomized to receive IN OT, vasopression, or placebo. Participants were shown photographic stimuli of emotional faces of adults and children. In addition they were exposed to a cry stimulus. Neural responses were examined through fMRI. The study found that OT significantly increased the BOLD fMRI response to viewing pictures of participants' own children in brain regions involved in reward, empathy, and attention in human fathers (32).

Luo and colleagues conducted a randomized, controlled, double blind placebo controlled trial with 86 healthy participants (43 males, 43 females). Participants were randomized to have intranasal OT or placebo and were then shown a range of images of emotional faces. Their brain function was measured with fMRI scans as participants viewed the images. In response to seeing a threatening facial stimuli, in males, OT suppressed the inferior frontal gyrus, dorsal anterior cingulate, and anterior insula responses. In females OT led to an increased response in these areas. The authors concluded that oxytocin produces sex dependent effects in social emotional processing and may have different therapeutic effects on men and women (33).

Strang and colleagues conducted a randomized, controlled, double blind placebo controlled trial with 132 healthy male participants. Following administration of OT or placebo, participants' performance on a task where they could decide how to give of their endowment to a person at a specific social distance. In those who received OT there was a positive correlation between individual trait empathy and the generosity toward others (34).

Hi and colleagues conducted a double blind, randomized cross over trial with 41 healthy male participants. Following administration of OT or placebo, participants took part in a "HelPun" task. In this task participants transfer money from their own endowment to either help a victim or punish a norm violator. Participants' behavior and fMRI scan results were observed. Under OT, participants showed a trend to accelerate altruistic decisions. The enhancement of prosocial-relevant perception was also supported by findings from the fMRI scans, which showed an increase in neural activations in Theory of Mind related neural areas such as the left temporoparietal junction during observations of others being helped (35).

Korb and colleagues conducted a double blind, randomized, placebo controlled, between subject trial with 60 healthy male participants. Following administration of OT or placebo participants were shown a number of stimuli in the form of pictures of expressive faces. The faces gradually changed the expressions between happy, angry, and neutral expressions. Participants were asked to identify when the expression changed. Participants were also asked to rate the intensity of the expression shown. Participants were also instructed to smile or frown in response to instructions on a screen which was assessed using facial EMG. Facial mimicry was increased in the OT group but the effects were strongest in response to angry infant faces. Assessment of the impact of the intensity of the facial expression showed that OT did not modulate facial mimicry in the intensity task (36).

Palgi and colleagues conducted a double blind, within subject placebo randomized controlled trial with 30 male and female participants. Following administration of OT or placebo, participants listened to an audio recording of protagonists of both genders describing distressing emotional conflicts. They were then asked to provide compassionate advice. Two clinical psychologists listened to their recorded responses and then rated their responses for levels of compassion. In both male and female participants OT enhanced compassion toward females but not males (37).

Perry and colleagues conducted a randomized double blind placebo controlled trial with 54 males. Participants were given an online questionnaire which investigated their reactivity to others in order to assess for the participants' global concept of empathy. They then took part in two experiments. The first experiment looked at preferred interpersonal distance with a number of hypothetical protagonists (a friend, a stranger, an authority figure, and a rolling ball). The second experiment involved participants deciding which room they would like to be in depending on different characteristics of the rooms

relating to interpersonal distance. The authors found that amongst highly empathetic individuals (as identified by the pre experiment questionnaire) OT promoted a choice of closer interpersonal distances. However, the opposite effect was found with individuals with low empathetic traits. The authors infer from these results that that OT may not have generalized positive effects on individuals with social disorder (38).

Gallup and colleagues conducted a double blind randomized control trial of 60 male healthy participants. Participants were shown a "contagious yawning" video stimulus, and were observed for contagious yawning and other behaviors. Intranasal OT did not increase contagious yawning but modulated expressions that were indicative of awareness of the social stigma associated with this behavior. Those who received OT were more likely to conceal their yawns and were less likely to display overt cues associated with this behavior (39).

Abu-Akel and colleagues conducted a double blind placebo controlled crossover trial of 29 male and female participants. Participants were shown pictures of people with their limbs in various painful situations and were asked to imagine themselves and others in these same painful situations and to give empathetic responses. It was found that OT increased empathy when imagining others compared with imagining oneself in pain; this difference was not found in the placebo group (40).

Cardoso and colleagues conducted a double blind randomized control trial of 82 male and female participants. Participants were asked to complete the perceiving and understanding emotion components of Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT). This looked at the effect of oxytocin on perceiving and understanding emotion, on accurate perception of emotions on the Faces Task, and on intensity rating of facial emotions. Participants treated with OT rated the emotion in facial stimuli with greater intensity than those treated with placebo. However, accuracy of emotion identification in faces was impaired in the OT group relative to placebo for all emotions (41).

Fischer-Shofty and colleagues conducted a double blind placebo controlled trial of 62 male and female participants. Participants completed an interpersonal perception task. The authors found that OT improved accuracy of perception of social interactions. In addition OT improved kinship recognition in women but not men. The performance of males was only improved on competition recognition (42).

Studies in Inhibitory Control

Two studies looked at the effect of OT on inhibitory control (43, 44).

Hirosawa and colleagues conducted a single blind placebo controlled crossover study of 20 male participants. Two paradigms were used: Paradigm 1 investigated the effects of OT on interpretation of facial cognition. Paradigm 2 investigated the effect of OT on attentional-inhibitory control using a modification of the speeded flanker task. OT did not show any effect on either of these tasks. However, the enhancement of attentional-inhibitory control after OT administration significantly correlated with the positively valenced effects of the interpretation of uncertain facial cognition (i.e., neutral and ambiguous facial expressions). That is to say, in those who exhibited a positive beneficial effect of OT on attentional inhibitory control, OT was associated with a tendency to interpret uncertain facial cognitions as being less hostile (43).

Ma and colleagues conducted a double blind placebo controlled between subject experiment with 150 male participants exploring the effects of OT on in-group favoritism where cognitive processing was experimentally manipulated. In addition, individual differences in participants' inclination toward intuition or reflection in daily life were examined. The study's results demonstrated the distinct functional roles of OT when different cognitive styles are promoted during group social cooperation. OT increased in-group favoritism in intuitive participants. However, decreased in-group favoritism was found in those who rely on a reflective style (44).

Studies in Compliance and Conformity

There were 14 studies that looked at the effect of OT on compliance and conformity; these were assessed through a number of tasks as described below (45–58).

Aygodan and colleagues conducted a randomized double blind placebo controlled trial with 120 healthy male participants. Participants received either intranasal OT or placebo and their performance on a competitive and noncompetitive coin tossing task, where participants had to self-report in order to win a monetary prize, was assessed. This task was to measure conformity to the widely accepted norm of honesty under the pressure of competition in the OT group compared with the placebo group. The study found that conformity was enhanced by OT. In the competitive task OT's positive effect on conformity was associated with a reduction in honesty. In the non-competitive task the opposite was found (45).

Gross and colleagues conducted a randomized double blind placebo controlled within subject trial with 139 healthy participants. Participants received either intranasal OT or placebo and were given a test of conformity to instructions. In the test, participants had a binary choice and were given an arbitrary rule that would mean that they would receive a lesser financial benefit. Under OT participants violated the rule more often. This was most apparent in individuals who had a high need for structure (46).

Lambert and colleagues conducted a randomized double blind placebo controlled trial with 30 healthy females. Participants received either intranasal OT or placebo and their performance on two social dilemma games was measured. At the same time, participants were shown social cues in the form of pictures of neutral or angry faces and also underwent fMRI scanning. The study found that OT significantly increased the activation of the nucleus accumbens during an assurance game that rewards mutual cooperation but significantly attenuated amygdala signal (47).

Ten Velden and colleagues conducted a randomized double blind placebo controlled within subject trial with 65 healthy males and 129 healthy female participants. Participants were placed in groups and given tasks to test the levels of cooperation within the in-group. The task involved the group deciding to make a within group contribution or a between group contribution. Prior to the decision to contribute participants undertook a Stroop Interference task that was either cognitively

taxing or not. The study found that participants receiving placebo contributed more to the within group when they were cognitively taxed. The OT group contributed to the within group regardless of cognitive taxation (48).

Hertz and colleagues conducted a randomized double blind placebo controlled trial of 90 healthy male participants. Participants were randomized to receive either placebo or intranasal OT and performed a visual search task in paired dyads. Compared to the placebo group there was a greater collective benefit over time in the OT group. In addition, in the OT group, the more competent member of each dyad was less likely to change their mind during disagreements (49).

Edelson and colleagues conducted a within subject randomized placebo controlled cross over study of 92 male healthy participants. Participants were exposed to erroneous information in various forms as individuals and as a group. Their memory of the events was then assessed in the context of manipulation and no manipulation, with an attempt to induce conformity with peer pressure. It was found that OT enhanced compliance to erroneous opinions of others, and decreased the influence of others' opinions on longer term memories (50).

Huang and colleagues conducted a double blind placebo randomized controlled trial of 85 male participants. They were asked to rate the attractiveness of unfamiliar Chinese faces (from the same ethnicity of the participants); subsequently participants were informed of the ratings of their peers from an ethnic in group (Chinese) and an ethnic out group (Japanese) before being asked to re-rate the initial faces for attractiveness. Results demonstrated that OT promoted conformity regardless of membership of social group when social pressure was applied (51).

Lane and colleagues considered the role of OT administration upon trusting behaviors. This was based upon a previous successful study by Kostfield et al. (63), which demonstrated an increase in trusting behavior with OT. Two double blind randomized controlled trials were conducted with 95 and 61 male participants, respectively. In the first trial participants were given OT or placebo and then asked to complete an "envelope task." Participants were asked to complete a questionnaire which had questions about the experimenter and intimate questions about the participant. Trust was assessed by the degree of openness of an envelope containing a participant's confidential information. In the second trial participants were given OT or placebo and were then assessed for compassion and openness of responses in a further envelope task. No effects were found on either of these tasks (52).

Ruissen and colleagues conducted a randomized double blind placebo controlled between subject trial of 63 healthy male participants. Following placebo or oxytocin, the performance of participants individually and jointly on completion of the Simon task (a test to investigate modulation of the self-other integration process during joint task performance) were assessed. EEG recordings were also taken. The study found that there was an enhanced Simon effect (positive response to the Simon task measure of self-other integration) in the social context after administration of OT. OT enhanced self-other integration (the ability to integrate of one's own and others actions) compared with placebo. This was apparent on behavioral measures and was also evident in the electrophysiological measures on the EEG (53).

Declereck and colleagues conducted a double blind control trial of 259 male and female participants. Participants played a range of mixed emotive games (prisoner's dilemmas) and one group had a manipulated social cue prior to completion of the task. OT and social cues interacted to alter the behaviors of individuals with a pro self-value orientation. After prior contact with the game partner, OT enhanced cooperative behavior compared to anonymous conditions where it increased intrinsic self-interest behavior (54).

Shalvi and colleagues conducted a double blind placebo controlled trial of 60 male participants. Participants worked in groups and completed a single coin toss prediction task. They were able to dishonestly report their performance levels to benefit their group. Healthy males in the OT group lied more to benefit their group and did so faster than those receiving placebo. These treatment effects were more apparent when lying had financial consequences though lying did not correlate with expected reciprocal dishonesty (55).

Yao and colleagues conducted a double blind between subject placebo controlled trial of 104 male and female participants. Participants took part in a revised version of a trust game with 5 players (1 truster, 4 trustees). The participant was always the truster and the trustees were not real. Although OT had no effect on modulating trust restoration, it did have a gender specific effect, with females showing less evidence of trust repair in the OT vs. the placebo group. The gender specific effect was more evident in the context of attempted trust repair using financial compensation (56).

Israel and colleagues conducted a randomized placebo controlled trial of 84 male participants. Participants were paired and asked to watch clips in an adaptation of the prisoner's dilemma task. Participants' financial awards were contingent on their own and their partner's decisions. People who had been given OT were less accurate than those on placebo at predicting their partner's decisions. The authors concluded that OT appears to impede the accurate assessment of trustworthiness in risky social exchanges (57).

Rilling and colleagues conducted a double blind randomized placebo control trial in 91 male participants. Subjects were given either intranasal OT (24 IU) or intranasal vasopression (140 IU) and both arms had a placebo group. The task used was an iterated prisoners' dilemma game during which the impact of intranasal OT and vasopressin on behavior and brain activity was assessed. fMRI results showed that OT, relative to both vasopressin and placebo, increased responses in the caudate nucleus and left amygdala to reciprocated cooperation. Behaviorally, OT was associated with; increased rates of cooperation, increased facilitation of reward of reciprocated cooperation, increased facilitation of learning that another person can be trusted (58).

Studies in Aggression and Violence

Two studies looked at the effect of OT on aggression and violence (59, 60).

Ne'eman and colleagues conducted a randomized double blind placebo controlled within subject trial with 28 healthy men and 20 healthy women. Participants were administered OT or placebo before performance on a Social Orientation Paradigm (SOP) to measure for real time aggressive behavior in response to provocation. OT increased the aggressive response in comparison with placebo (59).

DeWall and colleagues conducted a double blind placebo controlled between subject experiment with 93 male and female participants. Participants took part in two provocation tasks rating the probability that they would engage in various aggressive behaviors with an intimate partner. In those given OT there were increased interpersonal violence inclinations but this effect was limited to participants prone to physical aggression in the first place (60).

Studies in Moral Responsibility

There were two studies that looked at the effect of OT on moral responsibility (61, 62).

Goodyear and colleagues conducted a randomized double blind placebo controlled, between subject study of 84 male healthy participants. Participants were assessed for intuitions about free will and moral responsibility by asking them to rate hypothetical vignettes from deterministic and indeterministic universes. Vignettes related to the moral responsibility of a hypothetical offender. The placebo group held offenders more morally responsible whereas in the OT group participants had greater leniency and assigned less moral responsibility to the offender (61).

Scheele and colleagues conducted a counter balanced, within subject double blind placebo controlled trial of 157 male and female participants. During fMRI scanning, participants rated the intensity of their emotional arousal to a set of pictures of faces. Participants were presented with moral dilemma scenarios and asked how they would respond in these scenarios. It was found that OT facilitated cortical midline responses during the processing of disgust when exposed to pictures of faces. OT was also found to selectively promote self-interested moral judgments in men. In women, OT increased the reaction time in performing on the moral dilemma scenarios (62).

DISCUSSION

We have conducted a systematic review to examine the effects oxytocin may have in persons with ASPD. After an extensive systematic literature search we found only two studies using oxytocin in participants with ASPD. The lack of research in this area indicates that this is a novel and interesting area that may be the focus of research in the future.

The findings from the studies that have participants with ASPD look specifically at human aggression using the PSAP (28), and the ability to process and interpret emotional faces (27). What we know from these studies is that OT administration in participants with ASPD, corrected the relative deficits in recognizing fearful or happy faces (27). The effect of OT on human aggression, as assessed by the PSAP was found to be not systematically related to dose and there were no trends between OT and aggressive responses. Both of the ASPD studies highlight a number of limitations of their studies, including small sample size and confounding factors such as criminal and drug use histories. Future studies would need to have larger numbers to ensure that they are sufficiently powered in order for the results to be meaningful. It is impressive that in both of the studies there were no drop outs. It would perhaps be expected by the very nature of participants having ASPD, that they may be more likely to drop out. A sufficient number of participants recruited to future studies would help with this. Future studies therefore need to recruit sufficient participant numbers to allow for meaningful control of confounding factors. The ASPD population is a diverse group which can have large numbers of comorbid mental disorders and substance use disorders (2). This is something that would need to be screened for carefully and having such comorbidities could be part of the exclusion criteria for participants. Furthermore, the impact of other complex factors such as criminality and social factors should be accounted for and controlled for to manage the risk of confounding the primary outcome measures. Future studies in participants with ASPD would also need to carefully consider the potential risks associated with a complex ASPD group of participants receiving an intervention. In particular risks of worsening symptoms and causing an increase in the risk related aspects of their presentation.

With a limited number of studies that looked at the use of OT in ASPD we widened our search to include studies that looked at the effects of OT in modulating function in healthy controls that are relevant to the symptomatology of ASPD. We found 34 studies that met our inclusion criteria. All studies were placebo controlled and all but three (38, 50, 57) were randomized and/or double-blinded. This suggests that for most of the included studies there were robust study designs.

The 13 studies that examined the effect of oxytocin on empathy all demonstrated that oxytocin significantly improves empathy. However, the tasks used to assess this were very different. These results show promise for a population with ASPD who inherently have deficits with empathy. However, there are some potential areas of concerns regarding the use of OT in ASPD based on the limited literature described here. For example, one study found that OT worsened the accuracy of interpreting emotions (41). In the ASPD population, which is known to lack empathy as well as impulse control, such an effect would be counterproductive and potentially risky.

There were only two studies that looked at the effect of OT on inhibitory control, an area central to the risks associated with ASPD. Unfortunately, only one of the studies found that OT helped to control inhibition (44). However, even these results highlighted that outcomes were dependent upon individual's baseline traits—highly reflective individuals responded better to OT compared to those with intuitive personality styles. The evidence for using OT in improving inhibitory control is therefore limited. This again highlights the importance of future studies in participants with ASPD controlling for the effects of the individual's baseline traits.

Fourteen studies investigated compliance and conformity out of which seven found improvements in compliance and conformity following OT administration. The tasks used varied

between studies and included; competitive and non-competitive coin tossing tasks (45), social dilemma tasks (47), Stroop Interference task (48), tasks with monetary involvement, a visual search task (49), memory under peer pressure (50), judgements of attractiveness between in and out groups (51), envelope task (52), the Simon Task (53), and the prisoners dilemma (54). Whilst it would at first glance seem to hold some promise in managing patients with ASPD a more detailed analysis of the findings raises some concerns. Particularly, in a number of studies compliance and conformity was greater within an "in group." This would suggest that whilst OT increases compliance it could also increase a person's vulnerability to peer pressure. For patients with ASPD living in institutions with similarly antisocial individuals this would be an undesired effect.

Only one study explored the effect of OT on aggression and violence and results raise further concerns regarding the potential use of OT in this patient group as it appeared to increase inclinations toward aggression and violence in those already prone to violence (60). When compared with the study by Alcorn et al. (28) this raises additional concerns and would indicate a need for future studies to explore this difference in more detail.

The two studies on moral judgement likewise do not show promise; on the contrary OT appears to result in a greater degree of leniency toward offenders, the opposite of a desired effect in ASPD (61). Whilst we are not aware of what the effect it would have in an ASPD cohort, this would be a significant concern and could raise an increase in risks to others. It would indicate that future studies need to manage this risk carefully and assess for the effect of OT on "moral judgement" in the ASPD participants.

Across all the studies one of the challenges is that whilst there are a number of studies in both healthy and ASPD participants which show the effects that OT have there is no consistent evidence that OT has a single and reproducible effect on any one function of human behavior. Some studies looking at the same functions show that OT enhances functions but others looking at the same functions show that OT has the opposite effect. One of the limitations in trying to draw inferences from a wide range of studies is that the populations are heterogenous and this in itself may have a significant impact upon findings and results between studies that investigate the same functions. Our findings are also limited by the absence of studies in the actual target condition, ASPD. Instead we had to rely on proxy evidence using studies investigating the effect of OT on relevant functions in healthy individuals. It is not possible to know, on the basis of the available evidence to date, whether findings from healthy groups can be extrapolated to personality disordered individuals. Even within healthy individuals, in each of the symptom groups there was little uniformity between studies in terms of the tasks or outcome measures used. This is perhaps not surprising as the symptoms groups are complex to define and assess. Furthermore, whilst the studies only included healthy adults, in the absence of personality assessments in the included participants, one cannot rule out the possibility of confounding effects in the findings.

CONCLUSION

This is the first systematic literature review exploring the potential use of oxytocin in managing the symptoms of ASPD. It is apparent that there is a reasonable body of evidence addressing related symptoms in healthy individuals, but only two studies including participants with ASPD. The majority of studies were large sample, randomized controlled trials exploring a range of functions, including interpersonal relationships, compliance, empathy, emotional processing, moral judgment, deceitfulness, and conformity. Findings were highly dependent upon context and the participants' premorbid states. OT has been shown to demonstrate diversified effects, in most cases being associated with socially positive or non-criminogenic behaviors. However, some studies found opposite, and non-desirable, effects, e.g., an increase in violent inclinations. It is also of note that ASPD symptoms do not occur in isolation and there is likely to be a complex interplay between symptoms. It is difficult therefore to draw any direct inferences from healthy control studies. Further high quality large sample studies are required to explore the benefits of oxytocin in a population with an established diagnosis of ASPD. Studies should also rigorously control for potential confounding effects.

AUTHOR CONTRIBUTIONS

All authors contributed to this paper including the planning, development of a search strategy, reviewing the papers, and writing the article.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2019.00076/full#supplementary-material

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Determinants of Dropout From Correctional Offender Treatment

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Research indicates that approximately one third of offenders admitted to social-therapeutic correctional facilities in Germany fail to complete treatment and that treatment dropout is linked to higher recidivism in both sexual and violent offenders. The purpose of this study was to examine determinants of treatment dropout in a social-therapeutic correctional facility in Germany. The sample consisted of 205 incarcerated adult male offenders (49.8% sexual, 38.1% non-sexual violent) admitted to correctional treatment. Completers and dropouts were compared on variables pertaining to demographics, offense type, substance abuse, psychopathy, risk, and protective factors. Univariate analyses showed that treatment dropouts demonstrated significantly higher scores on measures of risk and psychopathy and lower scores on protective factors. Logistic regression analyses identified unemployment, non-sexual violent index offense, higher risk scores (HCR-20), and Facet 1 (interpersonal deficits) of the Psychopathy Checklist-Revised (PCL-R) as significant predictors of treatment dropout. Surprisingly, substance abuse disorder was a negative predictor of dropout. With the exception of substance abuse, the results support the notion that treatment dropouts represent a group of high-risk offenders with particular treatment needs. Practical implications and suggestions for further research are discussed.

Keywords: dropout, sexual offender, violent offender, correctional treatment, risk factor, protective factor, psychopathy

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In Germany, legislation regulates that social therapy represents the primary form of correctional treatment in prisons for sexual offenders whose sentencing is for more than two years (German Federal Penal Execution Law §9). Additionally, non-sexual offenders can apply for social therapy. Previous research indicates that approximately one third of offenders admitted to social-therapeutic correctional facilities in Germany fail to complete treatment (1). Comparable results were noted in an international meta-analysis by Olver et al. (2), who reported an overall attrition rate of 27.6% in sexual offender programs ($k = 34$, $n = 12{,}878$) and 26.9% in non-sexual violent offender programs ($k = 9$, $n = 1{,}238$). These numbers for several reasons raise concerns. First, those who do not complete treatment are unlikely to derive its benefits, posing a potential risk to public safety. In fact, research has shown that treatment dropout is linked to higher recidivism risk in both sexual and violent offenders (2–4). In a systematic review, McMurran and Theodosi (4) presented evidence that program dropout might even

increase the risk of reoffending compared to receiving no treatment at all. Second, research has repeatedly shown that especially high-risk high-need offenders [in terms of the risk, need, responsivity model by Bonta and Andrews (5)] are those who are less likely to complete treatment, calling for effective interventions to retain these individuals in treatment (2, 6). Third, treatment dropout has negative economic implications if resources are misallocated to participants who are unlikely to gain from the program and waitlisted offenders remain untreated (7). Fourth, dropout poses a problem for evaluation studies assessing the effectiveness of treatment programs. Excluding treatment dropouts from these studies, as it is common practice, can lead to potential overestimations of treatment effects, demonstrating the need for more elaborate research designs to permit more accurate evaluation of program effects including dropouts (8–10). Given its possible detrimental effects, research is required to identify factors associated with treatment dropout and to develop measures as well as therapeutic techniques to promote treatment completion.

Research identifying predictors associated with treatment dropout has yielded inconsistent results. In part, the outcomes are so divergent that Larochelle et al. (11) concluded that "it is difficult to draw unequivocal conclusions about the variables related to the phenomenon (p. 554)". Nevertheless, meta-analytic reviews identified numerous variables associated with treatment dropout across different treatment programs: With regard to demographic variables, higher rates of treatment dropout were associated with single marital status, lower educational attainment, higher unemployment rates, lower income, younger age, and ethnic minority status (2, 12). Moreover, dropouts tend to have higher rates of prior offenses and incarcerations and shorter sentence lengths; prior violent offenses were more strongly related to treatment attrition than prior non-violent offenses when compared across different treatment programs (2, 12). Static risk assessment instruments, which base their prediction predominantly on offense-related variables, predicted treatment dropout across different treatment programs, particularly in sexual offenders (2, 6, 13). Evidence on clinical variables suggests that substance abuse is linked to treatment dropout. However, results differ with regard to offender groups. Whereas a significant association between treatment dropout and substance abuse was found for domestic violence programs (2, 12, 14), no relationship was reported for sexual offender treatment (2). Moreover, higher rates of psychopathy have repeatedly been linked to higher treatment dropout rates, and in turn to higher rates of violent recidivism (15–17).

Whereas there is a strong evidence base linking risk factors to treatment dropout and recidivism risk, protective factors, which could retain individuals in treatment, have received less scholarly attention. A review in the field of domestic violence treatment suggested that programs designed to enhance motivation for changes and to address individual needs, such as personality traits, could decrease treatment attrition (18). A small body of empirical research has additionally shown that absent substance abuse, employment, and intimate relationship were positively related to treatment completion [i.e., (19)]. Recent studies have found that a decrease in dynamic risk and an increase in protective factors during treatment predicted reductions in recidivism (20, 21). Therefore, evaluating both risk and protective factors in the course of treatment could enhance treatment completion and outcomes (22, 23).

Social-Therapeutic Treatment in Germany

Admission to social-therapeutic correctional facilities is regulated by Art. 9 of the German Federal Penal Execution Code (StVollzG; Strafvollzugsgesetz). For sexual offenders who serve a minimum 2-year prison sentence, admission to a social-therapeutic correctional facility is mandatory. Sexual offenders shall only be transferred back to a general correctional facility if the purpose of the treatment cannot be achieved for reasons inherent in the person of the prisoner. Non-sexual offenders may apply for admission to the social-therapeutic correctional facility on their own initiative. Their admission requires the approval of the management. According to the federal law, admission should be granted if the institution's special therapeutic means and social assistance are appropriate for their resocialization. The therapeutic concept of the social-therapeutic institution of the federal state Hamburg suggests that, in addition to the need for treatment, responsivity factors (such as sufficient German language skills or introspection capability) and the motivation of the offender are decisive for the selection of the non-sexual offenders. In practice, however, there may be deviations due to the occupancy situation in Hamburg prisons and non-sexual offenders may be admitted who do not fully meet these criteria. Social-therapeutic treatment has no fixed length. Legislation allows a transfer to general prison if an offender is unlikely to generate treatment gains. Social therapy is characterized by a progressive transfer of responsibility to the client and the promotion of social learning within the community. Integrative social therapy follows three core principles (24): (1) consideration and inclusion of the offenders' living environment within and outside the social-therapeutic correctional facility until release; (2) development of opportunities and relationships within the social-therapeutic correctional facility in terms of a therapeutic community; (3) modification and integration of approaches based in psychotherapy, pedagogy, and occupational therapy. Within the program, participants receive the opportunity to take part in a variety of offers, such as vocational training, education, work opportunities, or individual and group psychotherapy.

Nationwide, social-therapeutic correctional facilities display heterogeneity regarding the kinds of interventions they offer (25). Besides psychodynamic-oriented milieu therapy, the social-therapeutic correctional facility in the present study offered both offense-specific group therapy, such as the Sex Offender Treatment Program [SOTP; (26–28)], strength-based approaches for sexual offender rehabilitation (29), and general and offense-unspecific group treatments, covering topics such as substance abuse and addiction. Additionally, participants can receive individual therapy sessions, special interventions, and support for release planning.

Study Aim

The purpose of the present study was twofold. First, it sought to identify relevant variables related to treatment dropout among offenders in a social-therapeutic correctional facility in Germany. The variables under study pertained to demographic and offense characteristics, recidivism risk, psychopathy, and protective factors. Based on the findings reviewed above, it was expected that treatment dropouts would more likely be single (never married), less educated (no secondary school diploma), unemployed, non-German, younger, and non-sexual violent offenders. They would suffer from substance abuse, demonstrate higher levels of risk and psychopathy, and score lower on protective factors than those who completed treatment. Second, the study explored whether any of the empirical-driven variables were predictive of treatment dropout. The rationale behind this was the creation of a model allowing the identification of offenders at increased risk of dropping out of the specialized treatment for sexual and violent offenders in a social-therapeutic correctional facility.

MATERIALS AND METHODS

Procedure

This study was part of a large research project "Evaluation of the Social-Therapeutic Correctional Facility Hamburg" (30), which was authorized and funded by the Ministry of Justice of the Free and Hanseatic City of Hamburg. The ongoing research project is being conducted by the Institute for Sex Research and Forensic Psychiatry at the University Medical Center Hamburg-Eppendorf (UKE) since 2010. The study was approved by the ethical committee of the Hamburg chamber of psychotherapists. Participants were informed about the purpose of the research project and gave their written informed consent in accordance with the Declaration of Helsinki. The aim was a complete survey of all offenders (only men) serving sentences at the social-therapeutic correctional facility of the Hamburg correctional services (SothA-HH). In the survey period from 2010 to 2018, all new entrants were informed about the study. Thirty-eight announced inmates (18.5%) refused to participate.

Data of the present study was based on pretreatment ratings and collected on site within the first weeks after the participants' admission to the SothA-HH. All data were derived from case file information (e.g., criminal record, court files, or psychological reports) and from semi-structured interviews, which lasted approximately 2 hours per participant. Information about treatment dropout was provided by the SothA-HH administration. All data were collected by trained psychologists.

Participants

The participants were $N = 205$ male offenders serving sentences at SothA-HH between the years 2010 and 2018. Social-therapeutic correctional treatment had been indicated and had started for all included participants. *Completion* was defined as either (a) having participated in treatment programs of the social-therapeutic correctional facility for at least three years or (b) having been released or (c) having been regularly transferred to another facility. Participants who did not complete social-therapeutic treatment and were consequently transferred back to general prison were classified as *dropouts*. Dropout status was determined irrespective of whether the dropout was initiated by the offender himself or SothA-HH staff. Offender type was determined based on the index offenses the participants were currently detained for. The "other" group refers to offenders who committed neither sexual nor non-sexual violent offenses but other crimes (e.g., fraud or theft). A more in-depth analysis of the criminological and risk assessment characteristics of the sample can be found in Brunner et al. (30).

Measures

Demographic and Offense Variables

Demographic variables in the study were marital status (ever married vs. never married), education (secondary school diploma vs. no secondary school diploma), employment prior to incarceration (employed or student/trainee vs. neither employed nor student/trainee), nationality (German vs. non-German), and age at time of the data collection. Offense type (sexual vs. non-sexual violent vs. other) was defined based on the index offense participants were currently detained for. Substance abuse (yes vs. no) was defined as lifetime mental and behavioral disorder due to psychoactive substance use [ICD-10 criteria for harmful use or dependency syndrome; (31)]. Index offense sentence length (months) was ascertained by court files. In case of accompanying sentences, only the index offense sentence was taken into account, unless a court has formed an overall penalty for several single convictions. Lifetime sentences were counted as 300 months. Preventive detentions were not considered in this variable.

Psychopathy Checklist-Revised (PCL-R)

The PCL-R (32, 33) is a 20-item measure of psychopathic personality traits. The instrument was designed with two interrelated factors, which are further divided into two facets each. The facets subsumed under Factor 1 describe interpersonal (Facet 1) and affective deficits (Facet 2). Factor 2 pertains to chronic antisocial behavior, and its facets are impulsive lifestyle (Facet 3) and antisocial behavior (Facet 4). Each variable is scored on a 3-point scale (0–2) with total scores ranging from 0 to 40. Based on Hare (33), scores on the PCL-R can be categorized into three levels, with values between 0 and 16 indicating a low score, values between 17 and 24 indicating a medium score, and values above 24 indicating a high score on the construct. The reliability, concurrent and predictive validity of the PCL-R have been supported by a substantial body of literature (33–37). In case of omitted items, prorated scores were used.

Historical Clinical Risk Management-20 (HCR-20)

The HCR-20 [(38); German version: (39)] is a widely used structured professional judgment (SPJ) instrument for the assessment of risk for violent (including sexual violent) behavior. The tool comprises 20 static and dynamic variables, divided into ten historical (e.g., previous violence, young age at first violent incident, employment problems), five clinical (e.g.,

lack of insight, negative attitudes, impulsivity), and five risk management factors (e.g., lack of personal support, non-compliance with remediation attempts, stress). Each item is scored on a 3-point scale (0–2), and the rater assigns a structured final risk judgment (low, medium, or high). The instrument has demonstrated good concurrent validity (40) and moderate to strong predictive accuracy (41, 42) in offender populations. In the present study, all offender groups (including sexual offenders) were assessed with the HCR-20 second version.

Structured Assessment of PROtective Factors for Violence Risk (SAPROF)

The SAPROF [(43); German version: (44)] is an SPJ instrument assessing protective factors reducing violent risk. It is used in combination with SPJ risk assessment instruments, such as the HCR-20. The checklist contains 17 protective factors, with two static and 15 dynamic variables. Factors are organized into *internal factors*, *motivational factors,* and *external factors.* Internal factors refer to personal characteristics with protective benefits (e.g., intelligence, empathy, self-control), motivational factors assess an individual's motivation to become a positive member of society (e.g., work, motivation for treatment, attitude towards authority), and external items comprise social, judicial and therapeutic control factors (e.g., social network, intimate relationships, external control). All items are rated on a 3-point scale (0–2) and a protection and an integrated risk level (low, medium, or high) is assigned, taking the combined judgment of the SAPROF and HCR-20 into account. In a sample of forensic psychiatric patients, the instrument demonstrated good inter-rater reliability and good predictive validity for non-recidivism of (sexual) violence in forensic psychiatric patients (45, 46). The German version of the SAPROF has shown small to moderate predictive accuracy regarding sexual offenders recidivism in the correctional system (47).

Statistical Analyses

Univariate analyses were applied to identify relevant differences between dropouts and completers. More specifically, χ^2-tests were used for categorical variables and one-way analyses of variance (ANOVA) for continuous variables, the effect sizes were calculated by Cramer's V and η^2. A Bonferroni-Holm correction was applied over all univariate tests in order to reduce the risk of alpha-error cumulation. All variables that were identified as relevant predictors for treatment attrition in previous studies and had been possible to assess in the present research project were entered into the logistic regression model with treatment completion status as the binary outcome variable. According to this empirical-driven procedure, the following variables were entered into the model: offender type, marital status, education, unemployment, nationality, substance abuse, age at admission, the HCR-20 sum score, all four facets of the PCL-R, and the SAPROF sum score. HCR-20 and SAPROF subscales were not entered separately to circumvent power loss due to a large model size. In a second data-driven approach, the model with the best fit was identified via stepwise backward elimination per likelihood-ratio-test (48). Data analyses were performed using IBM SPSS Statistics 23 software.

RESULTS

Sample Characteristics

The sample comprised $N = 205$ male inmates. Since all sexual offenders were transferred to the SothA-HH with a prison sentence of over 2 years, this group accounts for the largest offender group with 49.8%. Non-sexual violent offenders are represented in the sample by 38.0% and others by 12.2%. Overall, 70 participants (34.1%) were classified as dropouts and 135 (65.9%) as completers. **Figure 1** shows how the risk of renewed violent crimes differs between offender groups. Among sex offenders, the lowest risk category accounts for the largest share at 36.6%, while 57.7% of violent offenders fall into the highest risk category. **Table 1** shows an overview of the sample's demographic and criminological characteristics. Educational attainment ranged from no general education at all (27.3%; $n = 56$), secondary education (70.7%; $n = 145$) to tertiary education (2.0%; $n = 4$).

Offender Type and Demographics

Table 2 shows frequencies of completion and dropout for offender type and demographics. A 2×3 χ^2-test indicated that the relationship between completion status and offender group was significant. The majority of dropouts (54.3%; $n = 38$) was incarcerated for a non-sexual violent index offense. In contrast, within the completer group ($n = 135$), non-sexual violent index offenses made up only 29.6% ($n = 40$) of the index offenses. Completers were predominantly incarcerated for sexual offenses (57.8%; $n = 78$), whereas this offense type accounted for about a third of offenses among dropouts (34.3%; $n = 24$). Frequencies of other offenses were roughly similar in both groups. Further, univariate analyses yielded significant group differences for unemployment at the time of incarceration.

Risk Factors

In **Tables 3**, **4**, the results of statistical analyses of risk (HCR-20), psychopathy (PCL-R) and protective factors (SAPROF) are presented. Dropouts scored significantly higher on the HCR-20 and its respective subscales compared to treatment completers (**Table 3**). This finding is also confirmed by the χ^2-Test indicating a significant association between completion status and HCR-20 risk levels (**Table 4**); the dropout group consisted of a relatively higher proportion of high-risk offenders. Conversely, low and medium risk levels were reported for the majority of completers (70.2%; $n = 94$), but only for a minority of dropouts (35.7%; $n = 25$).

As indicated by **Table 3**, completers and dropouts differed significantly on psychopathy, with dropouts scoring significantly higher compared to completers. Analyses on facet level confirmed this finding for PCL-R Factors 1 and 2; dropouts scored significantly higher than completers on PCL-R Facets 1 and 2 as well as on PCL-R Facets 3 and 4. A χ^2-test indicated significant disproportional frequencies between psychopathy level and completion status. Dropouts tended to have increased PCL-R scores, with approximately one third of this group reaching the cut-off of 25. In comparison, only 5.2% ($n = 7$) of completers scored high on psychopathy. Nearly one third

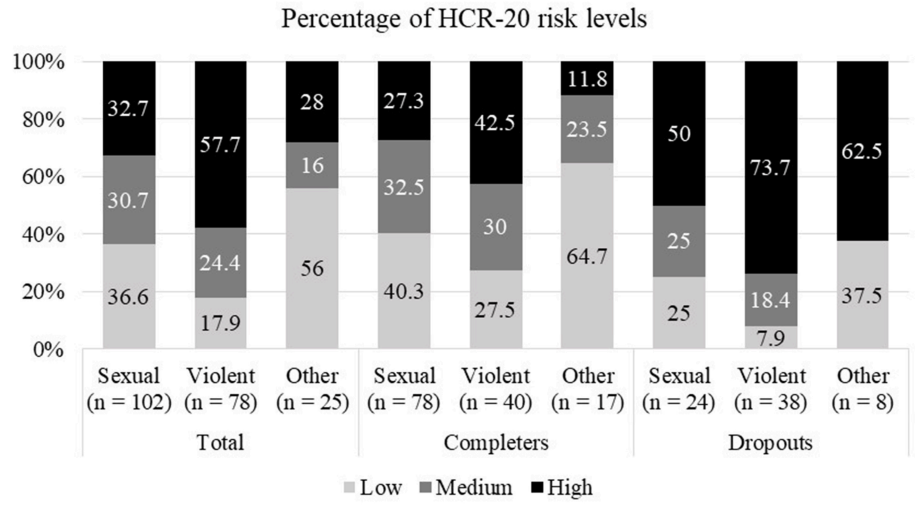

FIGURE 1 | Relative distribution of HCR-20 risk levels for offender group and dropout status.

TABLE 1 | Demographic and criminological characteristics.

Variable	*n*	%	*M* ± *SD*	Range
Offender type	205	100.0		
Sexual	102	49.8		
Violent	78	38.0		
Other	25	12.2		
Never married	116	56.6		
No education	56	27.3		
Unemployment	98	47.8		
Non-German	87	42.4		
Substance abuse	115	56.1		
Age at admission (years)	205		36.60 ± 11.52	21–67
Age at first conviction (years)	205		24.26 ± 11.54	13–65
Age at first incarceration (years)	200		28.85 ± 12.02	14–67
Number of prior convictions	205		6.65 ± 6.60	0–26
Index offense sentence length (months)[a]	205		57.41 ± 47.88	7–300

The variables "never married" and "age at first incarceration" contained n = 1 and n = 5 cases of missing data, respectively. [a]Life sentences were counted as 300 months.

of dropouts (30.0%; $n = 21$) received a low PCL-R score. In contrast, approximately twice the proportion of completers (63.4%; $n = 85$) scored low on the degree of psychopathic personality traits.

Protective Factors

As reported in **Table 3**, completers and dropouts differed significantly on the internal SAPROF subscale, with dropouts scoring significantly lower compared to completers. The χ^2-test (**Table 4**) indicated no significant relationship between completion status and level of protection after Bonferroni-Holm correction ($p_{adj} = 0.006$). Overall, the majority of offenders (86.2%; $n = 175$) received low or medium protection levels. Most dropouts (58.0%; $n = 40$) scored low on protection, whereas among the completers, the medium protection levels accounted for the largest share with 46.3% ($n = 62$). In addition, the data showed that approximately twice the proportion of completers received high protection ratings, compared to dropouts.

Logistic Regression Analyses

As described above, previously reported predictors of treatment attrition were entered into a logistic regression with treatment completion status as the binary outcome variable. **Table 5** shows that this first model significantly predicted treatment completion and based on Nagelkerke's R^2, explained 36% of the pseudo-variation. Compared to the constant alone, the overall model improved the prediction of completion status by 12.4% (from 65.3 to 77.7%). Analysis of the individual contributions of the predictors showed violent offender type, substance abuse, and PCL-R Facet 1 emerged as significant predictors of treatment dropout, when all other predictors were held constant.

In order to identify the model with the best fit, a stepwise backward elimination per likelihood-ratio-test was conducted (see **Table 6, Figure 2**). Overall, the new model correctly classified 74.8% of the cases and explained 35% of pseudo-variation (Nagelkerke's R^2). Interpretation on the variable level showed that violent offender type, unemployment, substance abuse, HCR-20 sum score, and PCL-R Facet 1 significantly predicted treatment dropout.

DISCUSSION

The current study examined determinants of treatment dropout in a male offender sample undergoing treatment in a social-therapeutic correctional facility in Germany. First, dropouts and completers were compared on several demographic, criminogenic risk and protective variables. Second, empirical-driven predictor variables were entered into two logistic

TABLE 2 | Comparisons of completers ($n = 135$) and dropouts ($n = 70$) regarding offender type and various demographics.

	Completers		Dropouts					
Variable	***n***	**% or *M* ± *SD***	***n***	**% or *M* ± *SD***	**χ^2 or F**	***df***	***P***	***V* or η^2**
OFFENDER TYPE								
Sexual	78	57.8	24	34.3	12.53		**0.002**	0.25
Violent	40	29.6	38	54.3		2		
Other	17	12.6	8	11.4				
DEMOGRAPHICS								
Never married	76	56.7	40	57.1	<0.01	1	1.00	<0.01
No education	29	21.5	27	38.6	6.78	1	0.013	0.18
Unemployed	53	39.3	45	64.3	11.57	1	**0.001**	0.24
Non-German	56	41.5	31	44.3	0.15	1	0.766	0.03
Substance abuse	70	51.9	45	64.3	2.89	1	0.103	0.12
Age	135	37.85 ± 12.30	70	34.17 ± 9.46	4.80	1.203	0.030	0.02

Bold values indicate significance after Bonferroni-Holm correction. The variable "never married" contained n = 1 case of missing data.

TABLE 3 | Comparisons of completers ($n = 134$) and dropouts ($n = 70$) regarding risk and protective factors.

	Completers	Dropouts				
Variable	***M* ± *SD***	***M* ± *SD***	***F***	***df***	***p***	η^2
RISK FACTORS						
HCR-20	17.07 ± 6.41	22.87 ± 6.50	37.33	1.202	**<0.001**	0.16
Historical	8.78 ± 4.03	12.17 ± 3.88	33.31	1.202	**<0.001**	0.14
Clinical	3.25 ± 1.79	4.67 ± 2.01	26.41	1.202	**<0.001**	0.12
Risk	5.03 ± 1.66	6.03 ± 1.76	15.92	1.202	**<0.001**	0.07
PCL-R	14.20 ± 6.52	20.86 ± 7.18	44.84	1.202	**<0.001**	0.18
Facet 1: interpersonal deficits	1.97 ± 1.85	3.06 ± 2.35	13.20	1.202	**<0.001**	0.06
Facet 2: affective deficits	3.49 ± 1.81	4.39 ± 2.02	10.41	1.202	**0.001**	0.05
Facet 3: impulsive lifestyle	4.12 ± 2.35	6.11 ± 2.29	33.67	1.202	**<0.001**	0.14
Facet 4: antisocial behavior	3.42 ± 2.84	5.79 ± 3.26	28.86	1.202	**<0.001**	0.13
PROTECTIVE FACTORS						
SAPROF	15.40 ± 3.51	13.93 ± 3.66	7.79	1.202	0.006	0.04
Internal	4.43 ± 1.34	3.57 ± 1.54	17.14	1.202	**<0.001**	0.08
Motivational	5.01 ± 2.07	4.46 ± 1.83	3.51	1.202	0.063	0.02
External	5.96 ± 1.18	5.90 ± 1.12	0.11	1.202	0.746	0.00

Bold values indicate significance after Bonferroni-Holm correction. Each of the variables contained n = 1 case of missing data, but PCL-R Facet 4 contained n = 2 cases of missing data. HCR-20, Historical Clinical Risk Assessment-20; PCL-R, Psychopathy Checklist-Revised; SAPROF, Structured Assessment of PROtective Factors.

regression models predicting treatment dropout. Several findings emerged from the analyses.

Finding 1: Admission of Medium to High-Risk Offenders for Social-Therapy but High Dropout Rate of High-Risk/High-Need Offenders

Risk estimates based on the HCR-20 scores indicated that medium to high-risk offenders serving sentences for sexual and non-sexual violent crimes are the typical clientele of social-therapeutic treatment. Especially among non-sexual violent offenders the proportion of high-risk offenders seemed particularly high compared to the sexual offender group. Having in mind that only non-sexual offenders may be selected before admission to the social-therapeutic facility, the overrepresentation of high-risk (non-sexual) violent offenders may indicate that social-therapeutic resources are indeed allocated to those who need them most [according to the RNR-model by Bonta and Andrews (5)]. However, analyses revealed that dropouts from social-therapeutic treatment demonstrated significantly higher levels on both recidivism risk and psychopathy measures. Therefore, a relatively high number of those offenders with high risk and high need for treatment could not be kept in therapy. These findings are in line with previous research demonstrating that non-completers are high-risk and high-need individuals and that psychopaths were proportionally overrepresented in groups of treatment or program dropouts (15, 17).

TABLE 4 | Pearson χ2-test of completion status by risk and protection levels.

	Completers		Dropouts		Total						
Measure	***n***	**%**	***n***	%	***n***	**%**	***n***	χ^2	***df***	***p***	***V***
HCR-20 (*n* = 204)											
Low	53	39.6	12	17.1	65	31.9	204	22.84		**<0.001**	0.34
Medium	41	30.6	13	18.6	54	26.5			2		
High	40	29.9	45	64.3	85	41.7					
PCL-R (*n* = 204)											
Low	85	63.4	21	30.0	106	52.0	204	34.23		**<0.001**	0.41
Medium	42	31.3	26	37.1	68	33.3			2		
High	7	5.2	23	32.9	30	14.7					
SAPROF (*n* = 203)											
Low	49	36.6	40	58.0	89	43.8	203	9.43		0.009	0.22
Medium	62	46.3	24	34.8	86	42.4			2		
High	23	17.2	5	7.2	28	13.8					

Bold values indicate significance after Bonferroni-Holm correction. The HCR-10 risk and PCL-R risk judgment contained n = 1 case of missing data each. The SAPROF protection judgment contained n = 2 cases of missing data. HCR-20 = Historical Clinical Risk Assessment-20; PCL-R, Psychopathy Checklist-Revised; SAPROF, Structured Assessment of PROtective Factors.

TABLE 5 | Logistic regression analysis predicting treatment dropout–first model (*N* = 202).

			95% CI	
Measure	***OR***	***p***	***LL***	***UL***
Offender type: sexual		0.051		
Offender type: violent	2.52	**0.024**	1.13	5.61
Offender type: other	0.95	0.932	0.30	3.01
Never married	0.60	0.250	0.25	1.44
No education	1.15	0.734	0.52	2.53
Unemployment	2.05	0.058	0.98	4.31
Non-German	1.76	0.135	0.84	3.70
Substance abuse	0.30	**0.012**	0.12	0.77
Age	0.99	0.535	0.95	1.03
HCR-20 sum	1.10	0.102	0.98	1.23
PCL-R Facet 1: interpersonal deficits	1.27	**0.016**	1.05	1.53
PCL-R Facet 2: affective deficits	0.97	0.760	0.77	1.21
PCL-R Facet 3: impulsive lifestyle	1.20	0.145	0.94	1.54
PCL-R Facet 4: antisocial behavior	1.05	0.553	0.89	1.25
SAPROF sum	1.02	0.720	0.90	1.16
Constant	0.02	**0.037**		

Nagelkerke R^2 = 0.36 (n = 3 cases were reported missing and excluded from analysis). Bold values indicate significance at $p \leq 0.05$. OR, Odds Ratio; CI, confidence interval; LL, lower limit; UL, upper limit; HCR-20, Historical Clinical Risk Assessment-20; PCL-R, Psychopathy Checklist-Revised; SAPROF, Structured Assessment of PROtective Factors.

Finding 2: Univariate Analyses Yielded Unemployment, Risk Factors and Internal Protective Factors as Significantly Different Between Completers and Dropouts

Except for unemployment, the univariate analyses yielded no significant differences between dropouts and completers on demographic variables and substance abuse. Recent studies have indeed found significant relationships between these variables and treatment dropout [i.e., (2)]. However, the lack of concordance with earlier research is not surprising, as an absence of consistent findings seems eminent to the field of attrition research (11) and may be explicable by differences in risk levels, types of treatment programs, populations under study, or ways in which dropout was operationalized. Motivational and external protective factors as assessed by the SAPROF did not significantly differentiate between the two groups. In line with the prediction, increased dropout rates were found among those who were unemployed, incarcerated for violent offenses, and scored high on risk (HCR-20), and psychopathy (all four facets of the PCL-R). These findings corroborate previous research showing that unemployment, violent offenses, risk and psychopathy were consistently associated with dropout (2).

Moreover, those with higher protection scores on the SAPROF internal subscale exhibited lower dropout rates. The higher manifestation of internal resources such as self-control, coping skills, intelligence, or empathy in the completer group might indicate that these factors are important prerequisites for treatment adherence. For example, research indicates that internal attributes like intelligence and self-control positively influence psychosocial adjustment and are able to prevent antisocial behavior (49, 50). While protective factors are still understudied, currently published research suggests risk-reducing effects on recidivism (23, 47) and that improvements in the domain of protection may also translate into reductions in treatment dropout rates (20).

Finding 3: PCL-R Facet 1, Violent Index Offense, Unemployment, Substance Abuse, and HCR-20 Sum Score Are Predictors for Dropout

The model with the best fit after stepwise backward elimination per likelihood-ratio-test indicated five variable as significant predictors of treatment dropout: violent index offense, unemployment, substance abuse, HCR-20 sum score, and PCL-R Facet 1 (interpersonal deficits). Surprisingly, substance abuse was inversely related to treatment dropout. Each predictor will be discussed in more detail below.

PCL-R Facet 1

Offenders with high psychopathic traits are particularly challenging to treat because they represent an offender group that responds poorly to treatment, displays low motivation and disruptive behaviors, and has usually high treatment dropout rates (15, 16, 51, 52). Their treatment requires special attention as some programs might even hinder a positive therapy outcome [e.g., (53, 54)]. In the present study, PCL-R Facet 1 (interpersonal deficits) emerged as a significant predictor of treatment dropout. This finding suggests that the interpersonal problems (e.g., pathological lying, manipulative behavior, and a grandiose sense

TABLE 6 | Logistic regression predicting treatment dropout–model with best fit after stepwise backward elimination per likelihood-ratio-test ($N = 202$).

Measure	*OR*	*p*	95% CI	
			LL	*UL*
Offender type: sexual		**0.044**		
Offender type: violent	2.61	**0.017**	1.19	5.72
Offender type: other	1.08	0.893	0.36	3.20
Unemployment	2.12	**0.044**	1.02	4.40
Non-German	1.88	0.083	0.92	3.84
Substance abuse	0.29	**0.008**	0.12	0.72
HCR-20 sum	1.10	**0.023**	1.01	1.20
PCL-R Facet 1: interpersonal deficits	1.26	**0.008**	1.06	1.49
PCL-R Facet 3: impulsive lifestyle	1.21	0.102	0.96	1.53
Constant	0.01	**0.000**		

Nagelkerke R2 = 0.35 (n = 3 cases were reported missing and excluded from analysis). Bold values indicate significance at $p \leq 0.05$. OR, Odds Ratio; CI, confidence interval; LL, lower limit; UL, upper limit; HCR-20, Historical Clinical Risk Assessment-20; PCL-R, Psychopathy Checklist-Revised; SAPROF, Structured Assessment of PROtective Factors.

of self-worth) presented in persons with high psychopathic traits may be responsible for treatment dropout. Multiple reasons may be discussed. These offenders may have more problems to establish meaningful relationships compared to offenders with low or medium scores. In a study by Olver and Wong (16) higher scores on the PCL-R Facet 2 (affective deficits) significantly predicted treatment dropout in a sample of sexual offenders. The authors argued that affective deficits may impede the formation of strong therapeutic bonds. Arguably, this can be posited for both interpersonal problems *and* affective deficits. Inmates with interpersonal deficits subsumed under PCL-R Facet 1 are exhausting and unpleasant in contact and can deteriorate the atmosphere of the facility. These interpersonal deficits may thus be harmful to the establishment of a strong therapeutic alliance as they undermine mutual trust. The relationship between patient and therapist is known to be an important factor to achieve positive treatment outcomes (55). In a sample of sexual offenders, DeSorcy et al. (56) showed that lower ratings of working alliance were related to higher rates of treatment dropout, whereas some studies did not confirm this relationship (57). Further research is needed to investigate therapeutic alliance in psychopaths, since the relationship between psychopathy and dropout can be moderated by treatment alliance.

Another reason for the elevated dropout rates among offenders with higher psychopathic traits may be explained by higher rates of behavioral problems. In a sample of 44 high-risk offenders admitted to a forensic psychiatric hospital, PCL-R Facet 1 and 2 significantly predicted interpersonal physical aggression (58). The findings suggest that scoring high on PCL-R Factor 1 increases the likelihood to engage in violent behavior. This in turn may translate into increased back-transfer to general prison if the institution worries that an offender poses a danger to fellow inmates.

O'Brien and Daffern (52) investigated the role of psychopathy in treatment dropout in an Australian violent offender sample. The authors found that psychopathy moderated the level of treatment participation and violent reoffending: offenders with high psychopathy scores, who engaged with treatment or completed it, had similar violent recidivism rates compared to those offenders with low psychopathy scores. In contrast, those who scored high on the construct but engaged poorly in treatment or did not complete it demonstrated higher rates of violent recidivism. The abovementioned findings have important implications, as appropriate interventions and successfully retaining psychopathic offenders in treatment appeared to be related to therapeutic improvement and reduced risk of sexually and violently reoffending (17). Findings by Olver et al. (59) further indicate that positive therapeutic change is negatively related to PCL-R Factor 1 supporting a growing body of literature that suggests psychopathy may be treatable after all (60) and that Factor 1-related risk factors provide good treatment targets to reduce dropout.

Violent Offense

Being incarcerated for a non-sexual violent index offense significantly predicted treatment dropout. This finding was in line with previous research showing that prior violent offenses were related to increased treatment dropout and recidivism across treatment programs (2). Unlike sexual offenders, violent offenders are not automatically admitted to social therapy but must undergo an application process—although deviations due to the occupancy situation in Hamburg prisons are possible. It is likely that, among the violent offender applicants, the SothA-HH purposefully selected those with the highest risk status. A rationale behind the selection of high-risk offenders may be that the latter group has the highest need for treatment [cf. RNR-model; (5)]. The results showed that it remained difficult to retain non-sexual violent offenders in treatment, emphasizing the need for future research to study responsivity issues as avenues for interventions (5) to mitigate the risk for treatment dropout. These may include ways of motivational interviewing, low-threshold group interventions for preparation of specific therapy or very individualized forms of single therapy if there are sufficient resources. Due to the steadily increasing proportion of non-sexual violent offenders in the last few years (25), research about new developments and improvements of treatment programs as well as techniques particularly devised for non-sexual violent offenders is warranted.

Unemployment

Previous studies showed that employment instability/unemployment was predictive of both treatment dropout and recidivism (12, 61, 62). Whereas unemployment per se is unlikely to *cause* treatment attrition, it may be part of a larger pattern of lifestyle instability and antisocial behavior, as also evidenced by group differences on Facets 3 and 4 of the PCL-R. It is plausible that those individuals unable to keep a job will probably show more interpersonal problems as well as a less stable therapeutic commitment as both make similar demands on the individual such as regular attendance, responsibility, the acceptance of rules and authority, and display of pro-social behavior. Thus, an individual who previously quit or lost his

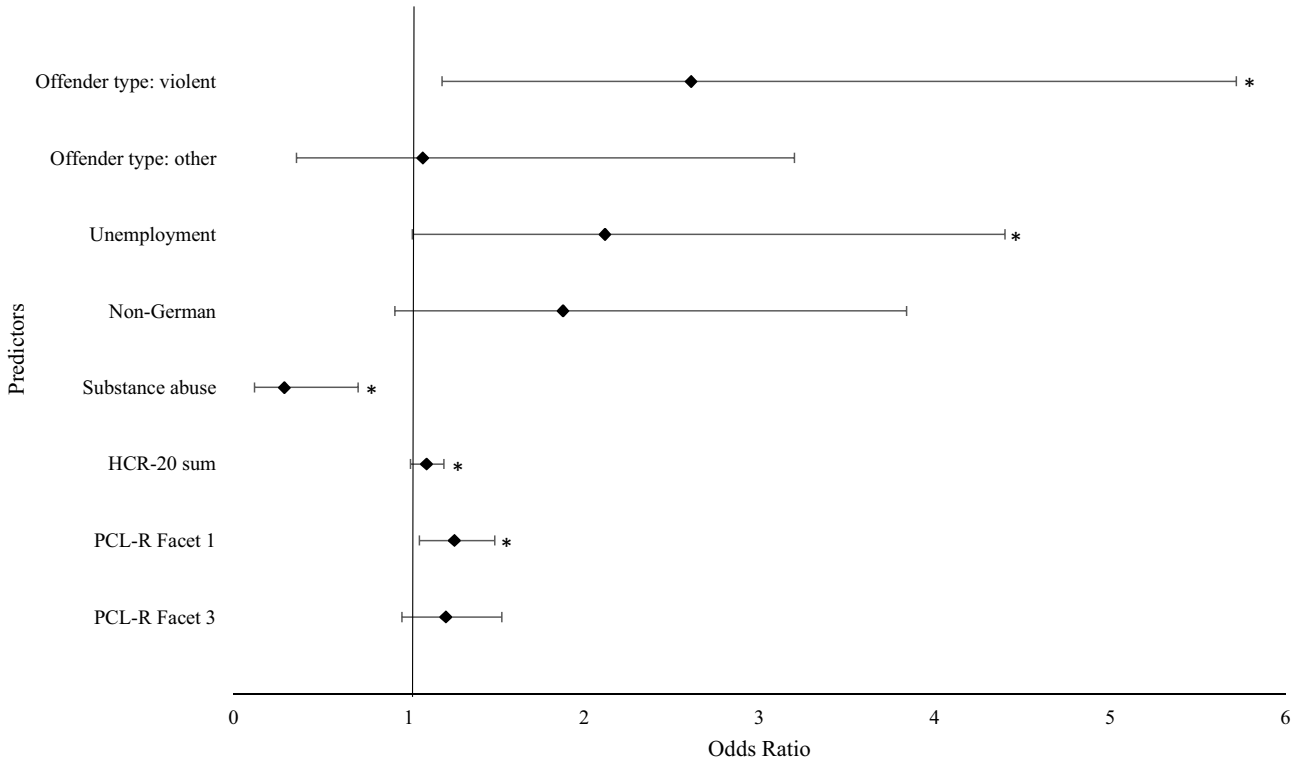

FIGURE 2 | Predictors for the treatment dropout of the model with the best fit. *indicates significance at $p \leq 0.05$. CI, confidence interval; HCR-20, Historical Clinical Risk Assessment-20; PCL-R, Psychopathy Checklist-Revised.

jobs frequently due to impulsive, irresponsible, rule-violating, or aggressive behavior may display similar behavior in a therapeutic context, which is likely to result in the premature termination of treatment. Based on these considerations, a specific targeting of criminogenic needs such as self-control, anger issues, or lack of perseverance may provide positive improvements for both employability and treatment outcomes. Moreover, treatment approaches based on the Good Lives Model (GLM) would focus on employment and education issues, in order to equip individuals with the capabilities to achieve outcomes which were considered as desired and beneficial by the majority of the society (63). Tentative findings by Ullrich and Coid (23) as well as Yoon et al. (47) suggest that under certain circumstances, employment could act as a protective factor reducing the risk of reoffending.

Substance Abuse

Substance abuse emerged as a significant predictor of treatment dropout, but, paradoxically, was inversely related to the criterion variable: offenders who had a diagnosis of substance abuse were *less* likely to drop out of social-therapeutic treatment. This is remarkable considering that substance abuse is a risk factor and has previously repeatedly been linked to treatment dropout in violent offenders (2, 12, 14). In fact, substance abuse are especially difficult to treat and dropout rates from treatment programs for substance abuse are oftentimes higher than 50% (64). In drug abuse treatment programs, dropout is actually considered a risk factor, as it increases the likelihood of a relapse (65). Similar to the present results, the meta-analysis of Olver et al. (2) found a small negative correlation between substance use problems and sex offender treatment dropout ($r_w = -0.04$), albeit this trend was not significant. Additionally, a study with 126 incarcerated sexual offenders also found that treatment completers were more likely to suffer from substance use disorder (66). The divergence in findings between sexual and violent offenders suggests that the relationship between dropout and substance abuse may be modulated by offender group. At present, we can only speculate why substance abuse is inversely related to treatment dropout. The finding may be explained by an increased allocation of resources to offenders with substance abuse. Being known as high-risk and difficult-to-treat individuals, offenders with substance abuse issues may have received additional treatment offers and were treated with particular attention to their needs. For example, the inmates of SothA-HH have access to an additional treatment for offenders with substance abuse. Future research is needed to investigate the role of substance abuse in predicting treatment dropout.

HCR-20 Sum Score

Every predictor for dropout already discussed is a component of the HCR-20: Therefore, an index as well as prior violent offense, psychopathic traits, substance abuse, and employment

instability may contribute to a high risk indicated by HCR-20 sum score. Additionally, high HCR-20 sum scores can indicate clinical risk factors such as lack of insight, antisocial, and hostile attitudes or impulsivity, but also risk factors such as noncompliance and an antisocial environment that make a future without renewed violent delinquency unlikely. At the same time, all these factors probably contribute in part to making it more difficult to cooperate with and adapt to a social-therapeutic correctional facility.

Limitations

Several limitations should be noted and addressed by future research. First, data on the reasons for dropout could not be obtained. This could threaten the validity of the results, if participants who exit the SothA-HH due to a systemic factor, such as administrative transfer, were accidentally categorized as dropouts. It could render interpretation of the results difficult, as dropout due to administrative reasons cannot be explained in terms of offender characteristics or behavior but rather external circumstances beyond the offender's control. Despite this being theoretically problematic, exits due to systemic factors happen only rarely in practice and their number in the present sample should be negligible. Future research would benefit from more detailed information on dropout reasons as they could provide a better understanding of the nature of treatment attrition and its relationship to the independent variables under investigation. Second, the generalizability of the findings is limited to the present population. Although, the participation rate is with 81.5% satisfactory (especially for a prisoners' sample), we cannot exclude self-selection bias resulting from refusers. Moreover, cross-validation with a different sample is advised when assessing the model's performance in practice. This is of particular importance, as social-therapeutic treatment is distinct to the German penal system, posing a threat to external validity if transferring results to international contexts. Finally, the current study could not investigate if dropout from a social-therapeutic facility did in fact translate into the assumed higher recidivism rates. Future research should test this hypothesis to reach a better understanding of the relationships between diverse risk and protective factors, dropout, and recidivism risk.

CONCLUSION

Despite some limitations, the present study provides important insights into the relationship between numerous variables and treatment dropout. The results support the notion that dropouts represent a high-risk and high-need offender group with pronounced risk and psychopathy scores, violent offense histories, and higher unemployment rates. Violent index offense, unemployment at the time of incarceration, HCR-20 sum score, PCL-R Facet 1, and, surprisingly, absence of substance abuse disorder were identified as significant predictors of treatment dropout, raising important considerations for treatment practice. Further research is necessary to determine how these variables contribute to treatment dropout, and to examine which variables exert a possibly confounding influence on the relationship between unemployment and treatment dropout. Even though findings regarding the relationship between dropout and protective factors remain inconclusive, further research should investigate if reductions in treatment dropout may be achieved if programs were adapted to address strengths as well as deficits.

AUTHOR CONTRIBUTIONS

FB, IN, and PB designed the study. FB, DY, and MR collected the data. FB, IN, and ES analyzed and interpreted the data. IN wrote the initial draft of the manuscript in constant consultation with FB. FB, IN, ES, and PB had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of data analysis. All authors have contributed to, read, and approved the final version of the manuscript.

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Confessions and Denials When Guilty and Innocent: Forensic Patients' Self-Reported Behavior During Police Interviews

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Several self-report studies together with analyses of exoneration cases suggest that suspects with mental disorder are especially prone to making false confessions. The present study asked 153 forensic patients in Germany about their behavior during suspect interviewing by the police. Self-reported ground truth of guilt and innocence was asked for, thereby taking into account that the risk of false confession is present only if a person has ever been interviewed when innocent. Indeed, surveying samples that include suspects who have never been interviewed when innocent may lead to underestimating the risk of false confessions. In the present study, all patients reported having been interviewed previously when guilty; and almost two-thirds (62%, $n = 95$), that they had also been interviewed at least once when innocent. These participants stated that they remained silent while being interviewed significantly more often when guilty (44%) compared to when innocent (15%). This corroborates laboratory research findings indicating that the right to remain silent is waived more often by innocent than by guilty suspects. Out of all 95 participants who were ever interviewed when innocent, 25% reported having made a false confession on at least one occasion. This result is in line with previous international research showing a high percentage of false confessions among suspects with mental disorder.

Keywords: police interview, suspect, interrogation, false confessions, forensic patients, denial, self-report, mental illness

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INTRODUCTION

The fact that suspects really do make false confessions has been confirmed repeatedly in recent years [e.g., (1, 2)]. However, for many reasons, it is difficult, if not impossible, to ascertain what the objective rates of false confessions might be, which offenses are confessed to falsely, and how frequently which different causal backgrounds emerge. Although most available knowledge on false confessions comes from analyses of exoneration cases (3, 4), self-report studies offer a further methodological approach.

Prevalence Estimations of False Confessions Based on Analyses of Exoneration Cases

Founded in 2012, the National Registry of Exonerations has been documenting information about exonerations occurring in the United States from 1989 to the present (by 26.01.2019, this had amounted to 2,364 cases; www.law.umich.edu/special/exoneration/Pages/about.aspx). For all offenses, the Registry reveals an average of 12% false confessions. At 23%, the proportion of false confessions for homicide is higher than that for all other offenses. However, a clear external criterion for the actual innocence of the exonerees does not exist for all cases listed in the National Registry of Exonerations. The Innocence Project in contrast, registers only cases in which the innocence of a previously convicted person has been confirmed by DNA analysis (362 cases by 26.01.2019; http://www.innocenceproject.org). Evaluation of these cases, which are primarily violent crimes and sex offenses, reveals that in 28% of DNA exonerations, false confessions were a contributing factor (https://www.innocenceproject.org/dna-exonerations-in-the-united-states/).

In Germany, Peters (5, 6) analyzed about 963 cases of retrials between the years 1951 and 1964. In 724 of these cases, retrial led to an acquittal. Peters found that around 7% of the defendants who were acquitted in the retrial had originally made a confession. Assuming that the subsequently acquitted individuals actually were innocent, these are false confessions. However, as in the National Registry of Exonerations, no external criterion of actual innocence is available for all members of this German sample. Nonetheless, analyzing only a subsample that is more comparable to the sample in the Innocence Project reveals a similar proportion to that found in the United States: within the German sample, a false confession could be found in 5 out of 21 homicide cases (24%) in which the convicted was exonerated in the retrial proceeding after his or her innocence was confirmed. However, this investigation is more than 40 years old, and no recent information is available on the frequency of false confessions in Germany.

Analyses of exoneration samples refer typically to (a) cases of serious crimes that have a low base rate and (b) police-induced false confessions (7) that were mostly withdrawn already at the end of the police interview but nonetheless led to a—false—conviction (3). In contrast, voluntary false confessions, in which somebody confesses in the absence of any interrogation influence, are hardly ever found in exoneration samples; they may either not be prosecuted or convicted in the first place, or they are not withdrawn and no retrial is sought.

Self-Reported Prevalence of False Confessions

Several studies have gathered self-reported information on false confessions in community samples as well as in samples of prison inmates. These reveal some consistent trends in the self-reported prevalence of false confessions [see, for a summary, (8, 9)]:

- Apart from one study in which nobody reported ever making a false confession (10), all studies—including those in community samples—revealed a small, but in no way negligible percentage of respondents who reported having already made at least one false confession (between 1.2 and 13.8% in community samples).
- When persons were surveyed who had already been interviewed repeatedly as suspects by the police, the proportion reporting having made a false confession in the past was larger and was almost always more than 10% and sometimes even more than 20% [between 6 and 24%; (8)].

However, several of the self-report studies were carried out in Iceland. Because false confession rates probably depend strongly on the given national boundary conditions (e.g., police interviewing practices), it is questionable whether these findings generalize to other countries. Although surveys from other countries are available (Bulgaria, Finland, Latvia, Lithuania, Norway, and Russia; 9), that also indicate differences between countries, findings are generally similar. However, no studies on self-reported false confession rates are available for Germany.

The most commonly *self-reported motives* for false confessions are succumbing to police pressure, protecting another person (the actual offender), and avoiding police detention (11). False confessions are self-reported most frequently for property offenses and serious traffic violations (11). In a study with mentally ill offenders (12), participants claimed that they made false confessions in order to stop police questioning, to protect the true perpetrator, because they succumbed to police pressure, or because they initially believed they were involved.

For logical reasons, suspects face the risk of making a coerced false confession only if the following preconditions are given: (a) the police suspects and interviews an innocent person; (b) the suspect waives the right to remain silent; and (c) there might be incriminating evidence, but evidence that *definitely proves* the guilt of the suspect is missing and cannot exist because of the suspect's innocence (13). Existing studies often neglect the very trivial fact that the risk of a false confession emerges only if a person has ever been interviewed when innocent. Hence, surveys of samples that include suspects who have never been interviewed when innocent may well-underestimate the prevalence of false confessions.

Risk Factors for False Confessions

Studies on factors that may increase the likelihood of a false confession refer mostly to confessions that are policed-induced. These focus on *investigative risk factors* and refer to the police investigators' cognitive processes and behavior along with the influence of specific measures such as custody. Reviews of this literature can be found in Gudjonsson (14), Kassin (15), and Kassin et al. (2).

There are also *personal risk factors* for false confessions. These are personal characteristics of the suspect such as, in particular, young age, and mental disorder. Gross and Shaffer (4) analyzed 873 cases registered in the National Registry of Exonerations and found that youths and persons with mental impairment were particularly vulnerable: whereas the false confession rate among adults with no known psychological disorders or mental impairment was 8% (56/719); that among the under-18s, was 42% (39/92); and that among persons with a psychological disorder or mental impairment, was even 75% (53/70).

Mental problems have also been identified as a risk factor in self-report studies. Two out of three studies in which more than 20% reported having made a false confession in the past have investigated persons with mental disorders [(12): 22%; (16) cited in (8): 23%]. Participants claiming to have confessed falsely also reported having higher levels of illicit drug use and substance misuse treatment; more adverse life events (17); and higher levels of victimization, anxiety, depression, and anger (18) compared to people who never made a false confession. Self-reported false confessors were also found to have more antisocial personality characteristics than non-false confessors (10).

Self-report studies also show that false confessions occur more often among persons with a delinquent lifestyle: in comparison to non-false confessors, false confessors had been interviewed more often as suspects (19), arrested more often (11), sentenced more often to life imprisonment, had more years of offending (12), served more frequently and longer in prison, were younger at the time of their first criminal conviction and imprisonment (20), and had more delinquent peers (18). However, these variables might reflect at least in part the fact that people with a more extensive criminal history are interviewed more often by the police, and this, in turn, may increase the probability that they will be suspected falsely.

True Confessions

To identify specific features of false confessions, they have to be compared with the conditions in which true confessions emerge. Unfortunately, there are still surprisingly few estimates of how often suspects confess at all during police interviewing. Moston and Emgelberg (21) found that general confession rates ranged from 42 to 64% in the United States and from 55 to 62% in Great Britain.

Nonetheless, confession rates vary greatly depending on the sample. In Germany, Bippert (22) analyzed the files of 106 male defendants who had been convicted of homicide offenses, and found that 67% confessed during the course of the police interview. In retrospective interviews with 56 incarcerated male adolescents, Kraheck-Brägelmann (23) found that 45% made a full and 50% a partial confession. In a self-report study, Sigurdsson and Gudjonsson (24) also found a true confession rate of 92% among Icelandic prison inmates. However, these studies analyzed only cases that were prosecuted further. Thus, they probably included a disproportionately high number of cases in which strong evidence might have affected the decision to confess.

A review of all 743 suspects (irrespective of whether or not cases were further prosecuted) from one police department in Germany across the span of 1 year—thus including a variety of offenses—showed that 35% confessed, 15% denied the alleged offense, and 50% made no statement (25). A study in Great Britain with unselected police interviews revealed a confession rate of 39% (26). Note that these studies were unable to control whether either allegations or confessions were true or false.

Reported reasons for true confessions are, among others, the perceived strength of evidence (21, 27, 28), a need to clear one's conscience, police pressure (24), custodial pressure, and a desire to be released from police detention (29).

Research contrasting true and false confessions is almost non-existent. One exception is Sigurdsson and Gudjonsson's (10) within-sample analysis of 51 alleged false confessor inmates in Iceland. This compared the false confession experience with the experience of their current true confession. Significant differences were found for external pressure (found to be higher for false than for true confessions), internal pressure, perception of proof, and legal rights (all found to be higher for true confessions). Another exception is Redlich et al. (30) between-subject design with which they studied 30 true and 35 self-reported false confessors with mental illness in the United States. False confessors reported significantly more external and less internal pressure than true confessors. Taken together, true confessions show at least a partial overlap with the factors associated with false confessions (14). However, true and false confessions differ in terms of the prevalence and distribution of the reported motives.

The current study is the first to survey the behavior of forensic patients in suspect police interviews in Germany. Forensic patients are offenders who are ordered by criminal courts to either (a) detention and treatment in a secure psychiatric hospital (section 63 of German Criminal Law) or (b) detention in a secure custodial addiction treatment unit (section 64 of German Criminal Law). As pointed out above, the available studies suggest that false confessions are particularly frequent in this population. The goal of the present study was to determine whether a German sample would reveal a comparable proportion of false confessions to that found within this group in international studies. In one aspect, the present study goes beyond most previous research on self-reported false confessions: it takes into account that a risk of making a police-induced false confession is given only if suspects are interviewed when innocent and waive their right to remain silent. Therefore, we asked participants explicitly whether they had ever been interviewed by the police when they were innocent. Subsequently, we analyzed self-reported participants' behavior separately if interviewed when guilty vs. if interviewed when innocent; and we also calculated the proportion of truthful (true confessions and true denials) and false statements (false confessions and false denials) as well as the proportion of patients exercising their right to remain silent. We consider that viewing the proportion of self-reported false confessions as the proportion of cases in which someone has been interviewed when innocent provides a more appropriate estimate of the risk of making a false confession than estimates based on samples that include participants who have never been interviewed when innocent. By asking participants about their behavior while being interviewed when guilty and being interviewed when innocent, we also gathered information on true confessions, false denials, or decisions to remain silent.

METHODS AND MATERIALS

Participants

Participants were 153 patients (7 female and 146 male) with a mean age of 33.69 years ($SD = 10.71$, range from 20 to 67) detained in six forensic hospitals in Germany.

Originally, 159 patients were recruited, but 6 were dropped because of language/communication difficulties. Patients had been convicted for violent offenses (82%), sexual offenses (24%), property offenses (27%), drug offenses (10%), and other offenses not covered by these categories (27%; multiple offenses possible). The distribution of ICD diagnoses was as follows (multiple diagnoses possible): mental/behavioral disorders due to psychoactive substance use (68%); personality disorders (31%); mental retardation (22%); schizophrenia, schizotypal, and delusional disorders (12%); and others (5%).

Procedure

The study was approved by the Ministries of Social Affairs and Health responsible for forensic hospitals in the respective Federal States. Patients were informed about the survey by their physician or psychotherapist. Those willing to participate were asked to register on a list. Participants were interviewed individually by one of four interviewers. Before the beginning, interviewers explained the purpose of the study again, assured patients that their data would be used anonymously, and emphasized that they could drop out of the study at any time without having to fear any negative consequences. After that, patients were asked whether they were willing to sign a consent for both the interview and access to information on their current diagnosis (ICD-10) and sentence. After they consented, the questionnaire was read aloud and patients' answers were documented. Patients whose capability to give informed consent was questionable were not interviewed. Interviews lasted between 5 and 30 min depending on how many police interview constellations were reported by the patient.

Measures

Questionnaire

A questionnaire was developed to gather information on the patients' behavior during police interviews. The first question asked whether the police had ever interviewed them as a suspect for an offense they had actually committed. If they answered in the affirmative, participants were asked how often they were interviewed in this way and whether they had remained silent, denied the offense, or confessed during these suspect interviews. Those who claimed to have confessed were asked about the reasons for their true confessions (presented in a yes/no format; multiple reasons were possible, see **Appendix**).

Next, patients were asked whether the police had ever interviewed them as a suspect for an offense they had not committed. If they answered in the affirmative, they were asked how often this had occurred and whether they had remained silent, denied the offense, or confessed during the interview. If suspects claimed they had made a false confession, they were asked about the number of false confessions, the offenses, and the reasons for these false confessions (yes/no format; multiple answers possible, see **Appendix**). Furthermore, they were asked about their age at the time of the false confession. We also asked patients whether they had been in a prison or in a forensic hospital before.

When answering questions on the reasons for making true or false confessions, patients were given a list of categories derived from the literature [see also (12)]. These categories could be subdivided further: suspects might, for example, infer mitigation because of wishful thinking, because minimization tactics were used, or because an explicit promise was made. However, given that these are retrospective data gathered from a relatively small sample of people with mental health problems, such distinctions were not made. Because the available studies indicate that reasons for making true or false confessions overlap, and the current study aimed to compare reasons for making true confessions with those for making false confessions, set response categories were preferred to an open response format.

Information on Current Sentence and Diagnoses

Information on patients' current sentences and diagnoses (ICD-10) was provided by the responsible psychiatrist.

RESULTS

All participants confirmed that the police had interviewed them over at least one offense they had actually committed, with a range from 1 to 150 interviews ($M = 14.71$, $SD = 23.14$, $Mdn = 6.00$). A total of 95 (62%) reported that they were also interviewed as a suspect over at least one offense they had not committed, with a range from 1 to 50 interviews ($M = 3.04$, $SD = 5.65$, $Mdn = 2.00$).

Patients who reported having been interviewed when both guilty and when innocent did not differ significantly in terms of prior imprisonment, prior forensic treatment, or diagnoses from those who stated that they had never been interviewed when innocent—with one exception: the percentage of patients diagnosed with schizophrenia, schizotypal, and delusional disorders was significantly smaller in the subsample with guilty and innocent interviews (6%) than in the subsample with only guilty interviews (20%; Fisher exact test $p = 0.015$).

Self-Reported Confessions, Denials, and Exercising the Right to Remain Silent

Table 1 displays the distribution of confessions, denials, and exercises of the right to remain silent in both conditions. Because measurements were repeated in the subsample of 95 patients who were interviewed when both innocent and guilty, whereas this was not the case for the remaining 58 patients, individual McNemar's chi-square tests were computed for each of the three interview variants (confessions, denials, exercise of the right to remain silent) in the 95 patients who reported both types of interviews (guilty/innocent). Results showed significant differences (all $p < 0.001$) between interviews in which patients were interviewed when guilty vs. innocent for all three interview variants. Participants reported more confessions when guilty (78%) than when innocent (25%), and more denials when innocent (79%) than when guilty (35%). They also reported significantly more frequently waiving their right to remain silent when innocent (85%) than when guilty (56%).

False Confessions

A total of 24 patients reported having made at least one false confession. This represents 16% of the whole sample

TABLE 1 | Reported behavior during interviews when guilty and when innocent (in brackets: frequencies for the subgroup that reported having been interviewed when both guilty and innocent).

	Interviewed when guilty ($N = 153$) [$n = 95$]	Interviewed when innocent ($n = 95$)
Remained silent	57 (37%) [42 (44%)]	14 (15%)
Denied	47 (31%) [33 (35%)]	75 (79%)
Confessed	124 (81%) [74 (78%)]	24 (25%)

Multiple answers possible; therefore, percentages do not add up to 100. Number of affirmative answers (n).

(24/153). But this percentage is somewhat misleading, because 58 patients were not at risk of confessing falsely, having never been interviewed when innocent. How these 58 patients would have behaved had they been interviewed when innocent remains an open question. Of the 95 participants who had been interviewed when innocent, 25% (24/95) reported having confessed falsely at least once. The prevalence rate increased further to 28% when including only those participants who (a) were interviewed when innocent and (b) made a statement (24/86). These 24 patients reported a total of 38 false confessions, ranging from 1 to 7 false confessions per patient. Fifteen of the 24 patients reported having been convicted after making a false confession. False confessions referred to property offenses ($n = 15$), violent offenses ($n = 7$), homicide ($n = 2$), drug offenses ($n = 2$), and other offenses not covered by these categories ($n = 7$).

Reasons for Confessions

"Strong evidence" (65%) and "hope for mitigation of sentence" (41%) were the most frequently reported reasons for *true* confessions, whereas the most frequent reason for *false* confessions was "protecting the real perpetrator" (63%). A substantial minority of participants reported "hope for release from custody," "interviewing pressure," and "feeling of physical discomfort (e.g., being overtired)" as reasons for true and for false confessions (**Table 2**). The group of 24 false confessors was, in a sense, divided: the 15 patients who claimed to have protected the actual perpetrator named only three other reasons (2 x being pressured by the real perpetrator, 1 x hope for mitigation of sentence). All other reasons were given by the remaining 9 false confessors.

Differences Between Confessors and Non-confessors

Fisher exact tests were calculated to examine differences in diagnoses and prior delinquency between (a) guilty confessors and guilty non-confessors and (b) innocent false confessors and innocent non-confessors. Results are displayed in **Table 3**.

Guilty Confessors vs. Guilty Non-confessors

Compared to guilty confessors, guilty non-confessors were more often diagnosed with a mental and behavioral disorder due to psychoactive substance use (ICD-10 F10–F19; 64 vs. 86%; Fisher exact test, $p = 0.026$). No other significant differences were found.

TABLE 2 | Self-reported reasons for true and false confessions.

	True confessions ($n = 124$)	False confessions ($n = 24$)
Evidence was strong[a]/Police claimed evidence to be strong[b]	80 (65%)	4 (17%)
Hoped for mitigation of sentence	51 (41%)	4 (17%)
Wanted to ease conscience[a]/Feeling of guilt[b]	35 (28%)	0
Hoped to be released from custody	24 (19%)	3 (13%)
Because of the interviewing pressure	16 (13%)	6 (25%)
Did not feel well physically, e.g., overtired	14 (11%)	2 (8%)
Protecting the real perpetrator	(not asked)	15 (63%)
Being pressured by the real perpetrator	(not asked)	2 (8%)
To gain attention	(not asked)	1 (4%)
Was convinced to be the perpetrator	(not asked)	0
Others	28 (23%)[c]	5 (21%)[d]

[a] *Asked for true confessions only.*
[b] *Asked for false confessions only.*
[c] *For example: "I am not able to lie" or "My family should not know."*
[d] *For example: "I did it out of love" or "I wanted to be part of the clique."*
Multiple answers possible; therefore, percentages do not add to 100.

Innocent False Confessors vs. Innocent Non-confessors

No significant differences were found.

DISCUSSION

The current study examined German forensic patients' self-reports on their behavior while being interviewed by the police when either innocent or guilty. All patients stated that they were interviewed by the police for at least one offense they had actually committed. Almost two-thirds of the forensic patients (62%) reported that they had also been interviewed at least once in the past when innocent. Little is known about how often people undergo a suspect interview when they are actually innocent. The results of our study suggest that being interviewed as a suspect when innocent is not a rare experience for people with a criminal record.

Most patients in the current study (81%) reported having made a true confession when they were guilty during at least one of the police interviews. The majority also reported having made a truthful statement during police interviews when innocent (79% true denials). Taken together, the most frequent behavior during police interviews was reported to be making a truthful statement, irrespective of whether patients were guilty or innocent [see also (9)]. Notwithstanding, a substantial proportion of false denials (31%) and false confessions (25%) was also revealed.

TABLE 3 | Frequencies and percentages of ICD-10 diagnoses and self-reported delinquency by confessors and non-confessors split for interviews when guilty and innocent.

	Interviewed when guilty ($n = 153$)		Interviewed when innocent ($n = 95$)	
	Confessed ($n = 124$)	Not confessed ($n = 29$)	Confessed ($n = 24$)	Not confessed ($n = 71$)
	n (%)	*n* (%)	*n* (%)	*n* (%)
MENTAL DISORDERS (ICD-10)				
F10–F19 (due to substance use)	79 (64%)	25 (86%)*	17 (71%)	48 (68%)
F20–F29 (Schizophrenia)	14 (11%)	4 (14%)	2 (8%)	4 (6%)
F60–F69 (Personality disorders)	40 (32%)	8 (28%)	8 (33%)	22 (31%)
F70–F79 (Mental retardation	29 (23%)	4 (14%)	4 (17%)	17 (24%)
Others	11 (8%)	1 (3%)	1 (4%)	7 (10%)
PRIOR DELINQUENCY				
Prior imprisonment	70 (56%)	20 (69%)	17 (71%)	40 (57%)
Prior forensic treatment	21 (17%)	4 (14%)	5 (21%)	14 (20%)

*$p < 0.05$.

True Confessions

The prevalence of true confessions (81%) in the current study exceeded the range of confession rates found in international studies [43–76%; (21)]. However, studies with samples of incarcerated inmates have also revealed comparable or even higher prior confession rates (20, 23).

False Confessions

The percentage of self-reported false confessions within the whole sample was 16% (24/153) and thus in the range of comparable surveys of prison inmates in other countries [6–24%: (8)]. Nonetheless, the proportion of false confessions within the whole sample was slightly lower than the 22% reported by Redlich et al. (12) who also surveyed a sample of offenders with mental disorders.

However, by calculating a proportion of self-reported confessions within a whole sample, one might well-underestimate the actual prevalence: suspects face the risk of making a false confession only if they are (a) interviewed when innocent and (b) waive their right to remain silent. This is at least true for police-induced confessions. People can, however, come forward to the police with a voluntary false confession without being suspected before. In these cases, a suspect interview would not be conducted without the confession in the first place. From the examples patients mentioned during the survey, it can nonetheless be assumed that this was often not the case in the current sample. Participants reported on cases in which, for example, they knew the real perpetrator but were mistaken for the culprit by the police. Or they were interviewed for an offense they actually had committed while they were additionally alleged to have committed a crime for which they were not responsible.

Whereas, the percentage of self-reported false confessions within the whole sample was 16%, this rose to 25% (24/95) in the subgroup of participants who had at some time been interviewed when innocent. Put differently, one in four forensic patients who ever had the opportunity to make a false confession claimed to have done so. Out of those suspects who made a statement while being interviewed when innocent, 28% (24/86) reported having falsely confessed in at least one of these interviews. Altogether, we view the proportion of false confessions that refer solely to interviews when innocent as a more appropriate estimate for the risk of making a false confession in a police interview than the proportion reported in most previous studies that gave only the overall prevalence (proportion of false confessions within the whole sample).

In line with other self-report studies, property offenses were the most common type of offenses for which the patients claimed to have confessed falsely [e.g., (11)].

Waiving the Right to Remain Silent

Whether patients denied, confessed, or exercised their right to remain silent during the police interviews differed significantly between interviews when guilty and when innocent. For denials and confessions, these results are rather trivial. Less trivial, however, is the result that significantly more patients stated that they had waived their right to remain silent at least once while being interviewed when innocent (85%) compared to interviewed when guilty (63% when looking at the total sample; 56%, when looking at the 95 participants who were interviewed when both guilty and innocent). This result is in line with Kassin's claim that "innocence puts innocents at risk" [2005; see also (2)]. A series of experimental studies have demonstrated that innocent suspects are more forthcoming than guilty suspects [e.g., (31, 32)]. Hence, the field data from the current study support these previous findings.

Reasons for Confessions

Focusing on the suspects' confessions, we asked them why they gave a true or false confession. Overall, the most frequently reported reason for a *false confession* was to protect the real perpetrator (*15/24;* 63%). This reason for false confessions is frequently reported in all self-report studies. However, the percentage in the current study was even higher than in other

self-report studies (11, 12). In contrast, interviewing pressure (6/24; 25%) was claimed less frequently in comparison to the percentages reported in international studies [e.g., (11, 12)]. Whether these differences are due to differences in the way police carry out their interviews in different countries or to different samples characteristics cannot be determined from the current data.

It should, however, be emphasized that police interviewing pressure still constitutes the second most frequently reported reason for a false confession in the current study. Moreover, a combination of different situational factors resulting from police interrogation tactics (interviewing pressure, claims by the police that the evidence was strong, hope to be released from custody, hope for mitigation of sentence) were reported by almost 40% of all cases (9/24). These factors point to substantial social-psychological influences. Even when protecting the real perpetrator is given as the reason, in many cases such constellations do not represent the classic version of a voluntary false confession in which a person confesses in the absence of any external influence (7). It is far more often the case that these patients were interviewed as suspects for an offense that was actually committed by a person they knew and that they then confessed during the police interview. Many of these patients would possibly not have falsely confessed without the situational effects of interrogation.

With respect to *true confessions*, the most commonly reported reason was that the evidence was strong. This suggests that strength of evidence is crucial for the decision to make a true confession, and this is once more in line with existing empirical evidence (21).

Taken together, some motives were inherently found to be exclusive to true confessions (evidence was actually strong) or false confessions (protecting the real offender, being pressured by the real offender), but there is also an overlap of motives reported for both kinds of confession (interview pressure by the police, hope for release from custody). Nonetheless, possible responses were limited by the categories used in this study. To explore the reasons for true and false confessions in a more differentiated way, future research should include interviews with true and false confessors.

Differences Between Confessors and Non-confessors

In the current study, prior imprisonment tended to be more prevalent among innocent false confessors compared to innocent non-confessors (71 vs. 57%). However, this difference was not statistically significant. Although this lack of significance may be due to the small number of cases, one might also argue that a longer criminal history will be associated with a higher number of suspect interviews and thus with a higher probability of being interviewed when innocent. Previous findings showing an association between criminal history and false confession (11) might simply reflect the heightened probability of being interviewed occasionally when innocent. However, in the current sample, participants who were interviewed only when guilty did not differ in terms of prior imprisonment and prior forensic treatment from those who were interviewed when guilty and when innocent.

Patients diagnosed with a mental retardation did not self-report higher false confession rates than other patients. This was rather unexpected in light of existing research on the vulnerability of suspects with low intelligence [e.g., (33)]. The present result may be due partly to a self-selection process: patients with more severe intellectual deficits probably did not volunteer to participate in this study or could not be included because they lacked the capacity to give informed consent or had difficulties in understanding and answering the questions.

Limitations

Some limitations have to be addressed: first, the sample probably does not represent the population of forensic patients in Germany. Participation required sufficient intellectual capacity to understand the questionnaire, maintain attention for a period of time, and communicate with basic German language skills. This might have excluded patients who may be even more prone to false confessions. Second, reports are based on persons and not interviews. Asking participants to report an interview behavior that they had displayed at least once in the past may have distorted the data on participants with multiple police interviews. They may well have shown the reported behavior only in one exceptional situation that deviated from their typical—more frequently shown—interview behavior. However, this approach can certainly be used as a basis to estimate whether a certain interview behavior (e.g., a false confession) has *ever* been shown. Nonetheless, the study is further limited by the questionable validity of self-report information with its susceptibility to motivational and memory errors. There is a lack of external criteria to corroborate the reported information on behavior during police interviews. Nevertheless, it should be emphasized that the percentages of self-reported false confessions in international studies are quite similar to those in the current study. In addition, those groups that have already proven to be vulnerable on the basis of exoneration file studies also prove to have higher false confession rates in self-report studies than others, and this can be viewed as supporting the validity of the self-report data.

CONCLUSIONS

Results of the current study confirm previous international self-report studies showing that a false confession is not a rare event. Rates are similar to those found in the international literature on persons with mental disorder.

Until recently, these findings had received little attention in German law enforcement practice (34). However, in 2017, the German Parliament passed legislation requiring certain suspect interviews by the police, including interviews of underage suspects and of suspects with mental disorder or disorders, to be audio- or videotaped from 2020 onward (35).

The current study shows—together with other self-report studies [e.g., (12)]—that examining only exoneration cases

might lead to the wrong impression that false confessions occur mainly in response to severe allegations. Proven false confessions in exoneration cases typically refer to offenses such as homicide or sexual assault that have a low base rate. In contrast, self-report studies suggest that false confessions occur frequently in more prevalent but less serious crimes. Self-reported false confessors name the protection of the true perpetrator as a frequent reason for a false confession [see also (8, 9)]. However, this does not necessarily mean that people enter the police station and confess to a crime despite never being suspected. In contrast, the patients were often erroneously interviewed as suspects for an offense that was actually committed by a person they knew, and they only made a false confession during the course of the police interview. Because many of the false confessors also stated reasons that indicate the situational effects of the suspect interviews, substantial social-psychological influences should be assumed in these cases. Based on the current data, it is not possible to state conclusively whether the circumstance that the patients knew the true offender was the actual reason for a false confession; or made them more vulnerable to interrogative influences in the sense that a false confession may constitute the alternative to betraying a peer. Future research should address this question by including interviews with innocent confessors and non-confessors.

DATA AVAILABILITY

The raw data supporting the conclusions of this manuscript will be made available by the authors, without undue reservation, to any qualified researcher.

AUTHOR CONTRIBUTIONS

RV and SL contributed the conception and design of the study. LM, JH, and SL organized the data acquisition and carried out data collection. LM performed the statistical analysis. LM wrote the first draft of the manuscript. RV wrote parts of the manuscript and revised the draft. All authors read and approved the submitted version.

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Conflict of Interest Statement: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

APPENDIX

Why did you truly confess?
Because the evidence was strong.
I wanted to ease my conscience.
Because of the interviewing pressure.
I was hoping to get released from custody.
I was hoping to get a more lenient punishment.
I was physically not well (e.g., overtired)
Other:
Why did you falsely confess?
I wanted to protect the real perpetrator.
I was pressured by the real perpetrator to confess.
Because of the interviewing pressure.
The police claimed the evidence to be strong.
I was physically not well (e.g., overtired)
I was hoping to get released from custody.
I was hoping to get a more lenient punishment.
I wanted to attract attention.
I felt guilty.
I was convinced to be the perpetrator.
Other:

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Suicide in Older Prisoners in Germany

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As in many countries, the numbers of older prisoners are rising in Germany, but scientific information on this group is scarce. For the current study, a survey was used that included all prison suicides in Germany between the years of 2000 and 2013. Suicide rates of the elderly prisoners exceeded the suicide rates of the general population and the same age group. We observed a continuous decrease in the suicide rate of elderly prisoners. When compared to the younger suicide victims in prison, significantly more elderly suicide victims were: female, of German nationality, remand prisoners, or serving a life sentence. In Germany, elderly prisoners are a vulnerable subpopulation of the prison population. Higher suicide rates than in the same age group in the general population indicate unmet needs regarding mental disorders and their specific treatment.

Keywords: prison, suicide, older prisoners, male prisoners, mental health care, suicide rate

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INTRODUCTION

For the longest time in history, prison was a matter of the young. Today, in Europe and North America the number of elderly prisoners is rising, although they are still a minority in prison (1). Currently, about 10–16% of the prison population in the western world is over 50 years old and about 3% is over 60 (2). Reasons for the growing number of elderly prisoners are manifold. One unspecific factor is that life expectancy is increasing in general, leading also to aging prison populations (3). Furthermore, older prisoners tend to receive longer sentences often as a consequence of repetitive reoffending (4).

In general, the cut-off age for older persons is 60 years (5), but it has been variously discussed that prison inmates should be considered as old at an earlier age, mostly because analysis of mortality rates revealed that aging is accelerated for persons with a history of incarceration when compared to the general population (6). Therefore, studies on older prisoners have been using different age-groups ranging from 40 to 65 years (3, 6, 7). Comparing frequencies and percentages of age used to denote older inmates, the most common minimum age criterion was 50+ years (8). Findings from an interview study with ex-convicts with a mean age of 55.8 years suggested that this group was characterized by a specific combination of health problems, combining symptoms of post-traumatic stress disorder, social-sensory disorientation, and alienation (9).

In many aspects older prisoners are a vulnerable group. They lack in physical strength compared to their younger inmates what puts them at risk of bullying, harassment, and violence. Due to overcrowding and inadequate resources, they may face more difficulties in getting their specific needs met. In addition, the prison environment of today is not designed to meet the needs of patients at risk for dementia (10). On the other hand, incarceration may actually have health

benefits especially for men of the lower or middle class, because life in prison offers regular meals, the possibility to rest often and access to health care services (11, 12). Evaluating data on 87 long-term prisoners over an average period of 14.6 years, Dettbarn was unable to prove a damaging effect of long-term imprisonment (13). Analyzing the cause of death in male prisoners in England and Wales over a period of 20 years, a lower standardized mortality ratio (SMR) was revealed for prisoners compared to the general population and the SMR for the age band 60+ was lower than for the younger age bands (14).

Regarding the prevalence of severe mental disorders, there is evidence that prisoners all over the world are more often mentally ill and that they are affected prematurely by cognitive impairment (15, 16). According to Fazel et al. 10% of male and 14% of female prisoners are diagnosed with severe depression (17). Furthermore, suicide is a leading cause of death in prison (18). Regarding the prevalence of cognitive impairment in older prisoners, a study of Kingston et al. showed that 12% of the examined prisoners aged 50+ years demonstrated signs of cognitive impairment and 50% were diagnosed with a mental disorder. In spite of the high proportion of mentally impaired older prisoners, only 18% received an appropriate, prescribed medication. Therefore, Kingston pointed out that the mental health needs of older prisoners tended to be undetected and untreated. Interviews with prisoners aged 59+ years in England and Wales revealed a high prevalence of depressive disorders, which was five times higher than that found in other studies of younger prisoners and elderly men in the community (19). In an interview study with 124 prisoners aged 50+ years, Barry et al. demonstrated that a past alcohol dependence and a poor self-rated health were associated with elevated suicidal ideation. Altogether, in their study, 22% of the older prisoners were showing current suicidal ideation and 12% were reporting active suicidal ideation (20).

THE AIM OF THE STUDY

As in many other countries, the number of older prisoners (age $\geq$ 50 years) in Germany continuously increased from 2000 to 2013 (21–24). Sound scientific evidence on this matter is scarce. To our knowledge, our study is the first publication on elderly German prisoners who committed suicide. For the first time, a suicide rate of elderly German prisoners will be determined using data of an exhaustive nationwide suicide survey. Our hypotheses are:

1. The suicide rate of elderly prisoners exceeds that of younger ones and suicide rates of younger and elder prisoners exceed the suicide rates of the respective groups in the community.
2. The suicide rates of elderly prisoners are decreasing between the years 2000 to 2013.
3. Some characteristics of the elderly prisoners who committed suicide in prison differ substantially and significantly from the younger prisoners.

MATERIALS AND METHODS

Data on all prison suicide events in Germany from the years 2000 to 2013 were collected from a survey using a specific questionnaire on each suicide event in prison. The survey was completed via the reports on exceptional events found in the routine prison documentation and was endorsed by the respective ministries of justice of the German Federal Lands. The respective federal institutions rated the questionnaires, and only 3 Federal Lands were not able to provide the rating of the questionnaires. In these federal lands, the "Generalakten" (Summary files for each prisoner that contain all respective data) were extracted by one of the authors (25). The survey of suicide events in prison comprised a period of 14 years, from January 2000 to December 2013.

The questionnaire that was used for the survey assessed socioeconomic data, data concerning the execution of the sentence and data concerning the course of imprisonment. The items of the questionnaire refer to the history of the prisoner. Since only aggregated data are published, no concern exists for disclosure of personal data. All items, except date of birth, were coded dichotomously. In German prisons, documented medical data is confidential and therefore not part of the "Generalakten." For that reason, information gained by health professionals is not included. Some variables were assessed incompletely, these are marked by an asterisk.

Sociodemographic data: gender, date of birth, country of birth, nationality, religion*, marital status*, number of children, housing before incarceration*, education*, professional qualification*, employment before incarceration*.

Data on the execution of the sentence and circumstances of the suicide: pre- or post-trial status, number of prior incarcerations, homicide, sexual offenses, actual sentence in month, alcohol/drug involved in actual offense, substance abuse, addiction therapy*, remand status, symptoms of alcohol withdrawal*, symptoms of drug withdrawal*, criminal behavior at a young age, criminal behavior involving close friends or relatives*, mental disorder*.

Data concerning the course of imprisonment: aggressive behavior, suicidal behavior, physical attacks, social contacts*, privileges*, escape, disciplinary measures*, bullying*, date of suicide, cause of death, suicide note, security measures*.

In accordance with publications on the elderly prison population, we chose the cut-off age of 50 years for older prisoners in our study (8). For calculating the suicide rates, the number of all subjects imprisoned in the respective years from 2000 to 2013 was taken from the annually published volumes of the German official demographic statistics (26). These reports provided the numbers of prisoners in 5-year age categories (e.g., 20–25, 25–30). Trends in the suicide rates were analyzed by linear regression for the years 2000 to 2013 and age groups (old vs. young) were compared using an ANCOVA-approach. The model we defined uses the suicide rate as dependent and year and age as independent variables. Both suicide rate and year were treated as numeric, while age was coded as 0/1. With that approach, the interaction effect of age and year can be tested. The suicide rates were standardized in order to make them comparable. Subsequently, a linear model was defined in order to test the interaction effect of the age groups and the year. Due to the small number of female prisoners that committed suicide in our sample, we focused the analyses for trends in prison and in the community on male subjects.

Data were analyzed using Pearson's Chi² test for r × c tables. These univariate analyses were done in order to get an overview regarding the possible relationships between variables. In order to identify factors describing the group of the elderly prisoner population, a logistic regression model was developed. Because variables with too many missing cases potentially bias the results, only those variables with at least 60% of valid values were used. The cut-of value of at least 60% valid cases was chosen arbitrary. The model was developed including in a first step all variables as independent predictors for the outcome to belong to the group of elderly prisoners that committed suicide. In a second step, only the statistically significant predictors from step 1 were considered. We presented the *p*-values and the odds-ratios with the confidence intervals. The statistical analyses were conducted with the statistical software R (ver. 3.5.0).

RESULTS

In the period between the years 2000 to 2013 in total 30 women and 1,037 men died from suicide in German prisons. One hundred seventy-seven men and 11 women (17.6% of all suicide victims) were 50 years of age or older at the time of their death. The suicide rates in prison were consistently higher in the group of older prisoners (age ≥ 50 years). The summary suicide rate from 2000 to 2013 for all age groups was 1,249 per 100,000 prisoners; for younger prisoners (<50) 1,157 per 100,000, for older prisoners 2,042 per 100,000 prisoners.

The suicide rates for men by year and age group were calculated for the prison population as well as for the general population (**Table 1**).

A downward trend in the suicide rates in prison applied to both age groups in male prisoners. The downward trends between the group of younger and older prisoners differed not significantly (Interaction year × age 0.13, *t*-statistic 1.75, $p = 0.09$). Parallel to the findings in the prison system, a downward trend in the suicide rates for the general German male population applied to both age groups, but did not differ statistically significantly either (Interaction year × age 0.04, *t*-statistic 0.65, $p = 0.52$). Although the suicide rates of the older prisoners declined continuously from 2000 to 2013, the suicide rates were still higher in comparison to the suicide rates of younger prisoners (**Figure 1**).

Table 2 shows variables with potential impact on suicidal behavior. Between the younger and older (age ≥ 50 years) suicide victims, there was no statistically significant difference regarding remand status, the perception of high suicide risk by prison personnel, reported bullying preceding the suicide, history of former suicide attempts or special security measures applied. There was a significant difference between the age categories concerning drug withdrawal symptoms, but not for alcohol. Female gender, lifelong sentence, a conviction for crimes against close relatives and sexual offenses were significantly more often positive in the elderly suicide victims. Furthermore, there were statistically significant lower proportions of older suicide victims with a non-German nationality.

To create a regression model, variables with missing data in more than 40% of the cases were excluded. Consequently, the following items were excluded: bullying, mental disorder, crime involving a close relationship, drug, and alcohol withdrawal and security measures. The initial model included 6 variables (**Table 3**).

The stepwise removal of variables in the analysis resulted in a model with 4 independent variables: gender, remand status, lifelong sentence, and German nationality (**Table 4**).

The odds ratios indicate that being female, of German nationality, in remand custody or lifelong sentenced as independent predictors to belong to the elderly group.

TABLE 1 | Male suicide rates in German prisons and in general population <50 vs. ≥50 years per 100,000 from 2000 to 2013.

	Male suicide rates per 100,00			
Year	**Male prisoners age < 50 years**	**Male general population age < 50 years**	**Male prisoners age ≥ 50 years**	**Male general population age > 50 years**
2000	159.7	15.0	309.4	31.8
2001	114.0	14.5	239.4	31.6
2002	166.7	14.5	245.8	32.6
2003	131.4	14.2	219.8	32.3
2004	147.0	13.6	240.4	31.6
2005	138.3	12.8	218.3	29.8
2006	111.8	11.8	205.5	29.4
2007	94.0	11.6	211.3	28.0
2008	107.8	11.7	120.3	27.7
2009	103.3	11.8	133.1	28.6
2010	77.6	12.4	280.0	29.0
2011	64.8	12.4	232.7	30.9
2012	107.6	11.9	145.2	28.9
2013	73.9	11.7	115.7	29.7

DISCUSSION

As hypothesized, between the years 2000 to 2013 the suicide rates of German prisoners aged 50 years and older were higher than the suicide rates of prisoners younger than 50 years. The suicide rates were in general higher in both age groups of prisoners than in the community. We observed a downward trend in both age groups and were able to identify characteristics in the older prisoners who committed suicide in prison that differed statistically significantly from the younger prisoners. The relevant factors that we identified were being female, German nationality, remand custody status, and a lifelong sentence. These factors proved to be independent predictors for belonging in the group of older prisoners that committed suicide.

The finding that the suicide rate of older prisoners exceeds the suicide rate of the younger prisoners is in accordance with results from Donahue et al. who identified older prisoners as a new vulnerable group. According to their findings, elderly prisoners are characterized by a combination of mental and physical health problems and a high rate of vulnerability, and victimization (27). A systematic review of middle-aged and older adults supported a

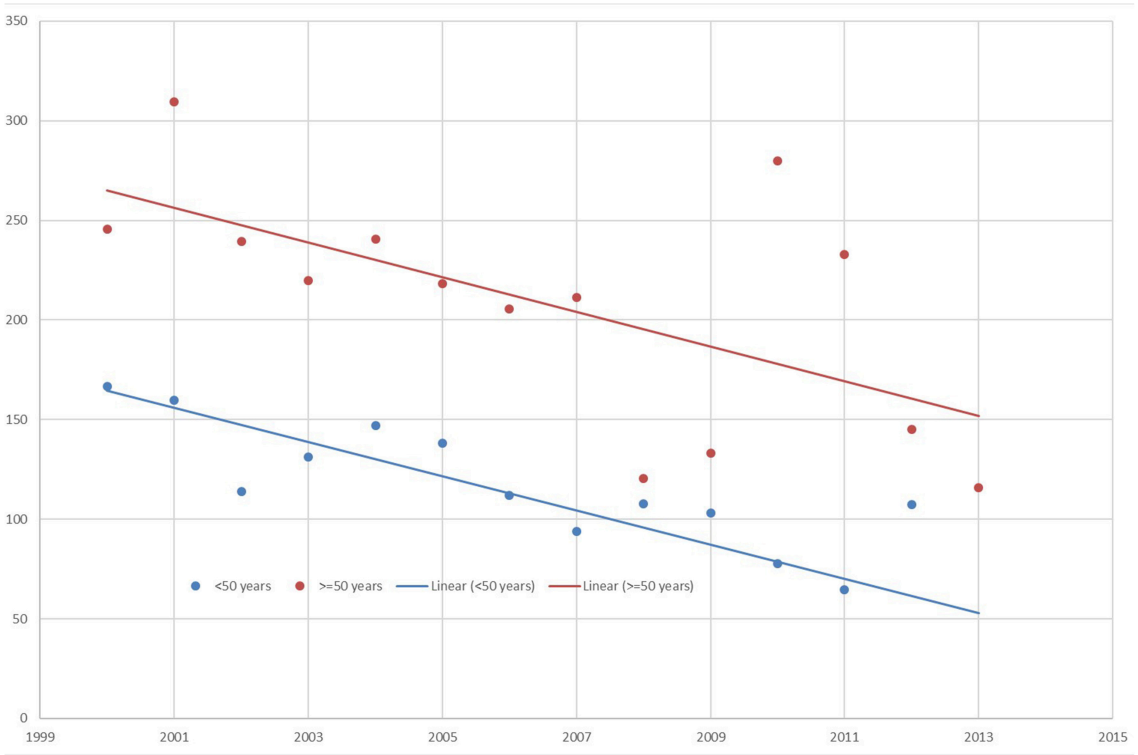

FIGURE 1 | Suicide rates in male prisoners from 2000 to 2013 by age.

significant association between functional disability and suicidal ideation with depression as a mediator between the two (28).

Kammerer and Spohr interviewed 18 men aged between 65 and 76 and asked them about their situation. The results showed that offers focused on the specific needs of this age group were rated positively, but that further need was apparent (22).

Looking at variables independently in association with age in German prison suicide victims revealed that the items "remand status" and "lifelong sentence" were associated with an increased risk of death by suicide in the group of older prisoners when compared to younger male suicide victims. Higher suicide rates in older remand prisoners may indicate a reduced ability of this age group to cope with imprisonment. In addition, elder men may be disadvantaged regarding physical strength and assertiveness in conflicts with younger inmates, which may result in difficulties to adapt to the prison environment and could lead to a depressive mood and suicidal ideation. Liem and Kunst introduced the idea that older prisoners frequently demonstrate a unique set of mental health problems related to post-traumatic stress disorder. They interviewed ex-prisoners who were released after serving a lifelong sentence and found a specific cluster of mental health problems characterized by institutionalized personality traits, social-sensory disorientation, and alienation. The authors argue that untreated or undertreated mental health problems hinder the successful re-entry into society. Furthermore, these mental health problems may explain the high prevalence of illicit drug abuse, the social withdrawal and (at least partly) the elevated suicide rate (9). According to our findings, Fazel et al. revealed an association between prison suicide events and being sentenced to life in prison in a systematic review (18). Our findings, that older prisoners with a lifelong sentence have a higher risk of committing suicide than their younger counterparts, support the assumption of Turner et al. that older prisoners face a "double burden," facing a de facto lifelong sentence when incarcerated at an older age (4). Elevated suicide risk in this group may thus be an expression of hopelessness and unmet social needs.

When comparing the groups of younger and older prisoners that committed suicide, we surprisingly observed no differences in the prevalence of mental disorders. The low prevalence of mental disorders in our data set is in stark contrast to findings from medical chart reviews, which report much higher rates of depression and mental disorders in general in older prisoners from 38 to 61% (7, 21, 27). The low prevalence of mental disorders in this group may be a result of the specific difficulties in older prisoners expressing their needs. According to de Smet et al. who studied factors related to the quality of life in older prisoners, psychiatric symptoms seemed to be noted less often in this age group because "older prisoners seem to be poorer self-advocates" than their younger mates (29).

Comparing older German and non-German suicide victims revealed a lower suicide rate in older non-German prisoners. This result is in line with findings from Radeloff et al. who described a significantly higher suicide rate among male German prisoners

TABLE 2 | Comparison of characteristics between age groups in German prisoners who committed suicide.

Variables (*N* valid cases)	<50 years: *N* = 876 (% of < 50)	≥50 years: *N* = 188 (% of ≥ 50)	Test statistic	*p*-value
Female (1,067)	19 (2.1)	11 (5.9)	7.71	0.01**
Non-German (1,064)	276 (31.5)	30 (16.0)	18.27	<0.001***
Remand status (950)	446 (57.8)	105 (58.7)	0.039	0.84
Lifelong sentence (1,067)	25 (2.8)	15 (8.0)	11.32	<0.001***
History of suicide attempts (735)	116 (18.9)	21 (17.2)	0.20	0.66
Mental disorder (586)	103 (22.2)	18 (14.6)	3.44	0.64
Bullying (483)	31 (7.9)	6 (6.7)	0.15	0.69
Drug withdrawal (586)	63 (13.6)	2 (1.6)	14.14	<0.001***
Alcohol withdrawal (586)	29 (6.3)	9 (7.3)	0.18	0.67
Security measures (605)	105 (22.6)	35 (25.0)	0.091	0.55
Crime involving close relatives (553)	92 (21.1)	54 (46.2)	29.80	<0.001***
Sexual offences (1,067)	53 (6)	21 (11.2)	6.34	0.01*

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

TABLE 3 | Logistic regression analyses.

	Estimate	Std. error	Statistic	*p*-value
Gender	−0.91	0.42	−2.15	0.03*
Nationality	0.86	0.22	3.86	<0.001***
Remand status	0.39	0.18	2.18	0.03*
Lifelong sentence	0.95	0.38	2.52	0.01*
History of suicide attempts	−0.11	0.20	−0.54	0.59
Sexual offences	0.35	0.21	1.67	0.01*

*$p < 0.05$; ***$p < 0.001$.

TABLE 4 | Variables independently associated with suicide events in older prisoners.

Variable	Odds ratio, 95% Confidence interval	p-value
Male gender	0.44 [0.19; 0.94]	0.05
German nationality	2.45 [1.59; 3.77]	<0.001***
Remand status	1.55 [1.09; 2.18]	0.01*
Lifelong sentence	2.59 [1.24;5.4]	0.01*

*$p < 0.05$; ***$p < 0.001$.

in comparison to male non-German prisoners (30). This finding contrasts with scientific evidence that immigration is a risk factor for death by suicide (31, 32). Some findings support the idea that a lower suicide risk of immigrants can be explained by descending from a population with a lower suicide risk than the host population (33).

Female prisoners have been described as a vulnerable group before and the suicide rate in this group has increased in Germany from 2000 to 2013 (34, 35). Specific factors connected to the prison setting that contribute to the suicide risk in incarcerated women are so far unknown (36). When compared to male prisoners, the increasing suicide rates in female prisoners in Germany was not linked to a more unfavorable risk profile regarding known risk factors for prison suicide. An analysis of routine data on prisoners who died by suicide in Germany between 2000 and 2013 revealed no significant gender difference regarding most characteristics, especially mean age, nationality, pre- and post-trial status, proportion of individuals serving a life sentence, and proportion of individuals who exhibited criminal behavior at a young age, previous suicide attempts and known history of psychiatric disorder (34).

Although the suicide rate of the prison population was substantially higher than that of the resident population, we found no difference when comparing the trends of suicide rates between the years 2000 to 2013, despite the rising number of older prisoners in the same time span. Factors that contribute to the differences in suicide risk between detainees and the resident population and to the positive trend in male prison suicide rates are not yet understood (37, 38). Although mental disorders, especially depression, are proved to be more common in prisoners than in the general population, the elevated suicide rate among prisoners cannot be explained with individual factors sufficiently (39–41).

LIMITATION AND OUTLOOK

The main limitations of our study were that there was no control group and that for many items the data was incomplete. Another limitation was that the data source did not include the medical charts so that the prevalence of mental disorders is surpassingly underreported. Future research will include the medical records and should have a case-control design, comparing the cases, who died from suicide, with a matched group of prisoners who survived. The matching variable will be calendar month. From all prisoners admitted in the same month (e.g., September 2005) as the case, one person will be chosen at random as a control.

CONCLUSION

In Germany, the number of elderly prisoners is rising. Our findings did not foster the assumption that mental disorders in general or depression are more common among older suicide victims in prison when compared to their younger counterparts. The fact, that hints for mental disorder or suicidal ideations are documented only in few cases, may indicate underreporting of mental disorder in younger as well as in older prisoners. As expected, the suicide rates in male prisoners in Germany with an age of 50 years and older showed a downward trend.

ETHICS STATEMENT

According to current legal regulation, no approval from the local ethics committee was required for the current study. After

having signed a formal obligation, the authors were allowed by prison Administration of Lower Saxony to use routine data for research purposes. We attached the respective form that was completed and signed by researchers that participated in the data assessment (see **Supplementary Data Sheet 1**). The results of the survey are anonymous, name, address before incarceration, and other personal information is not included. Since only aggregated data will be published, no concern exists about disclosure of personal data.

AUTHOR CONTRIBUTIONS

AO-W and NK designed the study. KB-K collected the data. AO-W, AV, UG, and JW analyzed and interpreted the data. AO-W and AV wrote the initial draft of the manuscript and had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of data analysis. All authors have contributed to, read, and approved the final version of the manuscript.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2019.00154/full#supplementary-material

Supplementary Data Sheet 1 | Formal obligation.

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ORIGINAL RESEARCH
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Validating the Utility of the Wilson Sex Fantasy Questionnaire With Men Who Have Sexually Offended Against Children

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The Wilson Sex Fantasy Questionnaire (WSFQ) assesses the use of 40 specific sexual fantasies, which are grouped into four overarching themes (Intimate, Exploratory, Impersonal, and Sadomasochistic). It also includes two items that reflect characteristics associated with children. Since sexual fantasies are a key factor in sex offender treatment, the present study tested the validity of the WSFQ for use with men who have sexually offended against children (SOC). Differential validity was assessed by comparing 54 SOC, 22 community males with a sexual interest in children (C-SI), and 79 community males with no sexual interest in children (C-NSI) on each WSFQ subscale and child-related item. Results showed that SOCs scored lower on each subscale than both community groups. On the two child-related items, the SOCs and C-SIs scored higher than C-NSIs. For the "Sex with someone much younger than yourself" item, younger SOCs had greater scores than younger C-NSIs, while older C-NSIs had greater scores than older SOCs. Construct validity was assessed using the SOC sample by examining relationships between WSFQ variables and 1) the self-reported use of deviant sexual fantasies assessed *via* the Thoughts and Fantasies Questionnaire and 2) offending behavior derived from crime scene data. The WSFQ Intimacy subscale was unrelated to any deviant sexual fantasies, while the other subscales were most strongly associated with sadistic fantasies. The child-related WSFQ items were most strongly associated with sexual fantasies about prepubescent children. Very few relationships were observed between the WSFQ variables and crime scene behaviors. The implications of the results are discussed, along with the study's limitations and suggestions for future research.

Keywords: sex offenders, sexual fantasy, Wilson Sex Fantasy Questionnaire, validity, crime scene behavior

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INTRODUCTION

Sexual fantasizing refers to the deliberate act of mentally envisioning a sexual scenario involving a target (e.g., a person) and/or behavior (e.g., dominating) (1). The content of the mental imagery generally reflects one's sexual interest (2) and is experienced as sexually arousing (3). For example, in individuals who have sexually offended against a child, sexual fantasies involving children are often associated with a sexual interest in children (4) and are often used as a means of inducing or enhancing a state of sexual arousal (5).

Although sexual fantasizing is implicated in the etiology of child sexual abuse (6), a detailed understanding of how it actually influences offending behavior has yet to be established. Bartels and Gannon (7) highlight two ways, however, in which it may occur. The first refers to heightening an individual's risk or propensity to sexually offend. That is, for those with a sexual interest in children, sexual fantasizing may psychologically and physiologically energize an individual (i.e., increase their sense of "wanting"), thus preparing them for engagement in sexually appetitive behavior (8, 9). When combined with masturbation and orgasm, this sense of wanting may be relieved in the short term but heightened in the medium term. The second link to offending is based on the idea that sexual fantasizing can create behavioral scripts (e.g., explicit or implicit plans) that an individual may enact in real life (5, 10, 11). Again, the inclusion of masturbation (and subsequent orgasm) is likely to strengthen the sexual meaning of the script, potentially increasing the likelihood of enacting the imagery in real life. Regardless of the exact causal mechanism, researchers have found that sexual fantasies about children are associated with contact sex offending behavior against children (4, 12, 13). While causality cannot be inferred from these findings given their correlational nature, sexual fantasizing is arguably an important factor to consider in the assessment and treatment of individuals who have sexually offended against children (SOCs). Thus, it is important for clinicians and researchers to have a reliable and valid tool for assessing sexual fantasy use.

One of the oldest and often used measures is the Wilson Sex Fantasy Questionnaire or WSFQ (14). The WSFQ includes a list of 40 sexual fantasy themes ranging from "the normal and innocuous to the deviant and relatively obscene" (15, p. 61). Each item is scored on a six-point scale ranging from Never (0) to Regularly (5), across five different contexts (i.e., Daytime fantasies, Fantasies during intercourse or masturbation, Dream while asleep, Have done in reality, and Would do in reality). When assessing the frequency of sexual fantasy use, Wilson (15) advises only using responses for Daytime fantasies, since scores for the other four contexts all highly correlate with Daytime fantasies. The WSFQ is composed of four factor analytically derived themes, each containing 10 items, namely, Intimate, Exploratory, Impersonal, and Sadomasochistic (14). This factor structure has been supported in subsequent confirmatory analyses, particularly in men (16). The WSFQ also provides a total score, which is argued to be a measure of one's overall sex drive (15).

Only a few published studies have used the WSFQ with SOCs[1]. In one of the first studies, Baumgartner et al. (19) found that the WSFQ had very good internal consistency as indicated by Cronbach's α (Intimate = .92; Exploratory = .86; Impersonal = .83; Sadomasochistic = .86; total score = .95). Below, we outline the studies that provide information about various forms of validity for the WSFQ.

[1] Some researchers have adapted the WSFQ by adding, removing, and/or amending items (17, 18). For the purposes of this paper, however, only studies using the original WSFQ are discussed.

Baumgartner et al. (19) also found that SOCs (n = 64) scored higher than nonsexual offenders (n = 41) on the Intimate and Exploratory subscales (d = 0.57 and 0.44, respectively). Crucially, they argued that two WSFQ items reflect themes associated with children (i.e., "Having sex someone much younger than yourself" and "Seducing an innocent") and found that SOCs scored significantly higher than nonsexual offenders on these two items (d = 0.77 and 0.55, respectively). Baumgartner et al. (19) also compared their data to those reported in previous studies using college males (N = 116) (20), as well as non-offending fetishists (N = 24), sadomasochists (N = 34), and men with numerous sexual interests (N = 14) (15). The SOCs did not differ from college males on any subscales and reported lower Exploratory, Impersonal, and Sadomasochistic scores than the sadomasochistic and sexually variant males. However, they were unable to compare differences on the two child-related items.

Using a sample of 95 SOCs, Gannon et al. (21) examined differences between SOC subtypes (established by cluster analyzing data from a battery of measures). They identified five clusters, which they termed "Impulsive," "Boy predators," "Intimacy deficits," "Generally antisocial," and "Multiple dysfunction." Discounting the "Multiple dysfunction" group due to a very small sample size (n = 4), it was found that, in contrast to the other groups, the "Boy predators" reported significantly higher scores on all WSFQ subscales, indicating higher levels of sexual fantasizing in general.

Other researchers have examined the WSFQ in relation to sexual recidivism in SOCs. Using an exploratory factor analysis with a sample of 495 SOCs, Allan et al. (22) found that the WSFQ subscales (pre-treatment) loaded on to a single factor. They labeled this factor "Sexual Interests," stating that it "measures the strength of an offender's sexual interest in terms of the frequency of their sexual fantasies" (p. 357). This factor, however, essentially represents the total WSFQ score and so does not provide any insight into the participants' specific sexual interests. Nevertheless, this factor was found to be associated with sexual recidivism (Area Under the Curve; AUC = 0.72), suggesting that SOC's frequency of fantasizing across an array of themes is predictive of sexual recidivism. A similar result was found by Stevens et al. (23) using a sample of 218 SOCs. Here, the same "Sexual Interests" factor (using WSFQ data) correlated with sexual recidivism, even after controlling for socially desirable responding (r_{pb} = .24). In addition, Stevens et al. (23) found that each WSFQ subscale was significantly associated with sexual recidivism (r_{pb} for Intimate = .15, Exploratory = .24, Impersonal = .19, Sadomasochistic = .18). Using the same dataset, Beggs and Grace (24) also found that positive change scores (following treatment) on the Sadomasochistic subscale were associated with reduced sexual recidivism (r = −.22).

Only a few studies have provided convergence data in terms of correlating the WSFQ with other indicators of deviant sexual interest. Using a sample of 302 sex offenders (type/s not specified), Seifert et al. (25) observed that the WSFQ total score strongly correlated with the sexual sensation-seeking and sexual compulsivity (r = .68 and .61, respectively). The WSFQ total also correlated strongly with the total score from a 90-item version of O'Donohue and Letourneau's (26) Paraphilic Fantasy

Questionnaire (r = .73) (27). Given that only the WSFQ total was used, a greater frequency of fantasizing across a range of themes is associated with sexual preoccupation (i.e., sexual compulsivity and sensation-seeking) and paraphilic sexual fantasies in general.

The link between fantasizing about sexual behaviors (e.g., sadomasochistic sexual fantasy themes) and objectively assessed offending behavior (e.g., sexualized aggression) in terms of construct validation has yet to be firmly established. This is rather surprising given the oft-described importance of sexual fantasies in forensic practice (28). This lack of research may be due to the range of issues pertaining to the study of sexual fantasies. For one, sexual fantasizing is a covert activity and is not externally identifiable outside of self-report. Moreover, from the point of view of someone who has offended, there may be little reward for being truthful about the content and use of one's sexual fantasies in a forensic setting. They may even anticipate negative consequences for doing so (e.g., longer sentences, postsentence restrictions and requirements, stigma, physical violence threats from other inmates). As such, offenders are likely to have an understandable tendency for dissimulation. Accordingly, clinical subjective self-report data (e.g., WSFQ) may be of limited value in forensic assessments as they are easy to fake and may be biased by distorted self-perception and/or introspective abilities. This dissimulation hypothesis may be particularly true for sexual offenders whose behavior is (or was) driven by paraphilic interest compared to sexual offenders without an atypical sexual interest (i.e., those who offended because of a lack of more preferred sexual opportunities or general antisociality) (29).

As indicated above, there has been little validation of the WSFQ for use with SOCs. Most studies have primarily focused on the WSFQ subscales, have not accounted for sexual interest in children within comparison groups, and only examined its relationship with sexual offending behavior in terms of sexual recidivism. Thus, the aim of the present study was to further test the validity of the WSFQ for use with SOCs, taking into account the above issues. This goal was approached in three ways.

The first was to examine differential validity by comparing a sample of male SOCs with a sample of community males on the WSFQ subscales and child-related items. Recent findings indicate that some men from the general community report using sexual fantasies about children (30, 31), particularly those with a proclivity to engage in child sexual abuse (13). Therefore, we compared the SOCs with two subgroups of community men, namely, those reporting a sexual interest/proclivity for child sexual abuse, and those reporting no such interests. Based on Baumgartner et al. (19), it was hypothesized that SOCs would report using Intimate, Exploratory, and child-related sexual fantasies to a greater extent than community males with no sexual interest in children. We also predicted that SOCs would not differ from those with a sexual interest in children.

Second, we examined construct validity by correlating the WSFQ (i.e., its subscales and the two child-related items) with child-related and sadistic fantasies measured *via* another questionnaire designed to assess the use of offense-related sexual fantasies. It was hypothesized that, in terms of convergent validity, the Sadomasochistic subscale would positively correlate with sexual fantasies related to sexual sadism, while the child-related WSFQ items would correlate positively with sexual fantasies overtly involving children.

Third, construct validity was tested again. This was done by examining whether the WSFQ subscales and child-related items correlated with four behavioral themes identified in SOCs by Lehmann et al. (32) using crime scene data. These behavioral themes include a) Fixation (characterized by a persistent attraction to children), b) Regression [characterized by nonparaphilic sexual excitation and victim availability (e.g., in family setting) in response to intimacy deficits], (c) Criminality (where sexual abuse occurs in the context of generalized criminal behavior), and (d) Sexualized Aggression (characterized by offenses that involve overtly expressive aggression including behavioral indicators of sexual sadism). Accordingly, we hypothesized a positive relationship between the nonsexually deviant behavioral themes of Regression and Criminality and the normative and innocuous Intimate subscale. On the basis of the dissimulation hypothesis, we expected negative relationships between deviant behavioral themes (Fixation, Sexualized Aggression) and the WSFQ data.

METHOD

Sample

The offender sample was composed of 54 male individuals who had sexually offended against a child (i.e., aged 13 and younger), recruited from a secure treatment facility in the state of Wisconsin in the USA. The ages ranged from 25 to 73 years (M = 46.9, SD = 10.2). The majority (87%) had only sexually offended against a child, with the remaining 13% having sexually offended against both a child and an adult. Fifty-two (96.30%) reported being "single," with one participant reporting being in a relationship, and another not providing his relationship status. Of the 50 participants with available information, the majority (77.8%, n = 42) had undergone or were undergoing some form of psychological treatment for their offending behavior at the time of data collection.

The non-offending sample was composed of 101 community males, who were all recruited online. The age of the community sample ranged from 18 to 51 years (M = 25.01, SD = 6.80), with 12 preferring not to provide their age. Fifty-seven of the non-offending sample (56.4%) reported being a relationship, while 44 (43.6%) reported being single.

Data

Sexual fantasy data for the SOC sample were initially collected as part of a larger, distinct project led by one of the first authors. This initial project was aimed at exploring new indirect measures of sexual interest in children and offense-supportive cognition (33). Offense-related data were also available in some of the participants' case files (n = 37). This allowed crime scene behaviors to be coded in the current study (see below for details). Sexual fantasy data for the community sample were drawn from a distinct online project examining child-related sexual interests in community males (Henek and Bartels, in preparation). Data for this initial project were collected online (using Qualtrics) *via*

various social media platforms and forums (e.g., Twitter, Reddit). Each participant completed a small battery of measures assessing sexual compulsivity, sexual functioning, sexual fantasies (using the WSFQ), and sexual interest in children. In the current study, only the WSFQ data were used (for the group difference analyses). The data regarding sexual interest in children were used to categorize the community males into two groups: those reporting no sexual interest in children and those reporting some sexual interest in children (see below).

Study Variables

Wilson Sex Fantasy Questionnaire (WSFQ) (14)

The WSFQ assesses how often people use 40 specific sexual fantasies. Each item is scored using a six-point scale (0 = Never, 5 = Regularly). The WSFQ is composed of four 10-item subscales: Exploratory (e.g., *Sex with two other people*), Intimate (e.g., *Having intercourse with a loved partner*), Impersonal (e.g., *Watching others having sex*), and Sadomasochistic (e.g., *Whipping or spanking someone*). Using the sample as a whole in the present study (N = 155), the WSFQ subscales showed acceptable to good levels of internal consistency: Impersonal (α = .68), Exploratory (α = .74), Sadomasochistic (α = .85), and Intimate (α = .87). The total score showed excellent internal consistency (α = .92).

Two specific sexual fantasy items were also of particular interest in this study. These were "Having sex with someone much younger than yourself" and "Seducing an innocent." While these two items do not directly refer to children (e.g., a 50-year-old who fantasizes about a 25-year-old movie star may rate high on the former item), it has been argued that they involve "partners whose qualities could be seen as matching those of children (innocence and aged significantly younger)" (19, p. 28). We were additionally interested in the "Having incestuous sexual relations" item as it could reflect the offending behavior predominantly engaged in by SOC with a "regression" propensity (32). Please note that this item is rather vague and does not directly refer to children as well. Nonetheless, it was included given the exploratory nature of this part of the paper.

Thoughts and Fantasies Questionnaire

This is an unpublished questionnaire created by the third author for use in practice. It is designed to assess clients' use of five specific deviant sexual fantasies during their time in treatment, namely, Abduction, Forcing, Children under 13 years, Children between 13 and 17 years old, and Sexual sadism. In addition, sexual fantasies involving the client's past victim/s are also assessed. For each theme, a respondent first states whether they have experienced the sexual fantasy using a Yes/No format. If they respond with a "Yes," they are required to answer a further set of open-ended questions (e.g., how often the fantasy was used, when it was last used, and how long it lasted). It also asks the respondent to write out the fantasy. In the present study, data from this measure were only available from the SOC sample.

The Interest in Child Molestation Scale (ICM) (34)

The ICM is a vignette-based self-report measure designed to assess community participants' interest in sexual activity with children. The ICM is composed of five vignettes, each describing a hypothetical scenario of sexual activity with a child (age not specified). After reading each vignette, participants are required to report their level of sexual arousal, behavioral propensity (i.e., whether they would do the same), and general enjoyment. Each item is rated on a seven-point Likert scale (e.g., 1 = Not at all sexually aroused, 7 = Very strongly sexually aroused). Three of the vignettes involve low force and two involve high force. The ICM produces an overall score, a low-force subscale score, and a high-force subscale score. Previous studies using the ICM indicate that the low-force subscale is a particularly reliable and valid measure for assessing sexual interest in children in community samples (34, 35). On this basis, only the low-force subscale was administered to the community males in Henek and Bartels' study (Henek and Bartels, in preparation). As there are nine items on the low-force subscale (rated on a Likert scale ranging from 1 to 7), the lowest possible score participants can obtain is 9 (i.e., no self-reported proclivity), with the highest possible score being 63.

In a study exploring pupillary responses as a method for assessing sexual interest, the ICM was used in a way to ensure that participants were solely interested in adults (36). Similarly, in the present study, the low-force subscale of the ICM (α = .82) was used to identify community males with a sexual interest in children (i.e., a score greater than 9). Of the 101 participants, 22 were identified as having some sexual interest in children (M = 14.55, SD = 5.60). These individuals were categorized as a "sexual interest in children" community group (C-SI), with the remaining 79 categorized as a "no sexual interest in children" community group (C-NSI).

Coding

The offense-related information present in the offender participants' case files was independently coded by two research assistants. This involved coding for the presence of 39 crime scene behaviors using the coding scheme devised by Lehmann et al. (32). Of the 54 available case files, 37 provided specific details that could be sufficiently coded. To determine inter-rater reliability for each variable, Cohen's κ was computed. For seven variables (i.e., victim masturbates, offender offers money, offender films/photos victim, longer offense, ritualistic behavior, offender humiliates victim, and offender drugged victim), κ could not be computed due to a lack of variance. These variables, however, had high percent agreement (range = 95%–100%). For seven variables (affection, fondle, offender makes promises, luring, offender makes sexual comment, searching, and offender not deterred), κ coefficients were low (<.45) (37). Nevertheless, the variables aforementioned were included on the basis of the high percent agreement (range = 82%–92%) and because they were needed to compute propensity scores in order to test the link between the WSFQ and crime scene behavior (see **Supplementary Material** for full details). The κ coefficients for the remaining variables ranged from .52 to 1.00 (median = .76). After these initial codings, the first author examined each case file independently in order to provide the final decision on whether the crime scene behavior was present or not. Finally, following Lehmann et al. (32), the "present" crime scene variables associated with each behavioral

theme (i.e., Fixation, Regression, Criminality, and Aggression) were averaged. This resulted in a continuous Thematic Sum Score (TSS) for the four behavioral themes.

Analyses

Differences between the SOC, C-SI, and C-NSI groups on each WSFQ variable were assessed using one-way MANOVAs. Also, since the SOC group were (on average) older than the two comparison groups, we examined whether any group effect on the two child-related WSFQ items were moderated by participant age. Next, in the SOC sample only, relationships between WSFQ variables and the child-related and sadistic themes of the Thoughts and Fantasies Questionnaire were examined using rank-biserial correlations (controlling for age). Finally, for those SOCs with available crime scene data (n = 37), Spearman's Rho correlations (controlling for age) were run to explore whether scores on the WSFQ were associated with the TSS scores derived from crime scene data. Given the multiple correlations (i.e., 38), a Bonferroni correction was employed to adjust for the familywise error rate (α changed from .05 to .0013).

RESULTS

Differential Validity

A one-way, independent-samples MANOVA was used to compare the three groups (SOC vs. C-SI vs. C-NSI) on the four WSFQ subscales (i.e., Intimate, Exploratory, Impersonal, and Sadomasochistic). A significant multivariate main effect of Group was observed [Wilks' $\lambda = 0.69$, $F(8, 298) = 7.48$, $p < .001$, $\eta_p^2 = 0.17$]. As shown in **Table 1**, there was a significant main effect of Group for each WSFQ variable, except for Exploratory ($p = .09$). This lack of difference on the Exploratory subscale was in line with our hypothesis with respect to SOCs and C-SIs, but not SOCs and C-NSIs. *Post hoc* comparisons indicated that C-NSIs used Intimate fantasies significantly more so than SOCs ($p = .001$, $d = 0.62$). While this is counter to our hypothesis derived from Baumgartner et al.'s (19) findings, it is understandable that community males with no interest in children would report higher scores on this normative subscale. The lack of a difference between SOCs and C-SIs was, however, as expected. For Impersonal fantasies, C-SI had significantly greater scores than both the SOC ($p = .001$, $d = 0.92$) and C-NSI ($p = .03$, $d = 0.65$). The C-SIs also reported using Sadomasochistic fantasies more often than SOCs ($p < .001$, $d = 1.17$), as did the C-NSIs ($p < .001$, $d = 1.08$).

A second independent-samples MANOVA was conducted to examine group differences for the two specific WSFQ items of interest (i.e., "Having sex with someone much younger," "Seducing an innocent"). There was a significant multivariate main effect of Group [Wilks' $\lambda = 0.88$, $F(4, 302) = 3.50$, $p = .001$, $\eta_p^2 = 0.06$]. A significant main effect was observed for both items (p's < .01; see **Table 2**). *Post hoc* comparisons revealed that SOCs scored significantly higher than C-NSIs on "Sex with someone much younger" ($p = .001$, $d = 0.67$), as did C-SIs ($p = .001$, $d = 0.82$). For "Seducing an innocent," SOCs reported marginally greater and non-negligible scores (based on effect size) than C-NSIs ($p = .056$, $d = 0.44$), while C-SIs reported significantly greater scores than C-NSIs ($p = .02$, $d = 0.62$). These findings were in line with our hypotheses.

Given that the "child-related" WSFQ items do not actually explicitly refer to children (but rather youth and innocence), it is possible that the older participants interpreted them innocuously (e.g., in terms of a much younger *adult*). This could account for why SOCs scored high on these items, as they were significantly older than C-NSIs and C-SIs (both p's < .001). Thus, to examine whether participant age had a moderating effect on the link between group and the item "Sex with someone much younger," we used the PROCESS macro for SPSS (38). As there were three groups, the independent variable was specified as being multicategorical using indicator coding (39), with SOCs coded as the reference group. Age was found to have a significant moderating effect [$\Delta R^2 = 0.07$, $F(2, 137) = 6.83$, $p = .002$]. However, this was only in relation to the difference between SOCs and C-NSIs ($b = .12$, $SE = .03$, $t = 3.60$, $p < .001$), not between SOCs and C-SIs ($b = .09$, $SE = .06$, $t = 1.62$, $p = .11$). As shown in **Figure 1**, the conditional effects revealed that, at lower age levels (−1 *SD* below the mean), scores on the "Someone much younger" item were greater for SOCs than for C-NSIs ($b = 1.51$, $SE = 0.61$, $t = 2.47$, $p = .02$). There was no difference between the two groups at medium (mean) age levels ($b = .06$, $SE = 0.44$, $t = 0.14$, $p = .87$), but at higher age levels (+1 *SD* above the mean), C-NSIs showed greater scores on the item ($b = 1.64$, $SE = 0.62$, $t = 2.64$, $p = .009$). Conversely, the relationship between group and "Seducing an innocent" was found to not be moderated by participant age, $\Delta R^2 = 0.005$, $F(2, 137) = 0.34$, $p = .71$ (see **Figure 2**).

TABLE 1 | Descriptive and inferential statistics for group differences on each Wilson Sex Fantasy Questionnaire (WSFQ) scale.

WSFQ subscale	SOC (n = 54)	C-SI (n = 22)	C-NSI (n = 79)			
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*F*	*p*	η_p^2
Intimate	25.31[a] (11.82)	30.91[ab] (8.29)	31.85[b] (9.23)	6.99	.001	.08
Exploratory	13.85[a] (9.02)	18.55[a] (8.79)	15.11[a] (7.86)	2.43	.09	.03
Impersonal	11.96[a] (7.93)	19.00[b] (7.43)	14.38[a] (6.86)	19.54	<.001	.21
Sadomasochistic	4.65[a] (6.21)	14.64[b] (10.38)	12.76[b] (8.67)	7.22	.001	.09

SOC, sexual offenders against children; C-SI, community males with a sexual interest in children; C-NSI, community males with no sexual interest in children. Groups that share superscripts (i.e., a or b) do not significantly differ (p < .05, Bonferroni corrected).

TABLE 2 | Descriptive and inferential statistics for group differences on child-related WSFQ items.

WSFQ item	SOC (*n* = 54)	C-SI (*n* = 22)	C-NSI (*n* = 79)			
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*F*	*p*	η_p^2
Someone much younger	1.96^{a} (1.64)	2.32^{a} (1.91)	0.92^{b} (1.47)	10.32	<.001	.12
Seducing an innocent	$1.48^{a}{}_{m}$ (1.56)	1.86^{a} (1.91)	$0.87^{b}{}_{m}$ (1.20)	5.31	.006	.07

SOC, sexual offenders against children; C-SI, community males with a sexual interest in children; C-NSI, community males with no sexual interest in children. Groups that share superscripts (i.e., a or b) do not significantly differ (p < .05, Bonferroni corrected). Groups that share an m subscript are marginally different.

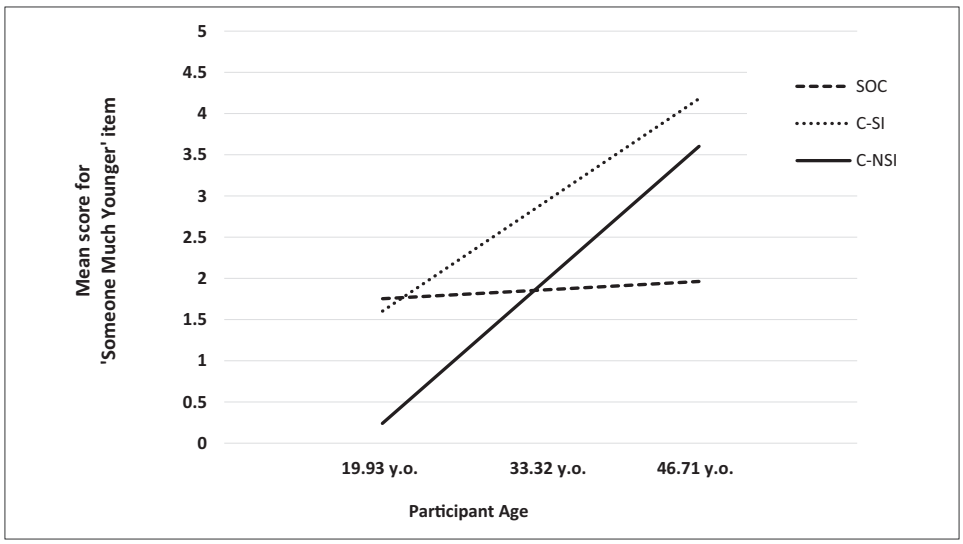

FIGURE 1 | "Someone much younger than yourself" scores as a function of group and participant age.

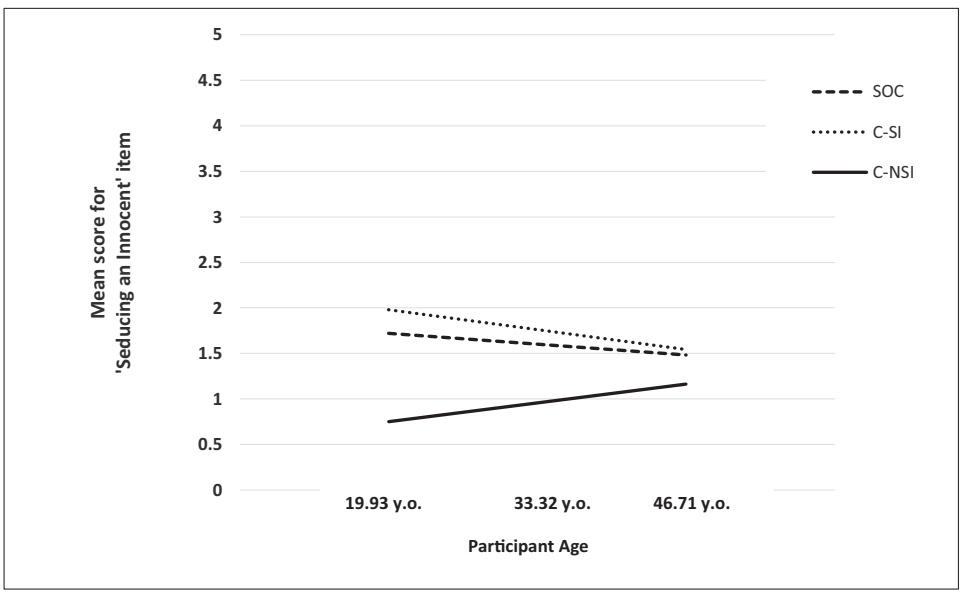

FIGURE 2 | "Seducing an innocent" scores as a function of group and participant age.

Construct Validity: Correlations Between Sexual Fantasy Measures

Data from both sexual fantasy measures were available for all SOCs. Rank-biserial correlations (controlling for age) between the WSFQ variables and the dichotomous responses on the Thoughts and Fantasies Questionnaire (TFQ) themes are presented in **Table 3**. As shown, only four correlations survived the Bonferroni correction for multiple testing. In line with our hypotheses, the Sadomasochistic subscale showed a positive relationship with the Sadistic theme of the TFQ (r_{rb} = .46) (convergent validity), as did the Impersonal subscale to a stronger degree (r_{rb} = .51). As expected, the Intimate subscale did not correlate with any of the examined TFQ themes (discriminant validity). Also as hypothesized, the "Sex with someone much younger" and "Seducing an innocent" WSFQ items both showed moderate-to-strong, positive correlations with the Child <13 TFQ theme (r_{rb} = .43 and .48, respectively). No significant relationships were found between the single WSFQ items and the postpubescent (Child 13–17 years) TFQ theme.

Construct Validity: Relationship Between Sexual Fantasies and Behavioral Themes

Crime scene data and sexual fantasy data were available for 37 SOCs. **Table 4** shows Spearman's correlations (controlling for age) between the WSFQ variables and the four behavioral themes derived from crime scene information (i.e., TSS scores). None of the observed relationships were significant after applying the Bonferroni correction. Thus, we did not find support for the hypothesis that the nondeviant themes (Regression and Criminality) would correlate with the Intimate subscale. However, from looking at the size of the correlations, two relationships are worth noting (both of which were significant before corrections). First, the Intimate subscale showed a moderate negative relationship with the "Sexualized Aggression" TSS (r_{rho} = −.34) and, in line with expectations, the Regression theme showed a moderate relationship with "Incestuous sexual relations" (r_{rho} = .33). Also, in line with the dissimulation hypothesis, both behavioral themes indicating sexual deviance (Fixation and Sexualized Aggression) consistently showed negative relations with the WSFQ data (except between Fixation and the Sadomasochistic subscale).

TABLE 3 | Rank-biserial correlations between sexual fantasy measures within the sexual offenders against children (SOC) sample, controlling for age.

	Thoughts and Fantasies Questionnaire Themes		
	Child (< 13 years)	Child (13–17 years)	Sadistic acts
WSFQ variables			
Intimate WSFQ	.07	.23	.20
Exploratory WSFQ	.29	.14	.38**
Impersonal WSFQ	.30*	.04	**.46*** **
Sadomasochistic WSFQ	.10	.20	**.51*** **
"Sex with someone much younger"	**.43*** **	.23	.32*
"Seducing an innocent"	**.48*** **	.24	.33*

*$p < .05$, **$p < .01$, ***$p \leq .001$. SOC, sex offenders against children. Results in **bold** typeface indicate significant results after Bonferroni correction ($\alpha = .0013$).

DISCUSSION

The present study investigated the utility of the Wilson Sex Fantasy Questionnaire (WSFQ) in relation to its use with individuals who have sexually offended against children (SOC). Previous research using the WSFQ with SOC samples have 1) focused primarily on the broad subscales and total score (which provide no information about child-related sexual fantasy themes), 2) failed to account for sexual interest in children within the comparison group/s, and 3) focused on sexual recidivism, rather than specific offending behaviors. The present study aimed to take into account these three points.

Counter to our hypotheses, which were based on the findings of Baumgartner et al. (19), SOCs did not score higher than community males with no sexual interest in children (C-NSIs) on the Intimate and Exploratory subscales. Rather, C-NSIs scored higher than SOCs on the Intimate subscale. As predicted, SOCs and community males with a self-reported sexual interest in children (C-SIs) did not differ on these two subscales. In addition, SOC's scores on the Sadomasochistic subscale were much lower than that reported by C-SIs and C-NSIs, while C-SIs reported using Impersonal sexual fantasies more frequently than both the SOCs and C-NSIs. These findings could suggest some level of dissimulation of sexual fantasies in SOCs compared to community males. However, SOCs have been found to score lower than sadomasochistic and sexually variant men on the Sadomasochistic subscale, as well as the Exploratory and Impersonal subscales (19).

TABLE 4 | Spearman correlations between the WSFQ variables and Thematic Sum Scores, controlling for age.

WSFQ variables	Fixation	Regression (sexualization)	Criminality	(Sexualized) aggression
Intimate subscale	−.08	−.08	−.03	−.34*
Sadomasochistic subscale	.14	.04	.26	−.14
"Sex with someone much younger"	−.03	−.11	−.01	−.18
"Seducing an innocent"	−.23	−.09	−.21	−.12
"Incestuous sexual relations"	−.16	.33*	−.18	−.22

*$p < .05$. WSFQ = Wilson Sex Fantasy Questionnaire. Results in **bold** typeface indicate significant results after Bonferroni correction ($\alpha = .0013$).

Thus, the community males in the present study may have been particularly sadomasochistic. Indeed, our C-NSI group had much higher scores on the Sadomasochistic subscale than the college males in Plaud and Bigwood's (20) study (M = 12.76 vs. 4.9, respectively). Thus, it is possible that the present study used a biased (self-selected) community sample (i.e., one composed of sadistic and/or sexually variant individuals). However, as social desirability was not accounted for in this study, the dissimulation hypothesis cannot be discounted.

As hypothesized, the SOCs scored higher on the two child-related WSFQ items ("Seducing an innocent" and "Having sex with someone much younger than yourself") than the C-NSI group, as did the C-SIs. These results provide partial support for Baumgartner et al.'s (19) proposition that these two WSFQ items assess fantasy content related to children.

It should be noted, however, that the difference between SOCs and C-NSIs for "Sex with someone much younger" was moderated by participant age. This reflected a relatively stable level of fantasy use in the SOCs, but an increase in use for the C-NSIs. Thus, at a younger age, SOCs scored higher than C-NSIs, while at an older age, C-NSIs scored higher than SOCs. A similar trend was also observed for C-SIs (see **Figure 1**). This highlights an issue with the ambiguous terminology for this particular item (40). That is, the phrase "someone much younger" can mean different things for younger and older individuals. For younger men, it may be more likely to be interpreted as "children," which could account for why the SOCs (and C-SIs) scored greater than C-NSIs at a younger age. For older men, though, the item may be more likely be interpreted as a much younger adult.

In terms of convergence, correlational analyses (controlling for age) indicated that, within the SOC sample, the two child-related WSFQ items were most strongly associated with sexual fantasies about children under 13 years old (as measured by the Thoughts and Fantasies Questionnaire; TFQ). These findings provide further validation that these two items may tap a sexual interest in child-related characteristics. Other notable correlations were in relation to the Sadomasochistic and Impersonal subscales, both of which showed strong links with sexual fantasies about sadistic acts on the TFQ.

After correcting for multiple correlations, none of the relationships (controlling for age) were significant in relation to the behavioral themes derived from crime scene data. However, focusing on the size of the correlations, the Intimate subscale showed a moderate, negative association with the Sexualized Aggression theme (potentially attesting to discriminant validity). Also, the "Incestuous sexual relations" item showed a moderate positive correlation with the Regression theme. This aligns with Lehmann et al.'s (32) findings showing that the Regression theme was related to the closeness of the victim–offender relationship, indicating proximity to incestuous relations. However, despite the size of the correlations, it should be emphasized that they did not survive the conservative Bonferroni correction we applied. A clear pattern of relationships was observed, however, that suggested some level of dissimulation in the SOCs. That is, the deviant sexual fantasy TFQ themes were, overall, negatively related to deviant behavioral themes (albeit nonsignificantly). Thus, subjective self-report data may be of less value when assessing individuals in forensic contexts. Also, it is important to keep in mind that the SOC's sexual fantasies were assessed many years after their initial offense had been committed, as well as after undergoing treatment for their deviant sexual fantasies and related factors.

Nevertheless, taken together, the current findings offer some implications for research and practice. First, "Seducing an innocent" and "Sex with someone much younger than yourself" from the WSFQ both substantially correlated with sexual fantasies about young children in SOCs and distinguished sexually deviant community males (and SOCs at younger ages) from those with no sexual interest in children. Joyal et al. (40) argued that these two items are ambiguous and so, on their adapted WSFQ, they removed "Seducing an innocent" and amended the latter to "Sex with someone much younger (legally) than me." However, our findings suggest that these two items may reflect characteristics associated with children (i.e., "youth" and "innocence"), as suggested by Baumgartner et al. (19). It could be argued that individuals with a sexual interest in children may find these characteristics particularly appealing and, thus, incorporate them into their sexual fantasies (with fantasies involving children being the extreme manifestation of these characteristics). This is analogous to "dominance"—a characteristic associated (but not synonymous) with rape—that is sexually fantasized about by men who have sexually aggressed (41, 42). Taken together, researchers and clinicians may be able to use the "Seducing an innocent" and "Sex with someone much younger" WSFQ items as proxies for assessing child-related sexual fantasies, or as a means to identify the potential use of such fantasies. Arguably, this may be a more favorable approach, as items that overtly ask about fantasies involving children are likely to provoke faked responses. As our data suggest, however, it should be kept in mind that the ambiguity of the "Sex with someone much younger" item introduces issues for older respondents.

Second, this study highlights an important consideration for future comparative studies on the topic of SOC's sexual fantasies. That is, a sexual interest in children should be taken into account when collecting data from comparison groups. This will allow researchers to either screen out those with an interest in children (providing a purer comparison group) or form two comparison groups based on the presence or absence of a sexual interest in children (as in this study). Failing to account for a sexual interest in children within comparison groups will likely lead to biased interpretations (e.g., about the target and/or comparison group, or the measure that is being tested).

Limitations and Future Research

In addition to potentially having recruited a biased online sample of community males, further limitations should be noted. First, other comparison groups could have been included, such as a group of nonsexual offenders or a sexual offender comparison group (e.g., rapists). If these groups were found to score lower on the child-related items, it would provide further validation of the WSFQ for use with SOC populations. Second, the majority of the SOC sample had received treatment for their offending behavior. Since treatment has been shown to significantly reduce scores on the Exploratory, Impersonal, and Sadomasochistic

WSFQ subscales (43), it is possible that similar reductions had also occurred for many of the SOCs in this study. In spite of this possibility, the child-related items still correlated with the prepubescent child theme on the TFQ in SOCs. Third, most SOCs self-reported as being "single," whereas many of the non-offender participants were in relationships. This may have affected the use of normative sexual fantasies, potentially accounting for why SOCs did not score higher than C-NSIs on the Intimate subscale. Fourth, it is important to note that social desirable responding was not accounted for. Thus, given the possible indication of dissimulation in this study, future research should include impression management measures to control for response biases.

Finally, the exploratory findings regarding the relationship between sexual fantasies and offending behavior must be interpreted with some caution. First, due to a lack of sufficient crime scene information, only data from a much smaller sample could be coded. A larger sample with more detailed crime scene information would have been more desirable. Second, the sexual fantasy data in this study were collected (often long) after the offending behavior had occurred. Therefore, it is possible that the SOCs had been fantasizing about behaviors and targets unrelated to their prior offending behavior (either due to treatment-related or age-related changes). Future research should consider using a sample of recently convicted SOCs or those at a pre-treatment stage.

Conclusion

The results of this study suggest that using the WSFQ with SOCs may be more useful than just assessing broad fantasy themes (*via* subscales). That is, two items ("Seducing an innocent" and "Sex with someone much younger") contain characteristics associated with children. As such, they may be useful proxies for assessing child-related sexual fantasies for occasions when asking directly about children is problematic or particularly sensitive. However, given their vague terminology, issues with interpretation of these items (especially in older individuals) is something that should be carefully considered. The Sadomasochistic subscale also appears to be a valid means for assessing sadistic interests within SOCs. Further work is still needed regarding convergent validity (e.g., with other measures of sexual interest), predictive validity in relation to sexual recidivism, and differential validation (e.g., between SOC subtypes).

ETHICS STATEMENT

This specific study was carried out in accordance with the recommendations of the "British Psychological Society" guidelines and was approved by the School of Psychology Research Ethics Committee at the University of Lincoln. All participants tested in person provided written informed consent, while those who took part online provided informed consent by clicking the relevant response (i.e., "I Agree").

AUTHOR CONTRIBUTIONS

RB formulated the research question and designed the study, analyzed the data, and cowrote the article. RL formulated the research question and designed the study, helped with interpretation of the findings, and cowrote the article. DT provided important intellectual content and proofread the article.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2019.00206/full#supplementary-material

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Identifying Violent Behavior Using the Oxford Mental Illness and Violence Tool in a Psychiatric Ward of a German Prison Hospital

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Background: Although there is evidence that individuals who suffer from severe mental disorders are at higher risk for aggressive behavior, only a minority eventually become violent. In 2017, Fazel et al. developed a risk calculator (Oxford Mental Illness and Violence tool, OxMIV) to identify the risk of violent crime in patients with mental disorders. For the first time, we tested the predictive validity of the OxMIV in the department of psychiatry at the prison hospital in Berlin, Germany, and presented findings from our internal validation.

Materials and Methods: We designed a cohort study with 474 patients aged 16–65 years old who met the inclusion criteria of schizophrenia-spectrum or bipolar disorder and classified the patients into two groups: a violent group with 191 patients and a nonviolent group with 283 patients. Violence was defined as the aggressive behavior of a patient with the necessity of special observation. We obtained all the required information retrospectively through patient files, applied the OxMIV tool on each subject, and compared the results of both groups. Sensitivity, specificity, and positive/negative predictive values were determined. We used logistic regression including variable selection and internal validation to identify relevant predictors of aggressive behavior in our cohort.

Results: The OxMIV score was significantly higher in the violent group [median 4.21%; Interquartile range (IQR) 8.51%] compared to the nonviolent group (median 1.77%; IQR 2.01%; $p < 0.0001$). For the risk of violent behavior, using the 5% cutoff for "increased risk," the sensitivity was 44%, and the specificity was 89%, with a positive predictive value of 72% and a negative predictive value of 70%. Applying logistic regression, four items were statistically significant in predicting violent behavior: previous violent crime (adjusted odds ratio 5.29 [95% CI 3.10–9.05], $p < 0.0001$), previous drug abuse (1.80 [1.08–3.02], $p = 0.025$), and previous alcohol abuse (1.89 [1.21–2.95], $p = 0.005$). The item recent antidepressant treatment (0.28 [0.17–0.47]. $p < 0.0001$) had a statistically significant risk reduction effect.

Conclusions: In our opinion, the risk assessment tool OxMIV succeeded in predicting violent behavior in imprisoned psychiatric patients. As a result, it may be applicable for identification of patients with special needs in a prison environment and, thus, improving prison safety.

Keywords: violence, prison, forensic psychiatry, schizophrenia, bipolar disorder, prediction tool

INTRODUCTION

Violent behavior in individuals with severe mental disorders has been widely reported. Several studies and reviews from the United States (1, 2) and Europe (3–5) can verify this, and especially, two groups of patients (schizophrenia and bipolar disorder) are at higher risk of committing a violent crime compared to the general population (6, 7). This opinion is not agreed upon by all experts in the field, due to the vast majority of individuals diagnosed with schizophrenia never committing any act of violence (8).

Analyzing data of more than 24,000 cases of schizophrenia and related disorders, Fazel et al. pointed out that the adjusted odds ratio of adverse outcomes, including violent behavior, was 7.5 in men and 11.1 in women compared to the general population. They concluded that schizophrenia and related disorders are associated with increased rates of violent crime (5). In patients with bipolar disorders, the odds ratio for violent crime was 5 (6). Recent surveys have determined a variety of risk factors for aggressive behavior and violent crime in patients with schizophrenia and bipolar disorders, such as substance use disorder (SUD) (4, 7), young age (9), previous violent crime (10), male gender, and disadvantaged neighborhoods (11). Results of population-based studies suggest that there is an increased risk of violent offending and violent ideation in individuals with severe mental disorders and indicate a higher risk of homicide and violent crime, especially in individuals with schizophrenia (3). On the other hand, there are protective factors regarding violent behavior, including intelligence (12), self-control (13), intimate relationship (14), and social network (15). Modern risk assessment instruments such as the SAPROF (*Structured Assessment of Protective Factors for Violence Risk*) and the START (*Short-Term Assessment of Risk and Treatability*) are designed to consider the positive qualities of inmates and focus on resilient factors (16–18). Comparing patients with schizophrenia who showed violent behavior to individuals with the same diagnosis who were not violent, Ekinci and Ekinci reported that depressive symptoms were predictors for nonviolent behavior (19).

Regarding the results of epidemiological research on the increased incidence of violent behavior in patients with mental disorders, understanding the individual and situational risk factors for aggressive behavior seems to be crucial for the improvement of general safety and for the prevention of further stigmatization (9). To reduce and manage the risk of future violent behavior, one of the main approaches is the use of risk assessment tools. Over 200 different tools are currently available (20), with a wide range in applicability. Studies from the United Kingdom have evaluated that over 60% of general psychiatric patients and 80% of forensic psychiatric patients are routinely assessed for violent risk (21, 22). Despite the broad clinical application, there are just a few risk assessment instruments that have been externally validated (23).

In 2018, Ramesh et al. conducted a systematic review and meta-analysis on the use of risk assessment tools for predicting violent behavior in a forensic psychiatric hospital. Out of nine violence risk assessment instruments, only two (the *Bröset Violence Checklist* and the *Dynamic Appraisal of Dynamic Aggression*) demonstrated high accuracy for the prediction of violence (24). The most common tool, the HCR-20 (*Historical, Clinical, Risk Management-20*), had a moderate accuracy, while the PCL-R (*Psychopathy Checklist-Revised*) and the VRAG (*Violence Risk Appraisal Guide*) scored poorly on accuracy regarding the prediction of inpatient violent behavior (24). Further investigations into this area of research point to similar, debatable results: risk assessment tools have a range of accuracy (25) and a "large variation of the item content" (26) and are not designed for specific populations (24). As a result, the duration of stay in forensic institutions, often depending on the specific "risk" posed by the individual, may be longer than necessary (27), with social (28) and economic (29) consequences (25).

In 2017, based on data from 75,158 individuals, Fazel et al. developed a simple, web-based risk calculator (Oxford Mental Illness and Violence tool, OxMIV) to identify the future risk of violent behavior in patients with schizophrenia-spectrum and bipolar disorders. They developed a 16-item model for patient stratification into "low-risk" or "increased-risk" categories to identify the risk of violent offending within 12 months. With a sensitivity of 62% and a specificity of 94% in external validation, these results are the best in this field so far (10).

Although the total numbers of psychiatric beds has been declining in Europe since 1990, the number of institutionalized forensic psychiatric patients is increasing in Germany (30) and Europe (31). In addition, in six South American countries, the prison population is increasing, while the number of psychiatric beds has been decreasing since 1990 (32). These findings from Mundt et al. were consistent with the assumption of an association between the numbers of psychiatric beds and the sizes of prison populations as hypothesized by Sharples Penrose in 1939 (32). Regarding this development, there could be a connection to the increased tendency for violent behavior in patients with severe mental disorders compared to the general population (5).

THE AIM OF THE STUDY

The prediction of violent behavior through risk assessment tools is increasingly important for the treatment of mentally

disordered patients and for the prevention of future offenses in general psychiatric and especially in forensic psychiatric hospitals. With this in mind, the aim of our study was to test the predictive validity of the risk assessment tool OxMIV for the first time in patients with schizophrenia-spectrum or bipolar disorders in the department of psychiatry at the Berlin prison hospital in Germany to improve prison safety by identifying patients with special needs in a prison environment.

For this study, we have considered two hypotheses. First, we assumed that violent patients have a significantly higher score in the prediction tool compared to nonviolent patients (7, 33, 34). Second, we hypothesized that a previous violent crime and a SUD have a statistically significant effect regarding the violent behavior of psychiatric patients (10, 35, 36).

MATERIALS AND METHODS

Study Settings

For this retrospective study, a sample of 841 treatment episodes in the Berlin prison hospital between 1982 and 2017 was identified. Each treatment episode was defined as an inpatient stay by a patient in the department of psychiatry of the prison hospital in Berlin. For all identified treatment episodes, the patients were diagnosed with a schizophrenia-spectrum or a bipolar disorder (including schizophrenia, schizotypal, delusional, and other psychotic disorders) as well as previous comorbid depression in schizophrenia-spectrum disorder. The cases were pseudonymized with a personal number to protect private data. There were no connections between the names and the personal numbers.

In total, 841 treatment episodes where the patient had a schizophrenia-spectrum or bipolar disorder diagnosed could be assigned to 511 unique patients (see **Figure 1**). For patients with more than one inpatient stay, only the first stay in the prison hospital was included. Of these 511 patients, 36 patients had to be excluded from the study due to age (younger than 16 or older than 65) or death during the treatment. To ensure comparability within the violent group, one patient had to be excluded, because there was no necessity for special observation. Thus, 474 patients with a treatment episode at the Berlin prison hospital were included in our study (see **Figure 1**). In the last step, we formed two groups, a nonviolent group and a violent group; 191 patients who, for a certain period of time, had to stay under special observation due to violent behavior were included in the violent group, and 283 patients who demonstrated no violent behavior during their stay were assigned to the nonviolent group (see **Figure 1**).

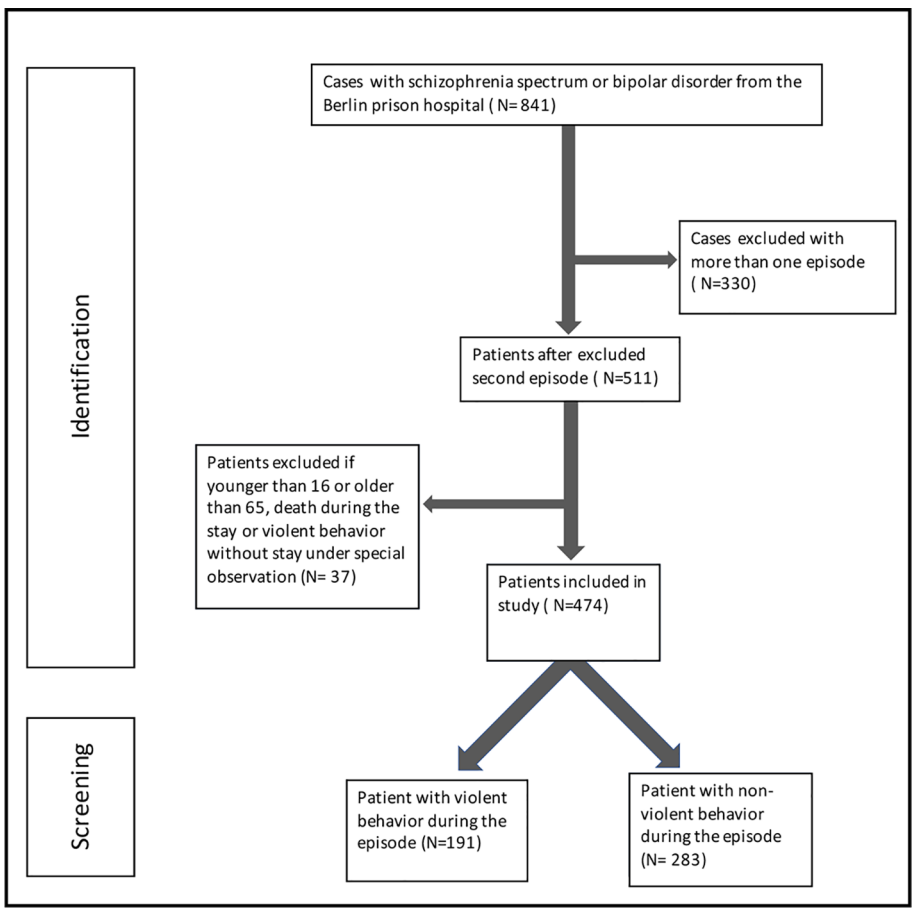

FIGURE 1 | Systematic identification for patients of the Berlin prison hospital from 1982 till 2017.

Procedures

The OxMIV is a prediction tool to identify those patients who are at low risk of violent offending. On the basis of 75,158 individuals with a schizophrenia-spectrum or bipolar disorder, the tool consists of 16 items, such as previous violent crime, drug and alcohol abuse, and socioeconomic and sociodemographic information (10). The final score classifies individuals into either a low-risk (<5%) or an increased-risk (>5%) group with a set point of 20%.

The required information on the 16 items was obtained by looking through the patient files for the whole treatment period. It is important to point out that we received the necessary information on the items previous drug abuse, previous alcohol abuse, previous self-harm, education level, parental violent crime, parental drug or alcohol use, sibling violent crime, recent treatment, personal income, and recent benefits through the admission interview with the medical doctor in the prison ward. These admission interviews take place within the first few days of imprisonment. For the item previous violent crime, we used official information from the Federal Central Criminal Register (Bundeszentralregister), which includes past convictions and is also available within the first days of imprisonment. In terms of the items parental violent crime, parental drug or alcohol use, and sibling violent crime, not all information was available for every patient. For these cases, we had to select "unknown." We defined schizophrenia-spectrum disorder, bipolar disorder, and comorbid depression using the International Classification of Diseases (ICD), Ninth Version (ICD-9) (295, 297–299 excl. 299A, 296 excl. 296.2; 296 excl. 296D, 296.2, 300.4; 296D, 300E, 311 1979–1998) or Tenth Version (ICD-10) (F 20–29, F 30–31; F32–F34.1 1998–2018). In addition, comorbid alcohol and drug abuse disorders were based on the ICD-9 or Tenth Version (ICD-10) (F 11–19; 1998–2018).

All of the patients were screened *via* OxMIV. If the score was above the set point of 20%, we calculated the result with the formula by Fazel et al. (9) using Excel version 14.7.7. If one or more variables were unknown, OxMIV calculated a range of risk levels. To generate a score, the highest and lowest risk levels were calculated to determine the mean.

Outcomes and Definition

The primary outcome was the score of the risk assessment tool OxMIV. We defined violent behavior as any physical violence (kicking, biting, hitting, scratching) or verbal violence (psychological, emotional, threatening, insulting) against another person or a group, as well as the inventory (destruction, arson of detention rooms) that led to the necessity for special observation of the patient. This definition is based on the definition of violence from the World Health Organization (WHO) (37) and considerations from Wolff et al. (38). The WHO defines violence as "the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in, or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment, or deprivation" (37).

Statistical Analysis

Continuous parameters are shown as mean (SD) and categorical parameters as absolute frequencies and percentages. Continuous variables were compared between the groups using the t-test. Before that, the normality assumption was tested with the Shapiro–Wilk test. Variance homogeneity was tested with the Levene test. In case of violated assumptions, the Mann–Whitney U test was used. Categorical parameters were compared using the chi-square test. In 16 (6%) patient cases with an OxMIV score above the cutoff limit of 20%, we had to calculate each score using the given formula. This concerned 13 cases in the violent group and three cases in the nonviolent group. Using the 5% cutoff, we calculated the sensitivity, specificity, as well as the positive and negative predictive value. Further, the area under the receiver operating characteristic (ROC) curve was determined.

Due to the different setting and outcome in the original OxMIV study, we investigated a logistic regression model including 14 of the 16 items from the OxMIV. Two variables were excluded since all participants were male and currently in inpatient treatment. The items parental violent crime, parental drug or alcohol use, and sibling violent crime had missing values, and thus, we applied multiple imputation (m = 20 imputations), including all of the other parameters and the outcome in the imputation model. Further, we used variable selection in each imputed data set using backward selection with likelihood ratio tests to identify a sparse model for the prediction of violent behavior in our cohort. A variable remained in the model if it was selected in at least 80% of the imputations. The 14-item model and the selected model were internally validated using the Val-MI approach by Wahl et al. (39) with 20 imputations and 50 bootstrap samples.

A p value smaller than 0.05 was considered significant, although all results have to be interpreted as exploratory due to the nature of the study. All analyses and calculations were performed with the statistical program SPSS, version 25.0.0, and R, version 3.5.0 (40).

RESULTS

Descriptive Characteristics

Of 474 patients with schizophrenia-spectrum or bipolar disorder, 283 (60%) were nonviolent, and 191 (40%) were violent with the need for special observation during their stay in the psychiatric ward (see **Table 1**). The mean age was 32 [standard deviation (SD) = 9]. Regarding the diagnosis, 438 (92%) patients had schizophrenia, 25 (5%) had a bipolar disorder, and 11 (3%) had a schizophrenia-spectrum disorder with a comorbid depression. Out of 474 patients, 104 (22%) committed a previous violent crime, and 313 patients (66%) had a drug abuse disorder, and 220 (46%) had an alcohol abuse disorder. These two disorders were the common comorbid diagnosis. Concerning the topic of medication, overall, 436 (92%) of 474 patients had a recent antipsychotic treatment, and 143 (30%) had a recent dependence treatment. Overall, 147 (31%) had a recent antidepressant treatment.

TABLE 1 | Descriptive data from the nonviolent and violent groups in the Berlin prison hospital divided into risk factors.

	Nonviolent n = 283	Violent n = 191	Total n = 474	p value
Age	33 [10]	31 [9]	32 [8]	0.510
Male sex	283 (100%)	191 (100%)	474 (100%)	–
Previous violent crime	28 (10%)	76 (40%)	104 (22%)	<0.001
Previous drug abuse	167 (59%)	146 (76%)	313 (66%)	<0.001
Previous alcohol abuse	109 (39%)	111 (58%)	220 (46%)	<0.001
Previous self-harm	34 (12%)	21 (11%)	55 (12%)	0.734
Education level				0.888
• Secondary	240 (85%)	165 (86%)	405 (85%)	
• Upper secondary	26 (9%)	16 (8%)	42 (9%)	
• Post secondary	17 (6%)	10 (5%)	27 (6%)	
Parental drug or alcohol use	19 (7%)	9 (5%)	28 (6%)	0.600
Parental violent crime	6 (2%)	15 (8%)	21 (4%)	0.001
Sibling violent crime	1 (0.4%)	3 (2%)	4 (1%)	0.110
Recent treatment				
• Antipsychotic	259 (92%)	177 (93%)	436 (92%)	0.651
• Antidepressant	116 (41%)	31 (16%)	147 (31%)	<0.001
• Dependence	78 (28%)	65 (34%)	143 (30%)	0.132
Personal income				0.088
• First and second deciles	179 63%)	173 (91%)	352 (74%)	
• Third and fourth deciles	91 (32%)	70 (37%)	161 (34%)	
• Fifth to tenth deciles	13 (5%)	4 (2%)	17 (4%)	
Inpatient	283 (100%)	191 (100%)	474 (100%)	–
Benefit recipient	62 (22%)	54 (28%)	116 (24%)	0.114
Diagnosis				0.030
• Schizophrenia-spectrum disorder	262 (92%)	176 (92%)	438 (92%)	
• Bipolar disorder	11 (4%)	14 (7%)	25 (5%)	
• Comorbid depression	10 (4%)	1 (1%)	11 (2%)	

Data are shown as n (%) and mean [SD].

There were statistically significant differences between the two subgroups (violent/nonviolent) regarding the items diagnosis ($p = 0.030$), previous violent crime ($p < 0.0001$), drug abuse disorder ($p < 0.0001$), alcohol abuse disorder ($p < 0.0001$), parental violent crime ($p = 0.001$), and recent antidepressant treatment ($p < 0.0001$; see **Table 1**).

Comparison Between Risk Levels in OxMIV Score

The results of the OxMIV score were significantly higher in the violent group compared to the nonviolent group ($p < 0.001$). The risk levels were divided into a low-risk and increased-risk group, with a defined cutoff at 5%. In the violent group, the median was 4.21%, and the IQR was 8.51%. In the nonviolent group, the median was 1.77%, and the IQR was 2.01%, as seen in **Figure 2**. Out of 474 patients, 358 (76%) patients were classified as low risk, and 116 (24%) patients were at increased risk. In the nonviolent group, 251 of 283 (89%) were categorized as low risk compared to 107 of 191 (56%) in the violent group. Regarding increased risk, 84 of 116 (72%) of the violent group compared to 32 of 116 (28%) in the nonviolent group had an OxMIV score >5% ($p < 0.0001$; see **Table 2**). For a 5% cutoff for an increased risk for violent behavior, the sensitivity was 44%, and the specificity was 89%, with a positive predictive value of 72% and a negative predictive value of 70%, as seen in **Table 2**. Through the receiver operating characteristic curve (ROC curve), we calculated an area under the curve (AUC) value of 0.72 (see **Figure 3**).

Binomial Logistic Regression

In the 14-item model, the strongest significant predictors of violent behavior during the stay were previous violent crime (adjusted odds ratio 5.29 [95% CI 3.10–9.05], $p < 0.0001$), previous drug abuse (1.80 [1.08–3.02], $p = 0.025$), and previous alcohol abuse (1.89 [1.21–2.95], $p = 0.005$). The strongest predictor against violent behavior was recent antidepressant treatment (0.28 [0.17–0.47], $p < 0.0001$; see **Table 3**). The optimism-corrected AUC (0.75), Brier score (0.20), and pseudo-R^2 (0.18) indicated fair performance, while the calibration intercept (0.35) and slope (0.82) showed poor performance. The Hosmer–Lemeshow test was nonsignificant in all 20 imputed data sets for the 14-item model.

After variable selection, previous violent crime (adjusted odds ratio 5.08 [95% CI 3.02–8.55], $p < 0.0001$), previous drug abuse (2.09 [1.30–3.37], $p = 0.002$), previous alcohol abuse (1.76 [1.15–2.70], $p = 0.009$), parental violent crime (2.04 [1.00–4.19], $p = 0.051$), and recent antidepressant treatment (0.28 [95% CI 0.17–0.46], $p < 0.0001$) remained in the model (see **Table 4**). The adjusted odds were almost unchanged, indicating a stable predictive ability independent of the other considered variables in the 14-item model. The optimism-corrected AUC (0.76), Brier score (0.19), and pseudo-R^2 (0.20) were slightly improved, still indicating fair performance, while calibration (intercept = 0.06, slope = 0.96) was greatly improved, showing good calibration of the model. The Hosmer–Lemeshow test was nonsignificant in all 20 imputed data sets for the selected model. The pseudo-R^2 was 0.203.

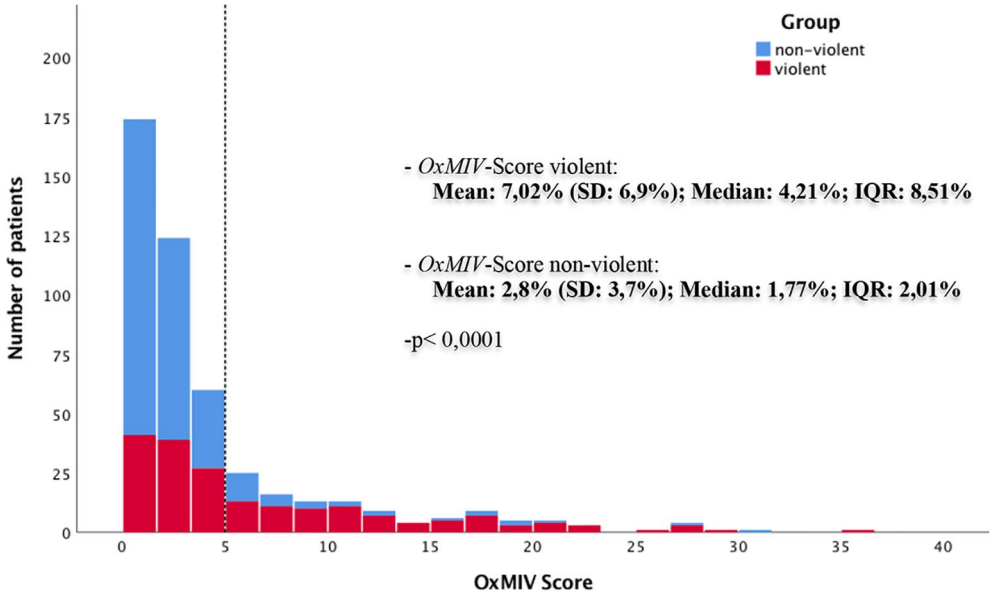

FIGURE 2 | Distribution of the Oxford Mental Illness and Violence tool (OxMIV) score in the nonviolent and violent groups with the cutoff set at 5% for "increased risk" of violent behavior (dashed line).

TABLE 2 | Two-by-two table using the OxMIV score and the 5% cutoff to derive sensitivity, specificity, positive prediction value, and negative prediction value to identify "increased-risk" patients for violent behavior during their stay.

		Violent behavior during stay		
		Yes	No	Total
OxMIV score >5%	Yes	84	32	**116**
	No	107	251	**358**
	Total	**191**	**283**	474

OxMIV, Oxford Mental Illness and Violence tool.

DISCUSSION

The purpose of this study was to test the predictive validity of the risk assessment instrument OxMIV in patients with a schizophrenia-spectrum or bipolar disorder in a German prison hospital. We analyzed 474 patient files from the data bank of the Berlin prison hospital and divided these into two groups: a violent and a nonviolent group. We (retrospectively) performed a risk assessment in all 474 patients using the prediction tool OxMIV, which is a 16-item model including criminal and personal background information, as well as sociodemographic and clinical risk factors. Out of 474 patients, 191 demonstrated violent behavior during their stay in comparison to 283 nonviolent patients. As hypothesized, patients who had demonstrated violent behavior had a significantly higher OxMIV score compared to the nonviolent group, with a fair performance in internal validation.

As assumed, the items previous violent crime, previous drug abuse, and previous alcohol abuse had a significant impact on the occurrence of violent behavior during inpatient treatment. This is in line with previous results in this field (3–5, 9, 10, 33, 41) and highlights further the strong interactions between severe mental disorders and substance abuse. In our results, the item recent antidepressant treatment had a risk reduction effect on violent behavior. This is in line with the findings of Fazel et al., who described a positive effect of antipsychotic medication and mood stabilizers on violent behavior and the occurrence of violent crime in over 82,000 patients with mental disorders (42, 43).

Using a logistical regression model after variable selection led to the identification of five items that demonstrated a significant effect on the prediction of violent behavior in our cohort. Thus, it may be discussed whether the risk assessment tool could be reduced to a five-item model consisting of: previous violent crime, previous drug abuse, previous alcohol abuse, parental violent crime, and recent antidepressant treatment. In light of the good performance in internal validation of the reduced five-item model, compared to the fair performance of the 16-item model, these findings lead to the assumption that the risk assessment tool OxMIV could be adjusted for male patients in a forensic psychiatric prison ward. However, to clarify these questions, further studies are needed.

There are certain differences when comparing our results to the results of the OxMIV study by Fazel et al. (10). They found three strong predictors of violent behavior/offending that (in part) differed from our results: previous violent crime, male gender, and age (10). Clearly, it was not possible for us to consider the item "gender" because of our study population, which consisted solely of male patients. Regarding the age variable, two studies on risk factors for prison violence found the item "older age" to be a protective factor (9, 10). In terms of the item "age," we did not find this to be a significant protective factor for violent behavior in our study. In our opinion, the results of this study might have several implications for the treatment of patients

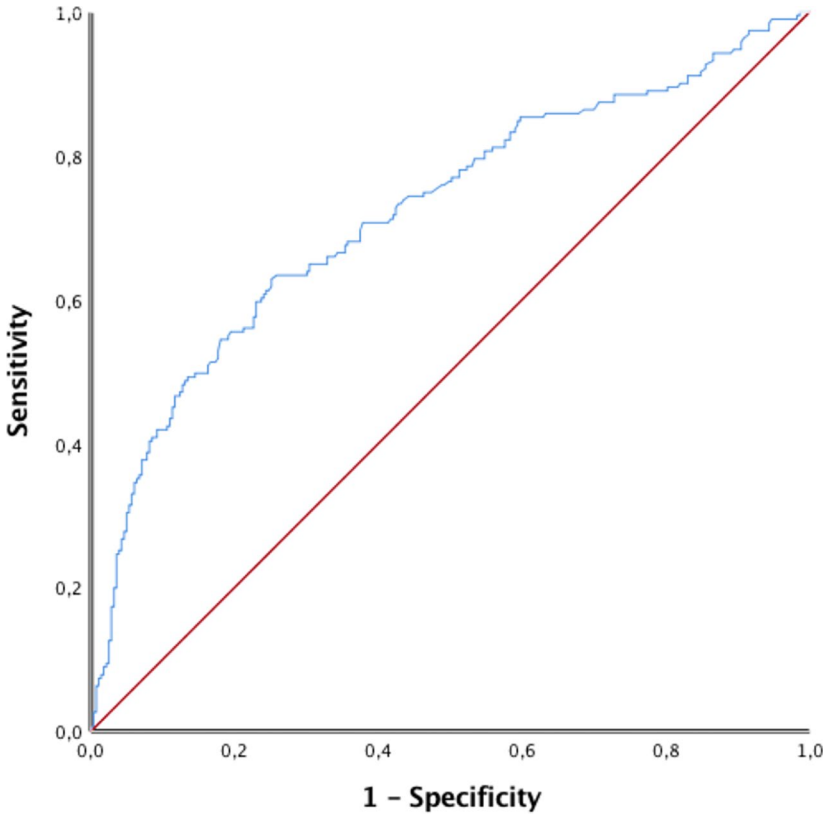

FIGURE 3 | Receiver operating characteristic (ROC) curve for the prediction of violent behavior.

TABLE 3 | Association between risk factors and violent behavior from logistic regression after multiple imputation.

	Coefficient	Standard error	p value	Adjusted odds ratio	95% CI	
Age	–0.02	0.01	0.171	0.98	0.96	1.00
Previous violent crime	1.66	0.27	<0.0001	5.29	3.10	9.05
Previous drug abuse	0.59	0.26	0.025	1.80	1.08	3.02
Previous alcohol abuse	0.63	0.23	0.005	1.89	1.21	2.95
Previous self-harm	–0.53	0.37	0.151	0.59	0.28	1.21
Education level						
- Lower secondary	1 (reference)					
- Upper secondary	0.32	0.42	0.444	1.38	0.60	3.17
- Postsecondary	0.16	0.48	0.737	1.18	0.46	3.01
Parental drug or alcohol use	–0.29	0.45	0.513	0.75	0.31	1.80
Parental violent crime	0.71	0.40	0.076	2.04	0.93	4.50
Sibling violent crime	–0.01	1.01	0.990	0.99	0.13	7.34
Recent antipsychotic treatment	0.07	0.42	0.861	1.08	0.48	2.44
Recent antidepressant treatment	–1.26	0.26	<0.0001	0.28	0.17	0.47
Recent dependence treatment	0.05	0.24	0.831	1.05	0.66	1.69
Benefit recipient	0.31	0.26	0.233	1.37	0.82	2.29
Personal income	–0.18	0.14	0.203	0.84	0.63	1.10
Constant	–0.36	0.74	0.628	–	–	–

in the forensic psychiatric ward. Due to the uncomplicated use of this risk assessment tool, not only medical doctors are able to categorize patients into low-risk and increased-risk groups, but also other clinical staff, including psychologists and trained nursing staff. In line with our findings, for the specific prison setting, it may be sufficient to focus on the five items that demonstrated a significant effect on predicting violence (see above), thus increasing practicability even further. It is known that mental health professionals are at a greater risk to be victims of violent offenses (44, 45). Analyzing a 12-month period of time,

TABLE 4 | Association between risk factors and violent behavior from logistic regression after multiple imputation and variable selection.

	Coefficient	Standard error	p value	Adjusted odds ratio	95% CI	
Previous violent crime	1.63	0.27	<0.0001	5.08	3.02	8.55
Previous drug abuse	0.74	0.24	0.002	2.09	1.30	3.37
Previous alcohol abuse	0.57	0.22	0.009	1.76	1.15	2.70
Parental violent crime	0.71	0.36	0.051	2.04	1.00	4.19
Recent antidepressant treatment	−1.27	0.25	<0.0001	0.28	0.17	0.46
Constant	−1.31	0.24	<0.0001	0.27	0.17	0.43

Foster et al. indicated a 1-in-10 chance per year to be attacked in a psychiatric hospital in the United Kingdom (46). Therefore, it is indispensable to have specific tools and skills to handle and prevent violent behavior (47). However, it is equally important to mention that this risk assessment tool is primarily intended as an adjunct for clinical decision-making and not as an isolated diagnostic device.

To our knowledge, the positive prediction value of 72% is the highest value in risk assessments so far. A 2012 systematic review on the nine most commonly used risk assessment tools in forensic wards reported a median positive prediction value of 41% (IQR: 27–60%) (25). As a consequence, nearly two-thirds of the patients in our cohort who demonstrated violent behavior by passing the 5% cutoff score were screened as increased risk by the OxMIV. Regarding the results from the original OxMIV study by Fazel et al., the positive prediction score was 11%, and the negative prediction score was 99% (10). Thus, nearly all of the patients from the general psychiatric service who had a score under the 5% cutoff did not commit a violence offense in the following 12 months. As a reason, the clinical implication of the original OxMIV was to identify low violence risk (10). Due to the specific nature of our patients (all male, mean age of 32), with a higher baseline risk (overall, 22% previous violent crime, 66% drug abuse, 46% alcohol abuse), we think that these aspects had a major influence on the results regarding the positive predictive value. Although we had a very specific cohort, our results suggested that the OxMIV may be used to identify violent behavior in high-risk patients of forensic psychiatric wards as well. As a consequence, the security in forensic wards for fellow inpatients and especially for staff members may be generally increased, while in addition, more specific treatment options regarding possibly aggressive patients could be implemented (e.g. group size, staffing ratio).

The reduction of future violent offenses by psychiatric patients after discharge may be possible through early identification of risk scenarios and specific preventive measures such as psychotherapeutic and psychopharmacological interventions. While static items of the OxMIV (parental violent crime, previous violent crime, gender, age) are not adjustable, our results suggest that targeting the changeable items of this tool by working on current and future treatment options with these patients (e.g. antidepressants, CBT, motivational interviewing for SUD) may have a positive influence on the prevention of violent behavior. Due to the known risk of violent offenses after discharging patients with severe mental disorders (6, 10), the prediction and especially the treatment of violent behavior in prison and in forensic wards is beneficial not only for the patients but also for society as a whole (47, 48).

A major limitation of this study is that only male patients were included due to our specific setting. Despite its free and easy use, there are also limitations of the prediction score OxMIV. On the one hand, it should be discussed that using the OxMIV tool for active risk management in a clinical prison hospital setting may be insufficient. The 16 items are all of a retrospective nature and not specifically designed for mapping an individual treatment process. Furthermore, the items age, previous violent crime, and male sex had a disproportionate effect on the total score. A patient (always) showed an increased risk (5.3–9.9%) if he was between 20 and 35 years old and male and had a history of previous violent crimes. The other prediction variables, in comparison, did not have the same power. On the other hand, as mentioned above, the items on the recent treatment of the patient do point to possibilities regarding risk management without the option to actively track the change in risk while treating the patient, due to missing specific clinical items. Another limitation of our study was the retrospective design, which may have led to various biases, such as recall bias or the present state effect (49). A further limitation is the fact that we did not check for interrater reliability as well as multicollinearity between the items. In terms of multicollinearity, we accepted the disturbance between the items as well as a wider range in the confidence interval and added a variable selection process to reduce the number of parameters for our setting. Still, multicollinearity might be a problem, but in order to yield a predictive model, we consider this problem as minor. Another limitation is that we conducted our study in just one psychiatric department in one prison hospital in one country. Despite the fact that inpatient forensic psychiatric health care differs thoroughly in high-income countries such as Germany, Great Britain, and the Netherlands, further research is necessary (48).

In summary, to the best of our knowledge, for the first time in Germany, we tested the predictive validity of the risk assessment tool OxMIV in patients with schizophrenia-spectrum or bipolar disorders in a prison hospital. Even if there are different kinds of studies in Germany that are dealing with specific overviews of mental disorders in the criminal justice system (50), specific treatment in forensic psychiatric wards (51), and suicide rates (52), there is less research on violent behavior and its assessment in patients in prison settings. Despite the significant results of this study, further studies in different countries are needed.

ETHICS STATEMENT

According to current legal regulation, the study was approved by the local ethics committee at Charité–Universitätsmedizin Berlin.

AUTHOR CONTRIBUTIONS

VN and AO designed the study. VN, PS, and AO collected the data. VN, AV, RR, and AO analyzed and interpreted the data. VN, AV, and AO wrote the initial draft of the manuscript. VN, PS, and AO had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of data analysis. All authors have contributed to, read, and approved the final version of the manuscript.

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A Latent Profile Analysis of Violent Offenders Based on PCL-R Factor Scores: Criminogenic Needs and Recidivism Risk

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Clinicians and theorists have often proposed the two psychopathic subtypes of "primary" and "secondary" psychopathy, with recent research indicating some empirical support for both psychopathy subtypes, though the findings across studies are far from uniform. For the current study, latent profile analysis was used to investigate if homogeneous latent classes exist within a sample of 215 adult male violent offenders from Berlin, Germany. The age of the offenders at the time of the index offense ranged from 19 to 59 years. The results indicated a solution with four latent classes, which we refer to as *prototypical psychopaths* (LC1), *callous-conning offenders* (LC2), *sociopathic or dyssocial offenders* (LC3), and *general offenders* (LC4). Validation of the four subtypes involved examination of differences on recidivism risk; criminogenic needs; and general, violent, and sexual reoffending. The results also are discussed in terms of the issue of treatment amenability.

Keywords: PCL-r, recidivism, criminogenic needs, risk assessment, psychopathy, LSI-R, subtypes

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Clinicians and theorists long have proposed numerous psychopathic subtypes [see reviews in Refs. (1, 2)]; (Mokros, Hare, Neumann, & Habermeyer, in press). An early distinction offered by Karpman (3, p. 46) was between two forms of primary or idiopathic psychopaths who shared similar motivations and dynamics but differed in their interactions with others: *aggressive/predatory* and *passive/parasitic*. Similarly, Arieti (4, pp. 307–308) described several kinds of "true" psychopaths who differed from one another in their interpersonal and aggressive behaviors: the *simple* and the *complex* psychopath. Karpman's aggressive/predatory and passive/parasitic variants can be viewed as analogous with Arieti's simple and complex variants, respectively (5–7). Karpman, Arieti, and other early influential clinicians also described individuals with some features of psychopathy (primarily disinhibition, externalizing) but falling outside of the psychopathy construct. The terms for these individuals included secondary, symptomatic, or pseudo-psychopathy. As put by Mokros and colleagues (6, p. 273), "A common view was that psychopathy is rooted in genetic predispositions and social/environmental forces that are quite different from those that lead to secondary psychopathy. In this sense, diagnostic labels, such as secondary or symptomatic psychopathy, are problematic and misleading because they imply that individuals so labeled are psychopaths in the traditional sense of the term (8)." More appropriate terms for these individuals might be *sociopaths*, as described by Lykken (9), or dyssocial individuals who are not socialized in the usual sense and are antisocial

with respect to society but loyal to members of their own group (6, p. 373). Paralleling the clinical descriptions, more contemporary theorists (10, 11) differentiated between primary psychopaths with a congenital affective "deficit" (i.e., genotype) and secondary psychopaths who did not develop basic affective competence due to traumatic interpersonal experiences (i.e., phenotype).

There is a considerable body of empirical literature on the topic of subtypes of psychopathy (2, 12), but it reflects studies that used a variety of different samples (e.g., correctional, treatment, or community samples), selection criteria (e.g., unselected samples versus extreme manifestations of psychopathy), and analytical techniques [e.g., cluster analysis, latent class analysis (LCA)]. Furthermore, psychopathy was defined and measured in different ways in these studies: Some researchers relied on self-report questionnaires, whereas others used clinical observer ratings primarily based on the Psychopathy Checklist—Revised (PCL-R; 13) or its derivatives. As measured with the PCL-R, psychopathy is a dimensional construct underpinned by four correlated first-order factors commonly referred to as facets (Interpersonal, Affective, Lifestyle, and Antisocial) constituting the two originals factors: Factor 1 (comprising the facets Interpersonal and Affective) and Factor 2 (comprising the facets Lifestyle and Antisocial). Given the diversity of approaches to the topic, subtyping studies have identified between two and four interpretable psychopathic subtypes (6, 14–16). For example, cluster analysis of the PCL-R facet scores of male offenders with high psychopathic trait levels resulted in four subgroups, or variants: prototypical (or primary) psychopaths, macho psychopaths, manipulative psychopaths, and pseudo- (or secondary) psychopaths (17). Mokros and colleagues (6) used latent profile analysis (LPA) with a large sample of male offenders (N = 1,451) with high PCL-R scores (≥ 27) and identified three latent classes labeled *manipulative psychopathy* (LC1), *aggressive psychopathy* (LC2), and a *sociopathic* or dyssocial subgroup (LC3). They (6, p. 372) suggested that "LC1 and LC2 represent phenotypic variations on the theme of psychopathy," corresponding, respectively, to Karpman's passive/parasitic and aggressive/predatory psychopathy, Arieti's complex and simple psychopathy, Book and Quinsey's (18) *cheater* and *warriorhawk* psychopathy, and the emotionally stable and aggressive psychopaths described by Hicks and colleagues (14). LC3 formed a separate subgroup consistent with conceptions of antisocial personality disorder and sociopathy. These findings were replicated with an independent sample of 487 male offenders (6). In a supplemental analysis, Mokros and colleagues (6) (http://dx.doi.org/10.1037/abn0000042.supp) raised the PCL-R threshold for inclusion in the LPA to 30+ (n = 856). Two latent classes emerged, virtually identical with LC1 and LC2, described above.

Despite some differences in findings, the subtyping studies generally have identified a subtype reflecting the traditional clinical construct of psychopathy (6, 15, 19, 20). Also, the majority of the studies have identified a group of "secondary psychopaths," who tend to show higher scores on measures of anxiety (15, 20), self-reported antisociality, and childhood trauma (20) than do primary psychopaths.

Several authors (14, 21) consider elevations on Factor 1 of the PCL-R as indicative of primary psychopathy and high scores on Factor 2 as indicative of secondary psychopathy. However, the view that primary and secondary psychopathy map onto PCL-R Factors 1 and 2, respectively, is simplistic and inconsistent with clinical accounts of psychopathy (4, 22) and with empirical evidence that many of the features measured by Factor 2 (e.g., externalizing behaviors) are essential components of the psychopathy construct (23, 24). In particular, the Mokros et al. (6) study of offenders with extreme elevations of the PCL-R provided clear evidence of a primary subtype that displayed very high scores on the antisocial facet. At the same time, this study only focused on offenders at the very top of the distribution with extreme PCL-R scores and did not examine a sample of offenders who manifested the full range of PCL-R scores. Thus, an open area of research concerns the nature of the subtypes that may emerge when the entire range of PCL-R scores are employed for subtyping in a large sample of offenders [though see Ref. (5), for initial work in this area] (7). Here, Neumann et al. (7) as well as Krstic et al. (25) used total, unselected offender samples and identified four subtypes: prototypic (high scores on all four facets), callous-conning (elevated Interpersonal and Affective facet scores), sociopathic (elevated Lifestyle and Antisocial facet scores), and general offender (relatively low scores on all four facets). Validation analyses by Krstic et al. (25) using offense behavior showed prototypic subtype offenders to be more violent in the commission of their sexual crimes (compared to all other three subtypes) and general offenders to engage in more sexual behavior (compared to sociopathic offenders). These results indicate that the use of a total sample provides evidence of a range of subtypes, which may also vary considerably in their recidivism risk, criminogenic needs, and response to treatment. This is very important, as the challenging intermediate-level cases (e.g., callous-conning, sociopathic) will be encountered more frequently in general offender populations than extremely psychopathic offenders (i.e., prototypic).

RISK, NEED, AND RECIDIVISM

Given the clinical, theoretical, and empirical conceptualization of psychopathic and non-psychopathic subtypes, it is reasonable to think that they may differ in their risk, needs, or response to treatment. In fact, differences among empirically identified subtypes may help to highlight important risk and protective factors associated with individuals who display certain profiles of psychopathic features. To assess offender risk and needs, evaluators commonly use purpose-built dynamic risk assessment instruments, such as the *Level of Service Inventory—Revised* (LSI-R) (26), which assess constructs (i.e., criminogenic needs) that are both theoretically and empirically relevant for criminal conduct (27) and may be amenable to intervention. Generally, Simourd and Hoge (28) found that psychopaths (PCL-R score ≥30) scored significantly higher than non-psychopaths on several risk and needs areas as

assessed by the LSI-R. Thus, the criminogenic need profiles of different psychopathic and non-psychopathic subtypes could help, for example, to identify the type of treatment that would be required to reduce recidivism risk. Since criminogenic needs include developmental factors (e.g., poor parenting, delinquent subculture), certain subtypes are likely to score higher on such factors, which may make them more amenable to treatment (29). In this regard, Poythress et al. (20), as well as Olver and colleagues (19), found some indication that secondary subtypes are more amenable to treatment (i.e., fewer unexcused absences, higher treatment motivation) than are primary subtypes. Poythress and colleagues (20) as well as Olver and colleagues (19) found no significant differences between primary and secondary psychopaths in terms of general or violent recidivism, but Olver and colleagues (19) did find significantly higher recidivism rates for sexual offending for secondary psychopaths.

PURPOSE OF THIS STUDY

This person-oriented study is divided into two parts. In the first part, we used LPA with a complete sample of violent offenders to determine if a manifest psychopathic subtype could be differentiated from other offender subtypes. Based on the theoretical literature and previous empirical findings (7, 25), we expected to find four viable latent classes (or profiles) of PCL-R facet scores. In accordance with the findings from North American and Swedish samples of adult male offenders (5, 7), we expected to find a class indicative of primary psychopathy with high average scores on all four PCL-R factors, a sociopathic class with low average scores on Factor 1 and high average scores on Factor 2, a class indicative of callous-conning offenders (with high average scores on Factor 1 and low average scores on Factor 2), and a general offender class with average low scores on all factors.

In the second part of the study, we sought to extend the literature on person-centered approaches (compared to variable-centered findings) in psychopathy research. Therefore, we sought to determine whether the latent classes thus identified differed in meaningful ways from one another with respect to the average recidivism risk for different offense types. In terms of recidivism, we expected sociopaths ("secondary" psychopaths) to be at risk for both general and violent recidivism. However, the subtype of primary psychopaths should display the highest overall recidivism rate. Moreover, we wanted to investigate the relationship between sexual recidivism and psychopathy subtypes in more detail. Finally, we examined which specific criminogenic need factors differentiated the psychopathy subtypes. Criminogenic needs were assessed by the LSI-R (26). Due to the expected elevation on Factor 2 of the PCL-R, we predicted the primary and sociopathic subtypes to show greater criminogenic needs than the non-psychopathic subtype(s). Our predictions are based on previous (17, 28) and recent research (7, 25).

METHOD

Sample

The current sample consisted of 215 male violent offenders from Berlin, Germany, convicted of homicide (21.9%), sexual offenses (48.8%), or other violent offenses (predominantly assault and robbery; 29.3%) and released from prison between 1995 and 1998. The age at release varied from 19 to 59 years ($M = 36.2$, $SD = 8.9$, $n = 213$). Most of the offenders were German citizens (85.6%, $n = 213$) and not in a relationship at the time of the index offense (59.1%, $n = 211$). According to the German Federal Central Criminal Register, 16.7% of the sample had no prior convictions ($n = 210$).

Recidivism

Official criminal records obtained from the federal crime registry were evaluated to assess recidivism. Information on recidivism was available for 212 offenders. The current study included general, violent, and sexual recidivism. Furthermore, cases of sexual and violent recidivism were coded as *severe* if they led to a conviction with a prison sentence of 2 or more years, as the German law defines these offenders as high-risk (§ 454 German Code of Criminal Procedure). Follow-up time varied from 7 to 11 years ($M = 9.29$, $SD = 1.01$).

MEASURES

Psychopathy Checklist—Revised (PCL-R). The PCL-R (13) is a reliable and valid clinical assessment instrument for the observer rating of psychopathic personality (5). The PCL-R is scored from a semi-structured interview and a coding framework for relevant file information. The instrument includes 20 items, which can be considered to assess four correlated first-order factors: interpersonal (e.g., pathological lying, conning/manipulative); affective (e.g., shallow affect, lack of empathy); impulsive lifestyle (e.g., irresponsibility, impulsivity); and externalizing, antisocial tendencies (e.g., early behavior problems, criminal versatility). The two original factors (30) of psychopathic personality traits (Factor 1) and social deviance (Factor 2) can be regarded as second-level constructs (Interpersonal/Affective and Lifestyle/Antisocial), respectively. The items are coded on a 0-to-2 rating scale with 0 = not present, 1 = present to some extent, and 2 = fully present. Prior research supports the view of psychopathy as dimensional, not as taxonic (31, 32), indicating that individuals differ from each other in degree rather than in kind. The conventional PCL-R threshold for diagnosing psychopathy in North America is 30 points, whereas empirical research indicates that on average, samples from European countries show significantly lower PCL-R total scores [e.g., Ref. (33)]. Based on the analysis of 25 published empirical studies, Mokros et al. (34) suggested a corresponding threshold of ≥ 25 points for the diagnosis of psychopathy in German-speaking countries.

Level of Service Inventory—Revised (LSI-R). The LSI-R (26) is one of the most widely used assessment tools designed to

identify the offenders' risks and needs with regard to recidivism. In addition, there is a large body of literature supporting the validity of the LSI-R measure [for overview, see Ref. (27)]. The LSI-R consists of 54 items (scored as 1 = present or 0 = not present) assessing offenders across 10 domains, 1 static (Criminal History) and 9 dynamic or changeable criminogenic needs that are amenable to treatment: education/employment, financial, family/marital, accommodation, leisure/recreation, companions, alcohol/drug problems, emotional/personal, and attitudes/orientation. The LSI-R total score can range from 0 to 54, with higher scores indicating a greater recidivism risk and need for clinical intervention. According to an overview by Hare (13, p. 162) on the results from three samples, the components of the LSI-R are associated more strongly with PCL-R Factor 2 than with Factor 1.

CODING

In order to assess the reliability of the LSI-R and PCL-R, ratings from two research assistants coded a random subsample of 30 cases each. The results showed an excellent level of inter-rater agreement, with intra-class correlations for a single measure (ICC) (35) of .96 and .92, respectively, for the LSI-R and PCL-R total scores.

Given the empirical evidence for a dimensional (and multifaceted) structure of psychopathy (36), information about meaningful subtypes may be lost by excluding subjects below a certain threshold for psychopathy. Therefore, an unselected sample of violent offenders across the full distribution of psychopathic traits was used, with total scores that varied from 0 to 33 (M = 13.4, SD = 7.0). The PCL-R ratings of each offender were based on file review only, which can result in lower PCL-R scores compared to the standard assessment approach (37). According to a meta-analysis from German-speaking countries (eight studies, total N = 1,419), the aggregate mean of the PCL-R total score based on file review only was 16.5 (34) and thus on par with the reference mean described for file reviews of North American male offender samples (M = 16.5) (13). Notably, the mean of the current sample was only slightly below the lower bound of the 95% CI (i.e., 14.2) reported for the aggregate mean of offender samples from German-speaking countries (34). The mean (SD) score of all offenders on the Interpersonal, Affective, Lifestyle, and Antisocial factors were 1.38 (1.55), 3.22 (2.11), 3.40 (2.45), and 4.05 (2.72), respectively.

DATA ANALYSES

LPA is a variant of LCA based on observed continuous rather than categorical variables. LPA is a method to identify homogeneous subgroups within a sample through maximum likelihood estimation. By virtue of information criteria and through modified likelihood ratio tests (38, 39), the optimum number of latent classes can be assessed. Nylund and colleagues (39) conducted a simulation study on the accuracy of statistical criteria for determining the number of latent classes in LPA. They found that the modified likelihood ratio test of Lo and colleagues (38) had a power of 84% for detecting the correct number of latent classes in simulated samples similar in size (N = 200) to the current one (N = 215). The corresponding statistical power of the Bayesian information criterion (BIC) (40) was estimated at 100% (39). However, the interpretation of the different LCA solutions should not rely only on statistical considerations and information criteria but also consider model parsimony, simplicity, and clarity (41). For an LCA solution to be interpretable, the mean probability of cluster membership per latent class should be .80 or above. Furthermore, particular latent classes in higher-order LCA solutions may simply represent subdivisions of uniform latent classes from solutions with fewer latent classes. In this case, the lower-order solution ought to be preferred. Finally, it is paramount that the number of latent classes obtained is meaningful.

For the analyses reported below, cases were assigned to one subtype in a mutually exclusive manner based on the maximum probabilities of latent class membership. Thus, the non-exclusive latent classes were treated like mutually exclusive clusters. Binary logistic regression analysis was used to predict the probability of recidivism risk (e.g., yes or no) for the different subtypes. Therefore, psychopathic subtype was used as a categorical predictor for the different criteria of recidivism.

To determine how the subtypes differed from one another with regard to the LSI-R subscales, Cohen's d was computed as a measure of effect size (i.e., the difference between means, divided by the pooled SD). Values of d equal to or larger than 0.2, 0.5, and 0.8 can be considered as small, medium, and large effects, respectively (42). As we also were interested in how the subtypes differed from one another, a full set of pairwise comparisons on the 10 LSI-R subscales, as well as the total LSI-R score, were conducted. Data were analyzed with SPSS, version 19.0 (IBM Corporation, Somers, NY), and LPA was carried out with Mplus for Mac, version 6.12 (Muthén & Muthén, Los Angeles, CA).

RESULTS

Person-Centered (LPA) Results

We used LPA to determine if homogeneous classes with relatively unique PCL-R four-factor profiles exist within a sample of male violent offenders. The LPA solutions with latent classes fit the data better than a unitary solution without latent classes (see **Table 1** for details). The likelihood ratio test (38) suggested that model fit did not improve substantially beyond a solution entailing three latent classes, whereas the BIC coefficient did not indicate any improvement in model fit at the transition from a five- to a six-latent-class solution. Therefore, based on the LPA fit statistics, previous research, as well as conceptual reasons, the intermediate solution with four latent classes was chosen for interpretation. The average latent class probabilities for allocation to the most likely class membership were substantial (.90, .84, .94, and .87), suggesting that the four latent classes represent separable variations on the PCL-R factors.

TABLE 1 | Model Fit of the Latent Profile Analyses With Up to Six Latent Classes (N = 215).

	Number of Latent Classes					
	1	**2**	**3**	**4**	**5**	**6**
Log-Likelihood	–1,880.57	1,796.03	–1,759.05	–1,738.43	–1,720.87	–1,707.67
No. of Free Parameters	8	13	18	23	28	33
BIC [a]	3,804.68	3,661.88	3,614.77	3,600.39	3,592.12	3,592.57
Adjusted BIC	3,779.33	3,620.68	3,557.73	3,527.51	3,503.29	3,488.00
AIC	3,777.71	3,618.06	3,554.09	3,522.87	3,497.74	3,481.34
(–2)*Log-Likelihood Difference [b]	–	169.06	73.96	41.24	35.12	26.40
LMR LRT, *p* Value [c, e]	–	<.001	.008	.263	.388	.034
Bootstrap LRT, *p* Value [c, d]	–	<.001	<.001	<.001	<.001	<.001
1 – Entropy	–	.873	.828	.826	.844	.827

AIC, Akaike's information criterion; BIC, Bayesian information criterion; LRT, likelihood ratio test. [a]Incremental changes of BIC < 2 are considered marginal (Kass and Raftery (43), p. 777). [b]Difference between models with (k – 1) and k classes. [c]LMR, Likelihood ratio test according to Lo, Mendell, and Rubin (38). [d]LRT according to Nylund et al. (39). [e]If < .05, a model with k latent classes will fit significantly better than a model with (k – 1) latent classes.

After the assignment of cases to manifest subtypes based on the maximum allocation probability, the four subtype groups contained 38, 57, 105, and 15 individuals, respectively. We first labeled the four subtypes as *Latent Class 1* (LC1; 7% of the sample), *Latent Class 2* (LC2; 17.7% of the sample), *Latent Class 3* (LC3; 26.5% of the sample), and *Latent Class 4* (LC4; 48.8% of the sample). The mean (*SD*) PCL-R total score of each latent class was as follows: LC1, 25.8 (4.2); LC2, 18.2 (3.5); LC3, 17.4 (3.8); and LC4, 7.6 (3.4).

For display purposes, factor scores were converted to *z*-scores, with a *z*-score of 0 representing the sample mean (see **Figure 1**). Consistent with previous research (7, 25) and current hypotheses, the four subtypes conformed to prototypic (LC1), callous-conning (LC2), sociopathic (LC3), and general offender (LC4) profiles. As **Figure 1** shows, individuals assigned to LC4 (general offenders) had low average scores on all four first-order PCL-R factors. Those allocated to LC3 (sociopathic offenders) had high mean scores on the Lifestyle and Antisocial factors of the PCL-R, yet they had average scores on the Interpersonal and Affective factors, close to the grand mean of the sample (i.e., a *z*-score of 0). In contrast, those allocated to LC2 (callous-conning offenders) displayed high mean scores on the Interpersonal and Affective factors of the PCL-R, yet they lacked high scores on the Lifestyle and Antisocial factors. Finally, the individuals allocated to LC1 (prototypical psychopaths) had the highest scores on the Interpersonal, Lifestyle, and Antisocial factors of the PCL-R.

Concerning the Affective factor, LC1 had a slightly lower mean score than did LC2, at a moderate mean difference (d = 0.59). This difference is somewhat at odds with other recent LPA research (5, 7, 44) and may be due to the file-only status of the PCL-R data and the likelihood that affective features were less adequately assessed in psychopathic than other offenders.

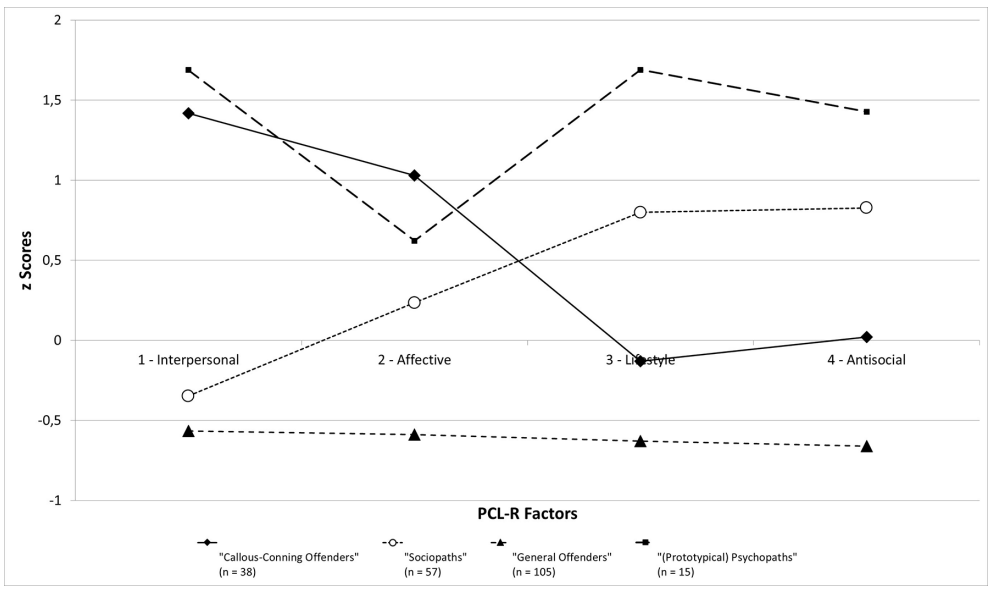

FIGURE 1 | Mean z-scores of each latent class on each PCL-R factor.

External Validation Analyses

Needs assessment. Because the four subtypes were compared to each other with regard to the 11 LSI-R scales, we controlled for family-wise error by using a Bonferroni–Holm correction (45). The LSI-R total scores (**Table 2**) indicated that individuals assigned to LC4 were at a low/moderate risk to reoffend (26), which was significantly different from LC1 (a large effect, $d = -1.92$) and LC3 (a large effect, $d = -1.84$). The risk for individuals assigned to LC4 was also lower than the average risk posed by individuals assigned to LC2 (a moderate effect, $d = -0.56$). In terms of LSI-R total scores, individuals assigned to LC3 ($M = 31.4$, $SD = 5.3$) and LC1 ($M = 32.7$, $SD = 4.7$) were at the upper end of the moderate recidivism risk category (24 to 33 points).

There were no significant differences between individuals assigned to LC1 and LC3 with regard to LSI-R subscales. Both subtypes tended to score highest on the LSI-R subscales (except for attitudes/orientation; see **Table 2**). In addition, differences between individuals assigned to LC4 and LC2 on the LSI-R subscales were small (**Table 2**). Only in relation to the two subscales of criminal history, and attitudes/orientation offenders assigned to LC2 tended to have significantly higher scores. They also had significantly higher scores on the attitudes/orientation subscale (procriminal and antisocial attitudes, values, beliefs, and thinking) than did the sociopathic and general offenders, with a moderate effect size (**Table 2**).

Risk assessment. Figure 2 shows the recidivism profiles for the three most pathological subtypes (LC1, LC2, LC3), relative to LC4. Binary logistic regression analysis shows a clear trend for individuals assigned to LC1 to be at the highest risk to commit a new offense of any kind. In particular, for general recidivism, individuals assigned to LC1 ($B = 2.48$, $p = .019$), LC3 ($B = 1.98$, $p < .001$), and LC2 ($B = 1.01$, $p = .019$) were at significantly higher risk to commit a new offense than were individuals assigned to LC4. In terms of violent recidivism, individuals assigned to LC1

TABLE 2 | Mean (SD) Scores of the Latent Classes and Pairwise Comparisons Between Classes for Each LSI Subcomponent.

	LC4—General Offender		LC3—Sociopathic Offender		LC2—Callous-Conning Offender		LC1—(Prototypical) Psychopaths		LC4 vs. LC3	LC4 vs. LC2	LC4 vs. LC1	LC3 vs. LC2	LC3 vs. LC1	LC2 vs. LC1
LSI	***M***	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***	***d***	***d***	***d***	***d***	***d***	***d***
Total Score	18.99	7.49	31.40	5.29	23.16	7.27	32.73	4.67	−1.84*	−0.56	−1.92*	1.35*	−0.26	−1.47*
Criminal history	3.83	2.09	6.58	1.58	5.55	2.34	7.20	1.42	−1.44*	−0.8*	−1.68*	0.54	−0.41	−0.79
Education/ employment	4.44	2.72	7.14	1.65	4.45	2.61	7.80	2.04	−1.13*	0	−1.28*	1.31*	−0.39	−1.39*
Financial	1.10	0.78	1.60	0.59	1.16	0.75	1.60	0.63	−0.68*	−0.07	−0.65	0.67	−0.01	−0.62
Family/marital	1.89	1.15	2.56	1.00	1.95	1.21	2.53	0.92	−0.62*	−0.05	−0.58	0.57	0.03	−0.53
Accommodation	0.38	0.61	0.82	0.80	0.50	0.60	0.80	0.77	−0.65*	−0.2	−0.67	0.45	0.03	−0.47
Leisure/recreation	1.53	0.65	1.91	0.34	1.50	0.69	1.73	0.59	−0.68*	0.05	−0.31	0.82	0.45	−0.36
Companions	1.46	1.21	2.56	1.15	1.42	1.24	2.47	1.25	−0.93*	0.03	−0.84	0.97*	0.08	−0.86
Alcohol/drug problem	2.30	2.48	4.68	2.54	2.47	2.02	4.73	2.22	−0.96*	−0.07	−1*	0.95*	−0.02	−1.11
Emotional/personal	1.35	1.12	2.11	0.96	1.89	1.13	2.20	1.01	−0.71*	−0.49	−0.77	0.21	−0.1	−0.28
Attitudes/orientation	0.70	0.85	1.44	1.12	2.26	1.00	1.67	0.98	−0.77*	−1.75*	−1.12	−0.78*	−0.21	0.61

*d, Cohen's d effect size measure: mean difference in pooled SD units. * p < .05 after Bonferroni–Holm correction.*

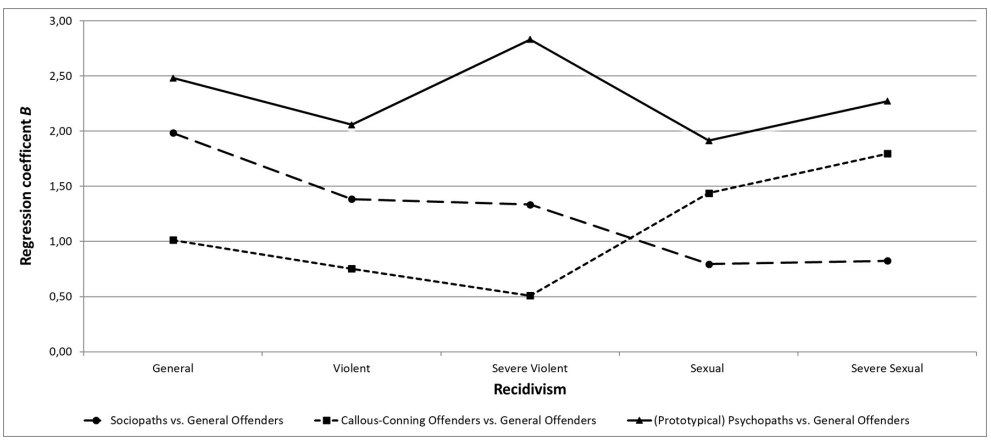

FIGURE 2 | Recidivism risk profiles for psychopaths, sociopaths, and manipulative offenders compared to general offender for general, violent, severe violent, sexual, and severe sexual recidivism.

(B = 2.06, p = .001) and LC3 (B = 1.39, p = .001), but not LC2 (B = 0.75, p = .12), showed higher risk than did individuals assigned to LC4. This pattern (of higher risk compared to individuals assigned to LC4) also held up with respect to severe violent recidivism for both individuals assigned to LC3 (B = 1.33, p = .023) and LC1 (B = 2.83, p < .001) but not for individuals assigned to LC2 (B = 0.51, p = .501).

For sexual (B = 0.80, p = .146) and severe sexual (B = 0.83, p = .190) recidivism, there were no significant differences in recidivism risk between individuals assigned to LC3 and LC4. However, the risk for sexual and severe sexual recidivism was significantly higher for both individuals assigned to LC1 and LC2 than for individuals assigned to LC4. Even if non-significant, risk for sexual recidivism was higher for LCI (Factor 1 and Factor 2 traits) than for LC3 (primarily Factor 2 traits).

DISCUSSION

This person-oriented study used LPA with a complete sample of violent offenders and identified four latent classes. Given the high average maximum allocation probabilities for the latent classes, cases could be assigned to one of four subtypes with good accuracy. Using the terminology of previous studies (7, 25, 44), the four clusters could be designated as *prototypical psychopaths* (LC1), *callous-conning offenders* (LC2), *sociopathic or dyssocial offenders* (LC3), and *general offenders* (LC4). Here we would use the term "prototypical psychopath" descriptively and not in terms of a diagnostic category. The tentative label for latent class LC3 would be sociopathic or dyssocial rather than secondary psychopathy based on our position that the term "secondary" makes little clinical or empirical sense. For convenience, we refer to LC1 and LC3 as *psychopathic* and *sociopathic*, respectively. The emergence of a psychopathic group, a sociopathic group, a callous-conning group, and a group of offenders who are neither prototypical nor intermediate-level cases was according to expectation. In line with early clinical typologies (4, 46), individuals in the sociopathic cluster appeared dissocial without necessarily sharing the psychopath's features of guile, lack of empathy or guilt, and emotional detachment. The callous-conning cluster (LC2) is particularly interesting, apparently sharing the manipulative skill and lack of empathy of the psychopath without displaying strong levels of impulsivity or recklessness, thereby falling short of the full expression of the psychopathy syndrome (23, 24, 47). Noteworthy is that the current four-cluster group solution is generally in line with LPAs conducted with much larger samples from North America and Europe, as described elsewhere (7, 25, 44). In this new research, based on standard interviews (plus file review), the prototypic psychopaths are the highest on all factors of PCL-R psychopathy.

Different risk assessment instruments are used in correctional and forensic-psychiatric assessments. We used the LSI-R to examine how the four subtypes might differ on risk-related criminogenic needs. The current results are in agreement with the hypothesis that psychopathic and sociopathic offenders show greater criminogenic risks and needs than other offenders (28). Here, the relative elevation of psychopathic (LC1) and sociopathic (LC3) offenders on the behavioral and social deviance features of psychopathy is consistent with previous empirical studies showing an association of Factor 2 with alcohol and drug abuse [e.g., Ref. (48)], lower educational achievement [e.g., Ref. (49)], and lower socioeconomic status (50). Also, a study using the historical, clinical, and risk management (HCR-20) (51) violence risk assessment scheme did show the highest total scores for the prototypical psychopath subgroup. Due to high levels of historical risk factors and in line with the current findings, the previous study found higher scores for the sociopathic subgroup compared to callous-conning and general offenders [compare Ref. (5)]. The fact that callous-conning offenders score significantly higher on the attitudes/orientation subscale (procriminal and antisocial attitudes, values, beliefs, and thinking) could indicate that they believe that the norms of society should not apply to them.

Recidivism risk varied as a function of offender subtype. Nearly all of the psychopathic offenders and the majority of sociopathic offenders reoffended. Overall, psychopathic offenders showed the highest risk for recidivism regardless of the criterion (i.e., general, violent, sexual). Thus, the Factor 1 components appear to add additional risk for recidivism, given that the prototypic offenders exceeded the sociopathic offenders on Factor 1 but were similar on Factor 2. At the same time, sociopathic and psychopathic offenders (each with a relative elevation on Factor 2) showed similar (higher) recidivism risk in terms of general and violent reoffending than did general offenders. The current findings are in agreement with Poythress and colleagues (20), who also did not find a significant difference in general and violent recidivism between primary and secondary psychopaths.

The relationship between PCL-R subtype classes and sexual recidivism involved results worthy of highlighting. For sexual and severe sexual recidivism, there were no significant differences in recidivism risk between sociopathic and general offenders. However, the risk for sexual and severe sexual recidivism was significantly higher for both psychopathic and callous-conning offenders than for general offenders. This is in line with findings by Krstic et al. (25) showing the callous-conning subtype to have the highest paraphilic factor scores. In agreement with Krstic et al. (25), we would argue that "high sexualization might be more related to the affective and interpersonal characteristic of psychopathy" (p. 18). While Olver and colleagues (19) found that secondary variants (e.g., LC3) had higher rates of sexual violence than did the primary subtype (e.g., LC1), one could argue, based on the results of Mokros et al. (6), that the secondary subtypes in the Olver et al. study may be better conceptualized as aggressive primary psychopathy subtypes.

The current findings may have implications for the issue of treatment amenability. Research by Durbeej and colleagues (52) and by Swogger and colleagues (53) indicates that traditional treatments are ineffective with offenders who score high on PCL-R Factor 1, especially its Affective component. Similarly, offenders with high PCL-R scores tend to drop out of treatment early (54, 55), while the Affective component is predictive of violence. This suggests that the psychopathic (LC1) and callous-conning (LC2) latent classes identified in this and other studies may include the offenders who pose the greatest challenges to treatment providers. The person-oriented research described here should prove to be a valuable addition to the more traditional variable-oriented research on psychopathy (7). For example, high PCL-R scores

in combination with sexual deviance are predictive of sexual offending (56). It would be interesting to determine how sexual deviance interacts with the latent profiles described here, with sexual recidivism, as well as with treatment outcome and violence.

FUTURE RESEARCH

The use of file-only ratings for the PCL-R assessment likely truncated the range of scores. Similarly, the use of official records as the sole outcome measure of offense recidivism presumably underestimated the actual rate of reoffending. Accordingly, future research should replicate the current results using the standard procedure (i.e., semi-structured interview, file, and collateral information).

The fact that the psychopathic cluster (arguably the most interesting one) consisted of only 15 individuals (7% of the sample) may raise concerns about the stability of the findings and the likelihood of replication in a new sample. However, a similar profile has been identified in very large samples from both the US and Sweden (5, 7, 44).

Even though the LPA model with four latent classes was replicated in different male offender samples (e.g., violent offenders, sex offenders), psychiatric samples, and samples from different countries (North America, United Kingdom, Netherlands, Germany, Sweden), and validated using different criterion variables (e.g., offense behavior, recidivism risk, criminogenic needs), future research should extend the cross-cultural and validation research using the full PCL-R distribution.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of the ethics committee of the Charité-Universitätsmedizin Berlin Campus Benjamin Franklin. Data collection and analyses were file-based in retrospect. The protocol was approved by Charité-Universitätsmedizin Berlin.

AUTHOR CONTRIBUTIONS

All authors have contributed to the manuscript and agreed to authorship in the indicated order.

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Conflict of Interest Statement: RDH receives royalties from the sale of the PCL-R and its derivatives, and income from PCL-R training workshops. AM receives royalties from the sale of the German PCL-R version, and income from PCL-R training workshops.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Let's Work Together — Occupational Factors and Their Correlates to Prison Climate and Inmates' Attitudes Towards Treatment

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The role of psychosocial and structural occupational factors in mental health service provision has broadly been researched. However, less is known about the influence of employees' occupational factors on inmates in correctional treatment settings that mostly seek to apply a milieu-therapeutic approach. Therefore, the present study investigated the relationships between occupational factors (job satisfaction, self-efficacy, and the functionality of the organizational structure) and prison climate, the number of staff members' sick days as well as inmates' treatment motivation. Employees (n = 76) of three different correctional treatment units in Berlin, Germany, rated several occupational factors as well as prison climate. At the same time, treatment motivation of n = 232 inmates was assessed. Results showed that higher ratings of prison climate were associated with higher levels of team climate, job satisfaction and the functionality of the organizational structure, but not with self-efficacy and sick days. There was no significant relationship between occupational factors and the perceived safety on the treatment unit. Inmates' treatment motivation was correlated with all aggregated occupational factors and with average sick days of staff members. Outcomes of this study strongly emphasize the importance of a positive social climate in correctional treatment units for occupational factors of prison staff but also positive treatment outcomes for inmates. Also, in the light of these results, consequences for daily work routine and organizational structure of prisons are discussed.

Keywords: occupational factors, prison staff, job satisfaction, team climate, prison climate, sick days, offender treatment, treatment motivation

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INTRODUCTION

In prisons, genuinely multi-disciplinary and challenging working environments, occupational factors have only been given scarce scientific attention in the last decades. Studies on this subject reported low levels of job satisfaction to have a significant effect on negative work outcomes such as reduced work inclusion (1), turnover intent and actual staff turnover (2–6) and also on absenteeism (7–9). More recently, depersonalization which is one of the indicators of burnout syndrome, has been linked with increased turnover intent and absenteeism among prison staff (10). Thus, job strain

that is perceived to be impossible to cope with increases the risk of certain psychological burden syndromes such as burnout (10).

In their meta-analysis, Dowden and Tellier (11) examined the predictors of work-related stress in correctional officers. The authors demonstrated that perceived safety of the workplace and role difficulties, as well as attitudes to work, were strongly related to stress. Also, both positive and punitive attitudes towards inmates were moderately related to stress at work. Nonetheless, Waters (12) found that positive correctional work settings that underline involvement, coworker cohesion and administrative support, could have supportive effects and reduce correctional officers experienced stress levels. In this respect, self-efficacy as the personal judgement of "how well one can execute courses of action required to deal with prospective situations" (13) plays an important role. Promising findings on self-efficacy and health outcomes in prison staff reveal that high levels of dispositional optimism, self-esteem, self-efficacy and perceived social support significantly enhance health in prison staff (14).

In any case, absenteeism and staff turnover are additionally financially expensive for correctional organizations (15). Furthermore, as missing staff is enlarging the staff–inmate ratio, the quality of professional staff–inmate relationships and of social climate on prison wards can hardly remain unaffected.

Very little is known about the relationship between social climate in prison and occupational factors. To our knowledge, only two studies have investigated this relationship. Moos and Schaefer (16) found improved job performance to be associated with positive climate ratings. Røssberg and Friis (17) found that positive ratings of climate were associated with higher ratings of staff satisfaction.

Occupational Factors and Their Impact on Offender Treatment

Only few studies have investigated the impact of occupational factors on inmates in correctional settings. Most of the existing studies focused on job satisfaction as an occupational factor. Thus, job satisfaction was associated with inmates perceiving less danger of sexual assault (18), a higher support for a human-service orientation among correctional security staff (19), and a more positive view of inmates and an affirmative attitude towards rehabilitation (20). Similarly, job satisfaction was also found to be negatively associated with a punitive orientation towards inmates (21). In general, the literature suggests that higher job satisfaction of staff is related to positive work outcomes which could benefit both staff and inmates through better staff–inmate relations (22), as well as improving correctional standards and conditions (23).

However, to our knowledge, no study has yet addressed the impact of further occupational factors (e.g. team climate, self-efficacy or the functionality of the organizational structure) on inmate related work outcomes. However, in organizational psychology literature team climate has been linked to many positive work outcomes such as superior clinical care in diabetes, more positive patient evaluations of practice and self-reported innovation and effectiveness (24; for a review on health care team effectiveness and its link to team climate see 25). Also, self-efficacy has been given more and more attention as it has been found to be associated with positive work outcomes as well (for a meta-analysis on self-efficacy and work-related performance see 26).

Research Aims and Hypotheses

This research focuses on how occupational factors among prison employees are associated with prison climate and inmates' attitudes towards correctional treatment. It was hypothesized that staff members' ratings on prison climate are correlated with occupational factors such as team climate, job satisfaction, self-efficacy and the functionality of the organizational structure. Furthermore, it was assumed that occupational factors are correlated with the number of staff members' sick days. Finally, it was presumed that occupational factors as well as correctional officers' number of sick days are correlated with inmates' attitudes towards treatment, and thus also with the effectiveness of treatment.

METHODS

Study Design and Procedure

On behalf of the Senate Administration for Justice and Consumer Protection, the Institute for Forensic Psychiatry of the Charité evaluates all treatment facilities for persons, who committed offences, located in Berlin prisons. The current study is part of this on-going evaluation.

According to the research question, all three treatment facilities for male individuals were included in the study. Prison-based treatment in Germany is predominantly provided in social-therapeutic facilities. The majority of these, including those located in the state of Berlin, follow a milieu-therapeutic approach (27). Another treatment facility required by law is to be found in the area of high-risk offenders. So-called preventive detention refers to a (potentially infinite) confinement practice of a selection of very high-risk sexual and violent offenders following a multi-year prison sentence and previous convictions. After several legislative changes, preventive detention is now focusing on psychosocial therapeutic treatment and support, which are similar to the treatment programs in social-therapeutic facilities. The preventive detention unit, the male as well as the adolescent social-therapeutic facilities in Berlin are located in separate units within prison. Thus, inmates can use the infrastructure (e.g. work and school) of the prison.

Data was collected between 2014 and 2016. The survey of staff members took place in semi-structured interviews, which lasted between one and a half and two hours and included open questions (not part of this study) as well as various questionnaires. Participation was voluntary; staff members who agreed to participate gave written informed consent. All psychologists/social workers of the facilities were asked to participate (participation rate: 54.2%). As for correctional

officers, in a first step for economic reasons one third was randomly selected to be invited to participate in the interview in the social-therapeutic facility for male adult offenders and in the social-therapeutic facility for male adolescents. One hundred percent of those who agreed to take part and an additional number of n = 12 volunteered to be interviewed. In the preventive detention unit, a quota sample was taken by computer-aided random sampling, taking gender into account (female: 29.6%), and including 50% (n = 27) of the correctional officers. This resulted in an overall participation rate of rate: 47.0%.

The aim of the evaluation was to complete a full survey of all persons treated in a facility of the Berlin prisons. Thus, all inmates that were present at the facilities between 2014 and 2016 were asked to participate in a semi-structured interview, which lasted between two and three hours and included open questions (not part of this study) as well as various questionnaires. Participation was voluntary. After detailed information on the aim and procedure of the study by a member of the research group, persons who agreed to participate gave written informed consent. Each participant received a financial compensation of 15€. The overall participation rate was 86.6% (social-therapeutic facility for adult male offenders: 88.0%, n = 125 of 142; social-therapeutic facility for adolescent offenders: 96.1%, n = 74 of 77; preventive detention unit: 78.6%, n = 33 of 42).

Participants

The overall staff sample consisted of 63 correctional officers and 13 psychologists/social workers (n = 76). Specifically, the sample was composed of 20 correctional officers and seven psychologists/social workers of the social-therapeutic facility for adult male offenders (age: M = 49.4 years; SD = 8.23; *Min–Max* = 34–59), 16 correctional officers and four psychologists/social workers of the social-therapeutic facility for adolescent offenders (age: M = 47.7 years; SD = 7.80; *Min–Max* = 37–59) and 27 correctional officers and two psychologists of the preventive detention unit (age M = 46.4 years; SD = 8.94; *Min–Max* = 30–57).

The overall offender sample consisted of n = 232 individuals. Largest subsamples were collected from the social-therapeutic facility for male adult offenders (n = 125; age: M = 41.4 years; SD = 10.8; *Min–Max* = 22–67; treatment duration: M = 24.7 months; SD = 24.3; *Min–Max* = 0-142; prior criminal record = 73.9%) and male adolescent offenders (n = 74; age: M = 19.9 years; SD = 1.8; *Min–Max* = 16–23; treatment duration: M = 11.8 months; SD = 10.6; *Min–Max* = 0–47; prior criminal record = 98.2%), whereas a smaller group was collected from the facility for offenders under preventive detention (n = 33; age: M = 40.1 years; SD = 9.7; *Min–Max* = 36–74; treatment duration: M = 58.4 months; SD = 36.9; *Min–Max* = 6–179; prior criminal record = 100%). Convicted for violent offenses (homicide, aggravated assault, battery, and robbery) were n = 111 persons (47.8%), 57 persons (24.6%) for rape, 53 persons (22.7%) for sexual abuse of children, and 11 persons (4.8%) for other offenses such as aggravated theft. Persons with a concurrent conviction for a sexual and a violent offense were categorized as sexual offenders.

Measures

Except for the measure to assess prison climate, the questionnaires used have been designed and validated for other occupational groups (e.g., nurses). Therefore, it was partly necessary to adapt and reformulate items for the prison context. In addition, the questionnaires were partially shortened to save time and resources. The selection of the items was based on empirical (e.g., highest factor loadings) and conceptual considerations (e.g., appropriateness for prison context). The questionnaires are available upon request.

Staff Members' Ratings

Prison Climate

The perception of prison climate was measured by the Essen Climate Evaluation Scheme – Prison Version (EssenCES; 28). The questionnaire entails 17 items that are answered on a 5-point Likert scale, from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate more favorable levels of prison climate. Except for two filler items, the 15 items can be divided into three subscales with five items each: a) *therapeutic hold*, b) *inmates' cohesion,* and c) *perceived safety*. The EssenCES has robust psychometrics (Cronbach's α ranged from .76 to .85 in theGerman norm sample; 29) and showed meaningful associations with a positive working environment, institutional aggression, and site security (29).

Team Climate

The Team Climate Inventory (TCI; 30, 31) is a psychometric questionnaire for measuring work atmosphere in groups. The questionnaire consists of 44 items that are assigned to four subscales (*vision, task orientation, safety, and support for innovation*) and a check scale for socially desirable response behavior. The items are answered on a 5-point scale, from 1 (strongly disagree) to 5 (strongly agree). For the present study, the TCI was shortened down to 15 items, which cover three subscales (1) *safety* (5 items), (2) *vision* (7 items), and (3) *task orientation* (3 items). The total score indicates an overall level of team climate, with higher ratings referring to a better team climate as perceived by staff. Previous research on the TCI suggested that higher levels of team climate were associated with reduced intentions to leave and turnover in hospital staff (32). The shortened version of the questionnaire has shown excellent internal consistency in the current sample as indicated by by Cronbach's α = 0.93.

Job Satisfaction

To gather data on job satisfaction an unpublished adaption derived from the Job Descriptive Index (JDI; 33) and the SAZ (Skala zur Erfassung der Arbeitszufriedenheit; 34, 35) was used. The developed *job satisfaction* scale entails 8 items concerning satisfaction with colleagues, supervisor, work task, working conditions, organization, management, work load and opportunities. The items are answered on a 5-point-Likert scale, from 1 (completely unsatisfied) to 5 (completely satisfied). Higher scores indicate higher levels of job satisfaction. The adapted version of the questionnaire has

shown good internal consistency as indicated by Cronbach's α = .85.

Self-Efficacy

Two unpublished versions (for teachers and nursing staff) of the general self-efficacy scale (SWE; 36) were adopted for use in social-therapeutic facilities. The 5 items of the questionnaire assess self-efficacy of staff in dealing with difficult and suspicious inmates. Each item is answered on a 4-point scale, from 1 (strongly disagree) to 4 (strongly agree). The total score indicates an individual level of self-efficacy. Higher scores indicate higher levels of perceived self-efficacy. The adapted version of the questionnaire has shown poor internal consistency in the current sample as indicated by Cronbach's α = .58. Thus, it is still above the threshold for rejection (Cronbach's α < .50; 37) and has demonstrated a high level of content validity assessed by expert opinion.

Functionality of the Organizational Structure

Since no suitable questionnaire for recording the functionality of the organizational structure was available prior to this project survey, the main points in this area were extracted from interviews with practitioners and experts in the field. To assess relevant aspects of the organizational structure, staff members were asked to grade eight aspects of their organization and working team: (1) professionalism, (2) specialist qualification, (3) commitment and motivation, (4) cooperation between officers and psychologists/social workers, (5) recognition of the officers work by psychologists/social workers or vice versa, (6) respect for the work of the treatment unit by the staff of regular prison units, (7) support and encouragement by the management within the treatment unit, (8) flow of information by the management of the treatment unit. Grades ranged from 1 (very good) to 5 (insufficient), an average grade was calculated. For better illustration, the eight questions were mapped in the form of a target, with the best grade in the middle and the worst at the edge of the target. The newly developed questionnaire has shown acceptable internal consistency as indicated by Cronbach's α = .76.

Sick Days

The number of days of absence due to sickness per employee per year (*sick days*) were anonymously obtained by the head office.

Offenders' Ratings

Attitudes Towards Treatment

Negative attitudes towards treatment were measured by the Therapiebezogene Einstellungen [attitudes towards treatment]-Short-Version (TBE-SV; 38; 39). The TBE-SV consists of 24 items, which can be divided into 5 subscales. Each item is answered on a 4-point Likert scale, from 1 (I do not agree) to 4 (I do agree). The first subscale, (I) *trust in therapy*, measures general beliefs about the helpfulness of treatment. This is the only subscale with positive encoding, i.e. higher scores indicate a positive attitude. The four remaining scales are reverse coded, i.e. higher scores indicate negative attitudes towards treatment. (II) *Mistrust in mental health professionals* measures resentments and suspicions about therapeutic staff. (III) *Therapy restraint* measures the level of aversive attitudes towards one's own treatment. (IV) *Fear of stigmatization* measures feelings of shame about looking for help from therapeutic staff, and (V) *fear of self-disclosure* measures hesitations about opening up to others in a therapeutic context. A total score can be computed with the formula (*30 – subscale I*) + (*II+III+IV+V*) and indicates an overall level of *therapy resistance* (high values indicate high resistance against therapy). Dahle (39) reported acceptable internal consistencies as indicated by Cronbach's α, ranging from .68 to .81 for the subscales. The readiness to enter a subsequent treatment offer could be predicted by the total score (39). Offenders' *therapy resistance* was negatively associated with perceived prison climate, $r = -.28$ (40).

Statistical Analyses

Statistical analyses were performed with SPSS 20.0 for Windows (41). Bonferroni-corrections were applied to all tests. Due to the exploratory character of the study and no clearly directed hypotheses, correlation analyses have been favored to assess the relationship between the variables in question. Pearson Correlations were calculated between the individual occupational factors and individual prison climate ratings from staff members. Pearson Correlations were also calculated for the occupational factors and sick days. Next, data from staff members' ratings (but not offenders' ratings) were aggregated by calculating means individually for each treatment unit. These means were then transferred to offenders' rating by assigning means from one facility to offenders' ratings from that specific treatment unit. This operation makes it possible to correlate means of staff members' ratings with individual offenders' ratings on prison climate as well as their therapy resistance measured by the TBE-SV. Theoretically this is based on Kozlowski and Klein (42) who stated that "a phenomenon is emergent when it originated in the cognition, affect, behaviours, or other characteristic of individuals, is amplified by their interactions, and manifests as a higher-level, collective phenomenon." According to them, through the process of emergence originally individual phenomena become so-called "shared unit properties" which are identified as properties of an organization. Occupational factors in our study can be seen as these so-called shared unit properties. Thus, aggregation of the data can be justified on a statistical level: Aggregation of data is verified if members of a group are consistent in their perceptions of a phenomenon (43). Therefore, intraclass-correlations (ICC) were calculated to check for consistency of the data. There is no strict standard on ICC-values that verify aggregation of data (44). However, values above an ICC ≥ .60 indicate good agreement in clinical settings and was therefore set as cut-off (45). All occupational factors satisfied this criterion, ICCs were as follows: Team Climate (ICC = .91), Job Satisfaction (ICC = .82), Self-Efficacy (ICC = .61), F-O-Structure (ICC = .78). Aggregation is verified, if the F-value in a variance analysis is statistically significant, which means that the variance between the groups is bigger than within the group (46). For all occupational factors this was the case except for self-efficacy. A

possible explanation was that self-efficacy refers to individual rather than group-targeted construct. However, as indicated above Self-Efficacy still has a good ICC, which is why we decided to include it for further calculations (42, 45). Descriptions of staff members' ratings are displayed in **Table 1** individually for each treatment unit. Lastly, Pearson's Correlations were calculated between aggregated occupational factors and individual offenders' ratings, as well as between individual staff members' ratings. Data were normally distributed as indicated by the Shapiro-Wilk test (results ranging from $W = .97$ to .95; $p > .05$); therefore Pearson's Correlations are justified. Missing data were dealt with by pairwise deletion. For all tests, alpha level was set at $p < .05$.

RESULTS

Occupational Factors and Their Correlations to Prison Climate

Team climate and the *functionality of the organizational structure* correlated significantly with the subscales *therapeutic hold* and *inmates' cohesion* of the EssenCES with correlation coefficients ranging from .31 to .52. *Job satisfaction* correlated positively with *inmates' cohesion* ($r(74) = .24$, $p < .05$), *self-efficacy* with *therapeutic hold* ($r(74) = .34$, $p < .01$). There was no correlation between occupational factors and the subscale *perceived safety* of the EssenCES, neither was there a correlation between *sick days* and overall *prison climate* ratings according the EssenCES. Results are fully presented in **Tables 1** and **2**.

TABLE 1 | Psychometric Measures for Staff Members (n = 76) and Inmates (n = 232).

	M	*SD*	*Min*	*Max*
Staff members' rating from social-therapeutic treatment unit for adults (n=27)				
Team Climate	56.41	9.56	37.00	75.00
Job Satisfaction	26.26	5.80	14.00	36.00
Self-Efficacy	15.48	1.83	13.00	20.00
F-O-Structure	22.80	4.86	13.00	31.00
Sick Days	50.70	–	–	–
Staff members' rating from social-therapeutic treatment unit for adolescents (n=20)				
Team Climate	52.25	6.57	41.00	64.00
Job Satisfaction	25.40	4.02	19.00	33.00
Self-Efficacy	14.75	1.80	11.00	18.00
F-O-Structure	23.79	4.74	16.00	30.00
Sick Days	69.65	–	–	–
Staff members' rating from treatment unit for inmates under preventive detention (n=29)				
Team Climate	57.39	7.60	38.00	67.00
Job Satisfaction	29.79	4.48	14.00	35.00
Self-Efficacy	14.17	2.02	11.00	20.00
F-O-Structure	23.29	4.85	16.00	36.00
Sick Days	23.50	–	–	–
Inmates from all facilities (n=232)				
SUM: therapy resistance	60.15	11.46	33.00	97.25
(1) Trust in Therapy	15.74	2.91	5.00	20.00
(2) Mistrust in Mental Health Professionals	11.19	3.21	5.00	20.00
(3) Restraint to Therapy	11.18	3.25	5.00	20.00
(4) Fear of Stigmatization	11.47	2.47	5.00	18.00
(5) Fear of Disclosure	12.04	3.34	5.00	20.00

F-O-Structure, Functionality of the organizational structure.

Occupational Factors and Their Correlations to the Number of Sick Days

No correlations were found between *team climate*, *self-efficacy*, *functionality of the organizational structure* and *sick days*. However, a correlation of $r(74) = -.36$, $p < .001$) was found between *sick days* and *job satisfaction* (see **Table 2**).

Occupational Factors and Their Correlations to Inmates' Attitudes Towards Treatment

Bivariate correlations were also calculated for aggregated *occupational factors*, *sick days* and individual *therapy resistance (attitudes towards treatment)* ratings from inmates (see **Tables 1** and **3**). The results are quite similar to the staff members' ratings. *Team climate* and the *functionality of the organizational structure* correlated significantly with all subscales and consequently with the sum of the *therapy resistance* questionnaire completed by inmates, demonstrating that positive *team climate* was associated with lower *therapy resistance* (notice: subscale (I) is reversed poled: higher ratings indicate a higher trust in therapy). The same applies to the *functionality of the organizational structure*. A poor marking by staff members is related to higher *therapy resistance* on inmates' side. *Job satisfaction* and *self-efficacy* show a similar trend even though a significant correlation was not found in all subscales. Thus, *job satisfaction* correlated with *fear of stigmatization* ($r(230) = -.14$, $p < .05$) and *fear of disclosure* ($r(230) = -.15$, $p < .05$) and *self-efficacy* with *mistrust in therapists* ($r(230) = -.15$, $p < .05$) and *fear of disclosure* ($r(230) = -.18$, $p < .01$).

Quite different from staff members' perceived *prison climate* there was a highly significant correlation between the number of sick days from staff members and inmates' quoted *therapy resistance* ($r(230) = .26$, $p < .01$). A high number of sick days on staff members' side was connected to all of the subscales of *therapy resistance* (see **Table 3**).

DISCUSSION

The study aimed at investigating the impact of occupational factors on prison climate and inmates' attitudes towards treatment. Reports of a good team climate and a functional organizational structure correlated significantly with perceived therapeutic hold and inmates' cohesion which indicates a connection between system variables and positive treatment factors. Accordingly, measures to improve team climate and working relationships are not only an investment in the organizational culture itself but also indirectly in therapeutic factors, and insofar have an impact on inmates as well. In other words, a positive intra- and inter-group climate could function as a crucial resource for

TABLE 2 | Pearson Correlations between Occupational Factors as well as the number of sick days from Staff Members and their Prison Climate ratings *(n = 76)*.

Occupational Factors	Prison Climate measured by the EssenCES				Number of Sick Days
	Sum	***Perceived Safety***	***Therapeutic Hold***	***Inmates' Cohesion***	
Team Climate	.53**	.20	.43**	.52**	–.17
Job Satisfaction	.23*	.07	.19	.24*	–.36***
Self-Efficacy	.13	–.13	.34**	.17	–.04
F-O-Structure	–.37**	–.16	–.33**	–.31**	–.16
Sick Days	–.05	–.01	.04	–.16	1

*F-O-Structure, Functionality of the organizational structure. * p < .05, ** p < .01, *** p < .001.*

TABLE 3 | Pearson Correlations between aggregated Occupational Factors and Sick Days with individual Attitudes Towards Treatment ratings from Inmates *(n = 232)*.

Occupational Factors	Attitudes towards treatment (TBE-SV)					
	SUM	***(I)***	***(II)***	***(III)***	***(IV)***	***(V)***
Team Climate	–.33**	.17*	–.24**	–.26**	–.24**	–.32**
Job Satisfaction	–.17*	.12	–.12	–.12	–.14*	–.15*
Self-Efficacy	–.16*	.04	–.13	–.15*	–.10	–.18**
F-O-Structure	.33**	–.16*	.24**	.27**	.24**	.33**
Sick Days	.26**	–.15*	.18**	.19**	.19**	.24**

*F-O-Structure, Functionality of the organizational structure. *p < .05, **p < .01, ***p < .001.*
SUM = therapy resistance: (I) trust in therapy; (II) therapy restraint; (III) mistrust in therapists; (IV) fear of stigmatisation; (V) fear of self-disclosure.

correctional settings as a milieu-therapeutic community (e.g. exemplary function). Moreover, the organizational structure seems to play an important role: Feeling adequately informed and valued by the leaders, feeling well qualified for their work, receiving regular training that meets the needs as well as a respectful cross-professional collaboration, was positively related to prison climate on treatment units.

In accordance with the aforementioned findings, personal job satisfaction correlated with inmates' cohesion. Previous studies showed that job satisfaction was related to a more positive view of inmates (20), a less punitive orientation towards inmates (21) and inmates perceiving less danger of sexual assault (18). Different from previous findings, there was no connection with the therapeutic hold (20). However, self-efficacy was linked to therapeutic hold.

An intriguing result is that none of the occupational factors correlated with the perceived safety on prison units. An explanation could be that persons who are willing to work in a prison are aware of potential risks. When completing the questions about their perceived safety, this could lead to a lower overall level of sensitivity. It is also conceivable, however, that for the same reason for this group of people, safety aspects might not influence work-related questions.

Surprisingly, there was no significant connection between the number of staff members' sick days and their perception of prison climate on the units at all. Nevertheless, the number of sick days negatively correlated highly with staff members' job satisfaction in general. Perhaps this may indicate that a retreat in sick days in uncomfortable situations at work is more contingent on personality traits and/or experienced stress (7, 11) than on the general climate on the prison unit. Thus, recruitment procedures should take that into account, especially because staff turnover is very costly for correctional organizations (15). Hence, further investigation of the reasons for absenteeism in prison is warranted.

As presumed, a positive team climate and a functional organizational structure as described above were not only positively connected with prison climate but also with inmates' attitudes towards treatment. When prison staff feel adequately informed and valued by the leadership, well qualified for their work, trained regularly according to their needs, and respected within the cross-professional collaboration, inmates seem to be able to trust in therapy and show less therapy restraint. Similar to the above findings, job satisfaction was connected with the atmosphere on the unit. Thus, there was no correlation with therapeutic variables but with the fear of being stigmatized and personal information being disclosed by others. Likewise, staffs self-efficacy as a personal construct was connected with inmates' lower restraint to therapy and fear of disclosure but not with inmates' general beliefs in therapy. It is assumable that self-efficacy of staff delivering treatment influences a specific therapeutic relationship but not an overall attitude towards treatment. Further research is needed to investigate these differences. Nevertheless, overall ratings of therapy resistance showed significant correlations with both job satisfaction and self-efficacy.

A result of particular importance was the overall correlation between the number of staff members' sick days and inmates' attitudes towards treatment. A higher number was connected with less trust in therapy, higher mistrust in mental health professionals, higher restraint to therapy, higher fear of stigmatization, and disclosure. A high number of sick days causes mistrust, which might lead to a treatment attrition (47). It can be assumed that inmates feel left behind and surrendered.

While team climate, self-efficacy, and the functionality of the organizational structure seem not to be associated with sick days, first indications of sick days being caused by job dissatisfaction could be identified. It has already been shown that job absenteeism can be caused by job stress (7). In turn, job stress is caused by perceived dangerousness, role difficulties, and favorable as much as unfavorable attitudes towards inmates (11). Therefore, by realizing a milieu-therapeutic approach it might be advisable to take staff members' attitudes towards inmates into account. A fundament for this could be team and case supervision on a regular basis to build awareness of staff members' favorable and unfavorable attitudes towards inmates.

There are several limitations in the current study. The self-efficacy questionnaire, which was adapted to the prison context, has shown questionable internal consistency. Therefore, results involving the self-efficacy questionnaire have to be interpreted very carefully. In future studies the adaption of the original scale has to be further investigated in order to improve psychometric measures. Since it was a partial analysis of an on-going evaluation project of correctional facilities, most of the participants in this study are still in detention. Thus, we could not test the long-term effect of occupational factors and inmates' attitudes towards treatment on long-term outcomes such as recidivism. The sample itself is relatively heterogeneous regarding their age and offense types since they are from three different correctional facilities. Also, larger sample sizes and non-selective staff samples need to be investigated in order to confirm the results. Most of all the correlations can only show an interdependence between variables. Longitudinal studies are needed to investigate the direction of the linear correlations. Only then, more elaborate practical implementations can be deducted from the results.

Nonetheless, the present study could show that occupational factors can be linked to prison climate and inmates' attitudes towards treatment. Therefore, creating a good working environment may not only support the employees of a prison but also create a constructive therapeutic setting, which can provide a continuous support for persons in detention. The study was an attempt to contribute to these clearly under-researched issues. The results indicated that occupational factors need further investigations not only for the sake of the prison staff but also for the sake of treatment outcomes. Future research should focus more on establishing programs to promote a positive team climate, increased job satisfaction, and self-efficacy. Furthermore, the hierarchical structure of prisons and its effects on working variables should be addressed in future research when investigating treatment outcomes.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of the Senate for Justice, Consumer Protection and Anti-Discrimination of Berlin, Germany with written informed consent from all subjects. All subjects gave written informed consent in accordance with the Declaration of Helsinki. The protocol was approved by the Official Data Protection Officer of Charité - Universitätsmedizin Berlin. Ethical approval for the study was sought and granted by the Ethics Committee of Charité - Universitätsmedizin Berlin (EA4/131/18).

AUTHOR CONTRIBUTIONS

JS and JV conceived of the present idea, developed the theory, performed the computations, and wrote the first draft of the manuscript. KS wrote sections of the manuscript. KS, JH, and K-PD verified the analytical methods. K-PD supervised the project. All authors discussed the results and contributed to the final manuscript.

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Violent Behavior During Psychiatric Inpatient Treatment in a German Prison Hospital

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Violent behavior in correctional facilities is common and differs substantially in type, target, implication, and trigger. Research on frequency and characteristics of violent behavior in correctional facilities and psychiatric hospitals is limited. Results from recent research suggest that comorbidity of severe mental disorder, personality disorder, and diagnosis of substance abuse is related to a higher risk of violent behavior. In the Berlin prison hospital, a database was created to collect data from all violent incidences (n=210) between 1997 and 2006 and between 2010 and 2016. In a retrospective, case-control study, we analyzed specific socioeconomic data and psychiatric diagnosis and compared the group of prisoners with violent behavior with randomly selected prisoners of the same department without violent behavior (n = 210). Diagnosis of schizophrenia, non-German nationality, no use of an interpreter, no children, and no previous sentence remained significantly associated with the dependent variable violent behavior. There were no significant differences regarding age and legal statuses. Practical implications for clinical work are discussed.

Keywords: violent behavior, mental disorder, prison hospital, schizophrenia, age

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INTRODUCTION

Violent behavior is a complex phenomenon linked to biological, psychological, and social factors (1), and it constitutes a common problem in mental health care settings, as well as in correctional facilities. Altogether, there is limited evidence on the prevalence of violent behavior in medical and mental health settings and even less evidence for prison environments. Regarding facilities of community-based mental health care, violent behavior was reported in about 2–7% of all admissions in psychiatric hospitals in Germany (2, 3). Recently, Müller *et al.* reported a moderate increase in violent behavior against staff members in psychiatric inpatient settings between 2008 and 2015, with an average increase in violent incidences of 4% per year (4). A recent meta-analysis, including 23.972 hospitalized psychiatric patients, reported that 17% had at least once acted violently during their hospital stay (5). Staggs *et al.* described no changes from 2007 to 2013 regarding the frequency of violent assaults in U.S. American psychiatric wards (6), but reports from other countries are lacking.

The literature suggests a higher risk of violent behavior in individuals suffering from a severe mental disorder (7–9). Results from a prospective cohort study in Finland (1997) including 12.058 unselected individuals born in 1966 revealed an odds ratio of 3.1 for any criminal offense

and an odds ratio of 7.0 for violent offenses in people with schizophrenia (10). Analyzing data of more than 18.000 cases of schizophrenia and other psychosis, Fazel et al. pointed out that the risk for violent behavior was increased compared to the risk of the general population. Furthermore, they described a significant increase in risk for comorbid substance abuse disorder (8). In terms of specific factors for violent behavior in general psychiatry, a history of violent offending, non-adherence to therapy (psychotherapy and/or medication), younger age, male gender, coming from a disadvantaged neighborhood, and recent alcohol misuse were described as risk factors (11) while depressive symptoms and better clinical insight regarding the symptoms were predictors of non-violent behavior (12).

Since the 1960s in Europe and North America, efforts were made to transfer the treatment of individuals suffering from mental disorders from segregated institutions to outpatient treatment facilities placed in the communities. During the last decades, this so-called "deinstitutionalization" was accompanied by a constant reduction of psychiatric beds (13). There is an ongoing discussion of whether the reduction of beds in psychiatric hospitals leads to an increase of severe mentally disordered individuals in prison (14, 15). In a review including 33.588 prisoners in 24 countries, the prevalence of psychotic disorder did not appear to be increasing over time (16). Comparing the level of distress in long- and short-term prisoners in Germany revealed a clinically significant level of depression, paranoid ideation, and psychosis in long-time prisoners (17).

Within the prison system of Berlin, Germany, specialist care is provided for mentally disordered prisoners in the department for psychiatry in the Berlin prison hospital. Admission is possible during every aspect of prisoner life, during remand prison and for the duration of the regular sentence. Typical clinical indications for admission are (exacerbation of) psychosis, suicidal ideation, violent behavior of unclear origin, depression, and adjustment disorders with comorbid personality disorders and substance abuse disorders. Due to the limited size, a waiting list system is implemented to manage the admission process. Also, weekly outpatient treatment is possible directly in the prisons. During the inpatient treatment, a personalized treatment plan includes, e.g., pharmacological treatment and psychotherapy and different options of group therapy including occupational therapy, art therapy, music therapy, addiction therapy, athletic training, and team sports. For severely disordered patients, the possibility of time-limited isolation in specific treatment rooms is available.

In general, in Berlin, male prisoners with a mental disorder are not transferred to a general psychiatric ward outside of the prison system.

If, however, during the trial period, the criminal responsibility of a remand prisoner is found to be diminished, he can be transferred to a forensic psychiatric hospital and, thus, leaves the prison system. Due to regulation through the department of justice, only male prisoners are treated in the department of psychiatry. Female prisoners are treated inside the women prison facility *via* outpatient service or are transferred to a specific forensic psychiatric ward outside of the prison system.

In a current review, the lack of intervention research regarding the prevention of violence in forensic psychiatric settings was identified (18). Regarding prison psychiatry specifically, research on trends and risk factors for violent behavior is rare.

Aims of Our Study

The first aim of our study was to provide a description of frequency, trends, and pattern of violent behavior in patients of a psychiatric ward in a prison hospital. In a second step, we aim to identify possible risk or protective factors regarding violent behavior in patients of the psychiatric ward in the Berlin prison hospital. Furthermore, we were interested in the changes in the incidence of violent behavior during the last decades.

Our hypothesizes were:

Regarding risk factors for violent behavior research suggests that criminal behavior in the past, younger age, and diagnosis of schizophrenia are risk factors for violent behavior (8, 11, 19–21).

1. We hypothesized that patients with violent behavior were young, had more previous prison sentences, and suffered more often from schizophrenia.
   Due to the often discussed "forensification" of psychiatric patients and the relocation of bed capacity between general and forensic psychiatry (13, 22),
2. We assumed a higher level of violent behavior in the patients of the psychiatric ward of the Berlin Prison Hospital in comparison to known rates from psychiatric inpatients in community hospital care.
3. We expected an increase in patients with a diagnosis of schizophrenia during the study period.
4. We expected that violent behavior in the prison hospital increased during the last 20 years.

MATERIAL AND METHODS

As part of the routine documentation in German prisons, specific incidents such as violent behavior are reported through a system called "official message" (German: "Dienstliche Meldung"). After 2007, the Berlin prison hospital was no longer an independent unit, but part of the Prison Plötzensee ("JVA Plötzensee"). Consequently, due to administrative changes, the "official message" system was no longer part of medical documentation. From 2010 onwards, new medical files were employed to record patient data. For our study, "official messages" were used to identify patients with violent behavior on the psychiatric ward of the Berlin prison hospital from 1997 to 2006. From 2010 to 2016, we identified violent patients by evaluating medical records. Although a change of the recording system took place during the study period, the basic principles for the assessment of violent behavior remained unchanged.

Between 1997 and 2006, 1,502 "official messages" were documented by the staff members of the psychiatric ward of the Berlin prison hospital. The "official messages" were categorized as "physical violence," "self-harm," "verbal violence," "damage to property," and "not categorized." The "not categorized" cases applied when patients offended general prison rules, e.g., behaving noisy, using the telephone without permission,

drinking alcohol, or taking drugs. In this study, we only included the cases categorized as "physical violence."

Altogether, we identified 244 incidents of violent behavior during the period examined, committed by 210 individuals. We compared this group with an equal number of patients who did not demonstrate this behavior during their stay. For the comparison group, we selected the first non-violent individual who was admitted subsequently to each violent individual. For all individuals who generated more than one official message because of violent behavior, we chose the non-violent individual who was admitted directly after the first violent episode as a control. For the actual analysis, the following items were ascertained for both groups: year of the violent act, age of the offender, nationality, using a language interpreter, status of imprisonment (remand or sentenced), previous sentences, self-harming behavior, psychiatric diagnoses, and parenthood/existence of children. The variable "using a language interpreter" was rated as positive when a language interpreter had to be ordered into the prison hospital to translate between the patient and the medical personnel. The variable "parenthood/existence of children" was extracted by analyzing the medical files of the patients. The other variables were rated using both the medical and prison files. Diagnoses were coded using the ICD-10 Manual. For the data from 2010 to 2016, we used a data set that was extracted for research purposes from routine data (23). The data for the same items regarding the period from 1997 to 2006 were extracted from medical files.

The proportion of violent patients of all patients admitted was assessed for each year from 1997 to 2006 and 2010 to 2016. We performed hierarchical linear modeling to test for annual fluctuations in our results. Fisher's exact test was applied to detect the significance of differences observed between the groups. The impact of all independent variables on the dependent variable "violent behavior" was calculated using a logistic regression model. The subset of all variables that minimize the AIC (Akaike information criterion) was determined by a stepwise elimination procedure to derive a final model. All tests were based on a significance level of $p < 0.05$. Analyses were performed with the statistical software R, Version 3.5.1. It is important to note that only male prisoners were included in the study.

RESULTS

Table 1 displays the absolute number of patients admitted to the psychiatric ward of the Berlin prison hospital with recorded violent behavior, the number of patients diagnosed with schizophrenia, and the relative share per year. While the percentages of patients with violent behavior in 1997 to 2006 ranged from approximately 4.7 to 9.3%, the percentages of patients exhibiting violent behavior in 2010 to 2016 were subject to more considerable fluctuations (3.2–15.9%). Despite the increase in patients with violent incidences in the last 2 years, test results showed no statistically significant increase over time ($p = 0.1543$), but the number of individuals in the study group diagnosed with schizophrenia increased significantly ($p = 0.0348$) (see **Figure 1**).

The univariate analysis of variables associated with violent behavior demonstrated statistically significant results for the items age, previous sentences, nationality, use of an interpreter, children, and diagnosis of a mental disorder (schizophrenia, substance use disorder, and adjustment disorder). While 71.9% of all patients who had displayed violent behavior had no previous convictions, the same only applied to 40.2% of all patients without recorded violent acts ($p < 0.001$). Having children was also highly significant ($p < 0.001$), whereas 89.5% of patients with violent behavior did not have children. Also, using the services of an interpreter was significantly lower ($p < 0.001$) among patients with violent behavior (5.26%) than in patients without recorded incidences (14.3%). Significantly, more patients with a diagnosis of schizophrenia had displayed violent behavior (68.1 *vs.* 47.6%).

TABLE 1 | Admissions, violent behavior, and diagnosis over time.

Year	Total admissions	Violent behaviorN = 210	% Violent of all admissions/ year	N = diagnosis of schizophrenia	% Diagnosis of schizophrenia of study group/yearN = 420
1997	156	10	6.4	11	7.1
1998	149	13	8.7	13	8.7
1999	162	15	9.3	14	8.6
2000	233	15	6.4	20	8.6
2001	255	12	4.7	18	7.1
2002	241	17	7.1	18	7.5
2003	212	12	5.7	15	7.1
2004	197	17	8.6	17	8.6
2005	159	9	5.7	9	5.7
2006	122	8	6.6	9	7.4
2010	115	5	4.4	7	6.1
2011	122	13	10.7	17	13.9
2012	127	4	3.2	5	3.9
2013	120	7	5.8	11	9.2
2014	118	8	6.8	12	10.2
2015	145	23	15.9	22	15.2
2016	139	22	15.8	25	18.0

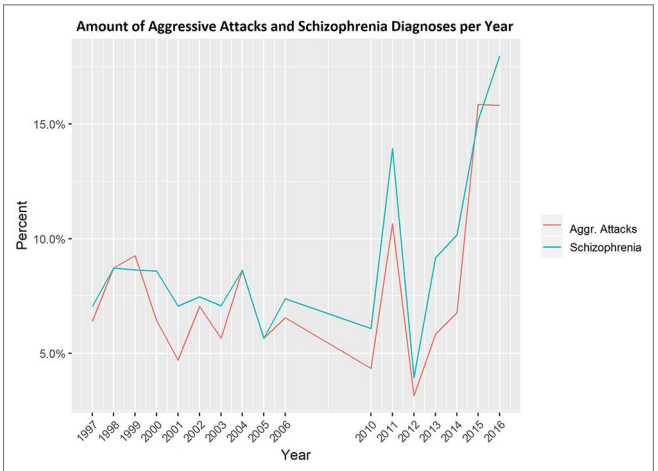

FIGURE 1 | Percentage of admissions of patients with violent behavior per year and of violent patients with schizophrenia per year.

All variables outlined above (**Table 2**), including the patient's age, were entered into a logistic regression model.

After a stepwise selection of variables using the Akaike information criterion, the final model was developed (**Table 3**). In this, the variable diagnosis of schizophrenia, non-German nationality, no use of an interpreter, no children, and no previous sentence remained significantly associated with the dependent variable violent behavior ($p < 0.05$). Note that "age" is not among the independent variables.

DISCUSSION

Our results present a rate for patients that demonstrated violent behavior in a prison hospital that ranged from 3.2 to 15.9%. This rate is in the range of rates reported from psychiatric inpatients in community hospital care (2–4). Regarding trends, there was no statistically significant increase in violent behavior in the last 20 years regarding the psychiatric ward of the Berlin prison hospital. Our findings did not support our hypothesis regarding an increase in violent behavior.

Looking for risk and/or protective factors regarding violent behavior, the main findings of our study are that the group of patients that demonstrated violent behavior in the specific setting of a psychiatric ward of a prison hospital differed statistically significant from the non-violent group regarding diagnoses of schizophrenia, nationality, previous sentences, the existence of children, and the use of an interpreter for communication. Interestingly, after logistic regression, there were no group differences for violent behavior regarding age.

Altogether, our findings suggest a strong relationship between suffering from schizophrenia and the frequency of violent incidents but do not support the hypothesis that violent incidents have increased during the study period or are in total more frequent than in community mental health care.

During the last two decades, there is a lively discussion going on whether changes in the provision of mental health care may lead to marginalization and "forensification" of mentally disordered patients. The process of psychiatric deinstitutionalization has changed the structure of psychiatric care during the study period in Germany, in most European countries and the United States (24). Psychiatric beds in community care were closed, and psychiatric care transferred to community-based outpatient service. This process was accompanied by an increase of placements in forensic psychiatric care (25–27), and this finding revived interest in the validity of the "Penrose hypothesis," which postulates an inverse relationship between the number of psychiatric hospital beds and the size of the prison populations (28). According to Blüml *et al.*, the number of psychiatric beds decreased by 12.6% in Germany between 1993 and 2011, and the prison population increased by 14.8%. Nevertheless, the authors argue that statistical analyses point to a more complicated process and that the "Penrose hypothesis" is a univariate simplification of a complex and multifactorial relationship (29). Our findings of an increase in patients with schizophrenia in the group of violent patients may cautiously support the "Penrose hypothesis."

Due to German law, individuals with mental disorders that committed severe offenses can be admitted directly to forensic psychiatric hospitals instead of prison. It is important to note that bed capacity in forensic psychiatric hospitals increased continuously during our study period (26). Interestingly, in forensic psychiatric hospitals, the literature suggests an increase in violent incidents (21, 22). Maybe, we did not detect a significant increase in violent behavior due to a shift of the most violent subgroup of prisoners with schizophrenia to the care of the local forensic hospital.

Schizophrenia proved to be a statistically significant marker for the patients in the violent group what is in accordance to the international literature on psychosis, substance abuse, and violent behavior (8, 11, 30). Interestingly, rates of violent behavior did not exceed the reported rates from general psychiatry (2–4). Wolf *et al.* recently reported results suggesting that, in specific forensic psychiatric populations, risk factors differ in comparison to general psychiatric populations (31). While in general psychiatric populations, the diagnosis is associated with violent behavior, in forensic psychiatric settings, this is the case regarding gender and previous violent behavior.

There were more patients without a previous sentence in the violent group than in the non-violent group, which contradicted our hypothesis. We hypothesized that there would be a greater percentage of patients with previous

TABLE 2 | Univariate analysis of variables associated with violent behavior.

	Non-violent group N = 210	Violent group N = 210	p-value
Age (mean +/– SD)	33.6 (+/– 10.5)	31.6 (+/– 9.25)	0.041
Self-harming behavior	29 (13.0%)	26 (12.4%)	0.970
Remand status	50 (23.8%)	49 (23.3%)	1,000
Previous sentence:	126 (59.8%)	59 (28.1%)	<0.001
German nationality	133 (63.3%)	109 (51.9%)	0.023
Using an interpreter	30 (14.3%)	11 (5.26%)	0.003
Children	66 (31.4%)	23 (10.5%)	<0.001
Schizophrenia	100 (47.6%)	143 (68.1%)	<0.001
Alcohol- or drug dependency	22 (10.5%)	9 (4.29%)	0.025
Adjustment disorder	51 (24.3%)	25 (11.9%)	0.002

TABLE 3 | Final logistic regression model of variables associated with violent behavior (final model)*.

	Estimate	Std. error	Adjusted OR (95% CI)	P (Wald´s Test)
Schizophrenia*vs*. no schizophrenia	0.775	0.228	2.17 (1.39, 3.4)	<0.001
German nationality *vs*. no German nationality	–0.633	0.23	0.53 (0.33, 0.84)	<0.007
Interpreter *vs*. no interpreter	–1.260	0.416	0.28 (0.13, 0.64)	0.002
Children *vs*. no children	–1.212	0.295	0.3 (0.17, 0.53)	<0.001
Previous sentence *vs*. no previous sentence	–1.313	0.228	0.3 (0.17, 0.53)	<0.001

**AIC value 486.828, McFadden log likelihood 0.188.*

sentences in the violent group than in the non-violent group, due to a potentially higher share of patients with antisocial tendencies in the group of individuals with previous sentences and the findings in the literature that criminal problematic behavior in the past is a risk factor for future behavior (8, 19–21, 31). A possible explanation is that the item "previous sentences" may indicate more individual experience in prison settings and, thus, the "shock" of being imprisoned is not as severe as in the group of "first-timers." It seems understandable that being imprisoned for the first time in combination with a mental disorder is especially traumatizing. After multivariate testing, this item remained statistically significant. As a possible implication for the clinical work, our results suggest that, in a psychiatric prison setting, a detailed medical history should always include the personal criminal record and past experiences with the penal system. To the best of our knowledge, specific studies on this item as a potentially protective factor against violent behavior in prison hospital settings do not exist.

In our sample, most individuals that demonstrated violent behavior had no children of their own, in contrast to the non-violent group. It seems reasonable that the existence of children may be understood as an indirect marker for general social skills such as social competence, the capability of building romantic relationships, and social networking. The international literature on protective factors suggests competencies in these life areas, such as relationships, family, work, and prosocial attitudes (32, 33). Our data supported our hypothesis that the existence of children for an individual may be regarded as a protective factor for violent behavior in a prison hospital setting.

In the violent group, there were significantly more patients of non-German nationality. This variable was significant after logistic regression analyses. Higher incidence of mental disorder, including schizophrenia in migrants, when compared to the resident population, has been reported consistently (34–36). According to current research, reasons for the increased incidence was multifactorial including higher prevalence rates in origin countries, the experience of an elevated level of stress, isolation, exposure to racism, and lower use of medication for psychotic disorders (37–39). In a past analysis regarding the characteristics of psychiatric inpatients in the Berlin prison hospital, there were no hints for an elevated prevalence of psychotic disorders in non-German prisoners (23). The differences in the frequency of violent behavior between German and non-German patients may be attributed to stress-related factors as well as to differences in the acceptance of antipsychotic medication. A limitation of our study regarding the item "mental disorder" was that we did not test for treatment adherence or the specific phase of the psychosis (acute, chronic). The available literature on these topics suggests a relationship between the severity of psychosis and violent or otherwise problematic behavior (11, 12, 40, 41).

Regarding the use of a language interpreter due to the lack of German language skills, this was the case statistically significantly more often in the non-violent group than in the violent group. This result supported our hypothesis that the use of language interpreters could have had a positive influence on violent behavior in our specific patient population. Psychiatric patients with additional deficits in the German language may demonstrate violent behavior more frequently, due to the lack of proper means for communication. The literature on the necessity of a language translator in prison settings concerning problematic behavior is, to our knowledge, minimal (42, 43). The regular interaction through language translators may have positive effects on the patient in the prison environment because; in comparison to the German staff, there is an opportunity for the patient to fully communicate with and through the translator, who is often of the same cultural background.

Regarding the patients in the violent group, it may be possible that the staff was unable to organize interpreters as often or as quick as in the non-violent group, although we did not test for that. Also, maybe due to the initial violent behavior of the patient, a proper appointment with an interpreter was difficult because of specific circumstances (e.g., isolation). Our results suggest a positive influence of language interpreters in a psychiatric prison setting.

International literature suggests that young age is a risk factor for violent behavior in psychiatric patients (44) and the general population. In our prison hospital setting, in the group of violent patients, there were more patients of younger age, but after multivariate analysis, age was not significantly associated with violent behavior. A possible reason for this may be that patients in our prison hospital are less heterogeneous regarding age than in a general psychiatric ward in the community. Still, in our population, patients that showed violent behavior were slightly younger.

Being in remand prison is known to be very stressful for individuals in prison with a significantly higher rate for suicide ideation, self-harm events, and mental distress (45, 46). Our hypothesis that remand prisoners who would be violent more often in our sample did not stand ground after multivariate analysis. In both groups, nearly a fourth of the individuals were remand prisoners. A possible reason could be that patients, once admitted into remand prison, are not always transferred to the prison hospital as soon as possible due to, e.g., lack of capacity. During this critical phase, agitated patients receive treatment in remand prison *via* outpatient psychiatric care and, thus, were not included in our population. It would be interesting to investigate the occurrence of violent behavior in the remand prison system and compare it to the prison hospital and the general prison population. Studies on these issues are missing.

Several limitations must be considered when interpreting our findings. The retrospective design may have led to various biases, such as a variation of the awareness for violent behavior. The fact that reorganization of routine documentation took place during the study period may have caused different rates of reporting violent incidents. Also, our study included only men and excluded women due to the structure of the specific psychiatric ward in the prison hospital in Berlin. Regarding the diagnosis, we did not check for current medication, the severity of symptoms, or the phase of the disorder. Due to incomplete data, we were unable to include the effects of specific personality disorders on violent behavior. High prevalence of personality disorders in prisoners is known, so this could be a focus for future research. Besides, although we covered a rather long time-span of 20 years, the years between 2007 and 2009 were not included due to missing data (see above).

In summary, to the best of our knowledge, this is the first study that explores violent behavior in the setting of a psychiatric ward in a German prison hospital. In our opinion, this is a vital field of research because the professionals in this field are confronted regularly with high-risk populations for violent behavior and because optimization of individual treatment may benefit the long-term outcome for the patient, as well as for the general society. We share the opinion that further research is needed in the area of prison psychiatry, preferably in an international context.

DATA AVAILABILITY STATEMENT

All datasets generated for this study are included in the article/supplementary materials.

ETHICS STATEMENT

According to current legal regulation, the study was approved by the local ethic committee at Charité–Universitätsmedizin Berlin.

AUTHOR CONTRIBUTIONS

PS, AO-W, AV, and NK designed the study. PS, VN, IK, DD, and AO-W collected the data. PS, AO-W, AV, UG, and BN analyzed and interpreted the data. PS, AV, and AO-W wrote the final draft of the manuscript. PS, AO-W, and NK had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of data analysis. All authors have contributed to, read, and approved the final version of the manuscript.

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Foreign National Patients in German Prison Psychiatry

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Introduction: Over the past few years, the share of foreign national prisoners in the European and American justice systems has increased at a disproportionately high rate, yet studies on mental health issues among this diverse group are rare. Recent research suggests a range of factors leading to mental health vulnerability in foreign national prisoners, including language barriers, isolation, cultural misunderstanding, and legal standing. Relevant findings of topic-related studies indicate that under-referral to mental health services due to missed or misinterpreted symptoms is a major risk for foreign national prisoners.

Aims: We aimed to investigate the disparities regarding the percentage of foreign national patients who were treated in high-security hospitals compared to the psychiatric ward of prison hospitals—after adjusting for diagnosis, age, marital status, and substance abuse. We hypothesized that foreign national patients were underrepresented in compulsory, high-security mental health care. We also aimed to explore citizenship-related institutional disparities concerning diagnoses and self-harmful behavior.

Method: From 2010 to 2015, data collected from high-security hospitals in the federal state of Baden-Wurttemberg and the psychiatric ward of a Berlin prison hospital was evaluated by comparing nationality, diagnosis, and self-harm using Fisher's exact test and χ^2-test. The odds ratios for citizenship-related differences in diagnosis and institution of treatment were evaluated by using logistic regression.

Results: Mentally ill foreign national patients were significantly less likely to be treated in high-security hospitals rather than prison hospital psychiatry (adjusted for diagnosis, age at admission, marital status, and substance abuse; adjusted OR = 0.5). Foreign nationals and Germans in prison hospital psychiatry showed no significant disparities in diagnosis; however, in high-security hospitals, foreign nationals were more likely to have been diagnosed with schizophrenia/psychotic or neurotic/stress-related disorders and were less likely to have been diagnosed with personality disorders than German patients. Additionally, foreign nationals were more likely to commit self-harm than Germans in

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prison hospital psychiatry, but significant citizenship-related differences could not be verified in high-security hospital patients.

Conclusion: Treatment conditions of foreign national patients in prison psychiatry must be improved. To achieve this, the psychiatric assessment and (mental) health-related aspects of these patients should be further investigated.

Keywords: prison psychiatry, high security hospital, diminished culpability, compulsory treatment, foreign national prisoners, citizenship

INTRODUCTION

In increasingly multicultural societies, the share of foreign national prisoners has grown at a disproportionately high rate over the past few years. In England and Wales, for example, foreign nationals accounted for approximately 9.4% (1, 2) of the general population and 12% of the overall prison population in 2017 (3). As further illustrated by a UK Prison Service Journal published in 2013, the number of foreign national prisoners increased by 93% between 2000 and 2012, compared to a 24% increase of British nationals (4). In the United States, non-US citizens comprised 7.2% of the general population (5) and over 21% of all federal prisoners in 2016 (excluding persons detained by the US Department of Homeland Security) (6). In Germany, 11.6% of the general population (7) and 30.1% of prisoners were foreign nationals in 2017 (8). Van Kalmthout et al. (9) stated that foreign nationals accounted for more than 20% of all European prisoners and according to the UNODC Handbook of Prisoners with Special Needs (10) and the World Prison Brief (11) foreign prisoners are significantly overrepresented in some non-Western countries as well.

Offenses related to immigration policy seem to partially explain this inequality in the justice system (12, 13), yet disparities in court sentencings for foreign nationals might also be at play (4, 10). Light et al. (14) recently revealed higher incarceration rates and longer sentencing periods for non-US citizens, even after adjusting for race and ethnicity as potential confounding factors.

The rising percentages of foreign nationals in the penal system has raised questions about their health conditions. Multiple sources indicate serious mental health issues among ethnic-minority and immigrant prisoners (15–23). Recent research suggests that the majority of factors leading to mental health vulnerability among prisoners, such as language barriers, isolation, cultural misunderstanding, and legal standing, are even more salient for foreign national prisoners (4, 12, 13, 24–26).

The principles of treatment for mentally ill offenders have been established in the legal systems of many Western countries. Offenders with a certain level of diminished responsibility may be compulsorily admitted to psychiatric care instead of an ordinary sentence, whereas criminally responsible offenders often receive the requisite psychiatric treatment during or prior to serving a prison sentence (27, 28). The German legal system involves a similar means of treating mentally ill offenders (29, 30). An offender with a certain level of diminished responsibility may be sentenced to high-security hospitals by law (§ 63 StGB, § 64 StGB) whereas inpatient mental health care for regular prison inmates is provided by physicians in prison hospitals located on prison premises if accessible (29, 31–33). Regardless, it is well understood that care in prison psychiatric wards is far less intense than that of high-security hospitals (34, 35).

Research in this field suggests that the conditions under which prison psychiatric health care is offered or compulsory treatment is imposed may place certain minority groups at a disadvantage. In their systematic review of 26 studies, Spinney et al. (36) revealed racial disparities in the US justice system, with Black and Hispanic juveniles referred to mental health and substance abuse programs less often than their White counterparts. Steadman et al. (37) found ethnic disparities among referrals to US mental health courts—courts designed "for persons with mental illness that were in part created to divert this population from jail/prison into community treatment" (38)—with non-Whites referred at a lower rate. Forrester et al. (39) stated that foreign nationals in a London prison were under-referred to mental health in-reach teams—originally developed to provide community-equivalent mental health services for prisoners (40, 41)—which raised "questions about the culturally appropriate ways in which they are advertised and delivered".

Recent studies implicate that citizenship-related barriers might be held responsible for treatment disparity: Sen et al. (13) suggested that foreign national prisoners in England and Wales under-accessed mental health care due to factors related to applying for these services, such as a specific residency and prior registration with a general practitioner (26, 42). In the Netherlands, Vinkers et al. (43) pointed out that while compulsory admission to psychiatric hospitals was higher among non-nationals, conditional admission to penitentiaries —which is only offered to patients who are considered compliant —was lower. In Germany, Hoffmann (18) discovered that drug-abusing immigrants were rarely admitted to detoxification therapy in high-security hospitals, presumably due to language barriers. The author partially attributed his findings to the high deportation rate of immigrant offenders charged with violating the legislation on narcotics.

In addition, other studies indicate that missed or misinterpreted symptoms of mental disorders among ethnic-minority, immigrant, and foreign national prisoners might aggravate symptoms and impact self-harmful behavior. By evaluating data from a New York City jail, Kaba et al. (19) showed that Hispanic and Black prisoners with mental disorders remained undiagnosed significantly longer than White prisoners.

Furthermore, non-White prisoners who began receiving mental health services at a later stage were more likely to be compulsorily admitted to solitary confinement which is considered to be associated with committing self-harm (44). In England and Wales, Borrill and Taylor (45) outlined that in 2007, foreign national prisoners accounted for 28% of all self-inflicted deaths, although this population only accounted for 16% of the prison inmates investigated. The authors stated that trauma symptoms had increased the vulnerability to suicide and that these patients had mainly received antipsychotic treatment instead of guideline-based therapy.

AIMS AND HYPOTHESES

In this study, we aimed to identify the institutional disparities regarding the distribution of national and foreign national patients. We hypothesized that foreign national patients were more likely to enter prison hospital psychiatry than high-security hospitals, after adjusting for diagnosis, substance abuse, marital status, and age at admission. Additionally, we suspected that there were citizenship-related disparities concerning diagnosis in both institutions, after adjusting for the same variables. We further hypothesized that significantly more foreign national patients had exhibited self-harmful behavior compared to German patients in prison hospital psychiatry but not in high-security hospitals.

MATERIALS AND METHODS

Data

The dataset for the prison hospital population was sourced from the psychiatric ward of the Berlin prison hospital (JVKB), which is located on prison premises, covering a total of 572 incarcerated males requiring inpatient mental health care between 2010 and 2015. Within the framework of administration, routine data concerning the penal, sociodemographic, and clinical aspects of the prison population were recorded and entered into the hospital database.

Every patient was assigned a unique identification number, which was derived from the prisoner's name and date of birth and subsequently encrypted. Since hospital visitations disrupt regular incarceration, the monitoring of symptoms was inconsistent. Each admission to the psychiatric ward was recorded using a new entry in the database system, potentially including a new diagnosis. We registered multiple admissions in 91 patients, 63 of these patients were admitted twice and 28 of these patients multiple times (the rates of admissions ranging from three to seven times). To prevent overweighting of those who were repeatedly admitted, we cumulated the data. In the 19 cases where the main diagnosis had changed, we considered the last-assigned main diagnosis in our calculations.

Marital status and age always related to the patient's status at initial admission. To estimate the percentage of patients with substance abuse problems, all diagnoses, including secondary diagnoses, given during all admissions of each patient were evaluated. Incidences of self-harm were recorded as a dichotomous variable (self-harm/no self-harm) in each admission. When cumulating data of patients with multiple admissions, we categorized self-harm as positive as soon as it was recorded at least once.

To ensure the validity and reliability of the clinical data assessment tool, all entries (categories, sub-categories, single variables) are explained to all staff members working in the Berlin prison hospital including detailed instructions on the meaning and content of the items. The majority of the collected data is derived from routine data which is also recorded by statutory health insurances.

The dataset for the high-security hospital population was sourced from eight high-security hospitals in the federal state of Baden-Wurttemberg. Routine data concerning the penal, sociodemographic, and clinical characteristics of 1,883 male patients—admitted to high-security hospitals from 2010 to 2015—was entered into a cross-hospital database and subsequently evaluated. Patients who had been transferred from external high-security hospitals or who were on revocation were not taken into consideration, as the actual date of admission was inaccessible. Every patient was assigned a unique identification number, which was derived from the identification numbers of hospital interns. To ensure the merging of data for patients who had changed facilities during treatment and consequently received a new number, we also gathered a combination of birthplace, birthdate, and date of judgment for each patient. After initial admission, data on each patient was consistently maintained and incidences were annually documented. The diagnosis considered in our calculations refers to the last recorded main diagnosis (diagnoses in high-security hospitals are rarely altered). Marital status and age always related to the patient's status at admission. Substance abuse and self-harm were recorded as dichotomous variables (yes/no) and categorized as positive as soon as they were recorded in at least one of the annual entries of the respective patient.

To ensure the validity and reliability of the clinical data assessment tool, all entries (categories, sub-categories, single variables) are explained in a glossary accessible to all forensic therapists working in forensic psychiatric units across the State of Baden-Wurttemberg. The glossary has detailed instructions on the meaning and content of the items, guiding data-managers through otherwise difficult to rate items. This is to make sure that therapists understand the same thing by each variable. The data were entered by the patient's principal therapist, reviewed by the chief medical officers, and anonymized. Thus, no researcher was or has been able to identify individual patients using the dataset. The data was collected and computed in accordance with the WMA declaration of Helsinki.

Methods

For our study, we aimed to compare the most common means of treating mentally ill offenders in Germany. The so-called *Maßregelvollzug* is comparable to high-security hospitals in other western countries and therefore referred to as such. A

further classification into low-, medium- or high-security hospitals is hardly relevant in the German legal system.

To allow for standardized classification, citizenship was used as a distinguishing characteristic. Migration background was not considered, since that information was not accessible for all patients. Patients with current German citizenship were considered nationals, including patients with dual nationality. It should be noted that this approach led to very heterogeneous groups as the patients' former citizenships or the countries of origin were not taken into consideration. Patients with unclear citizenship status (i.e. five in Berlin; 0.9%) were excluded from our calculations, leaving a total number of 567 patients in prison hospital psychiatry and 1,883 patients in high-security hospitals.

Due to individual institution-related regulations, the structure of the data-bases differed considerably. In order to achieve comparability of the investigated variables, the required content was firstly extracted and subsequently inserted in respective overview tables.

The data was then analyzed *via* logistic regression, using the Wald test and the likelihood ratio to determine significance. The crude and adjusted odds ratios were evaluated using a 95% confidence interval. First, we performed logistic regression to identify the odds ratio of mentally ill foreign national patients who would be treated in prison hospital psychiatry rather than in high-security hospitals, after adjusting for diagnosis, age, and marital status at admissions and substance abuse. Additionally, we performed the same analyses on patients with schizophrenia and psychotic disorders, affective mood disorders, and personality disorders.

We then applied similar procedures to investigate significant citizenship-related disparities in diagnosis across both institutions, adjusting for age and marital status at admission, as well as substance abuse. Further, we used χ^2-test to evaluate significant citizenship-related disparities in diagnoses and Fisher's exact test to evaluate significant institutional disparities in percentages of foreign national patients and significant citizenship-related disparities in self-harmful behavior.

Statistical analyses was performed by using R version 3.5.1.

All data was obtained during routine administration and sufficiently anonymized. Approval for the research has been obtained from the local ethics committee at Charité, Berlin University of Medicine.

RESULTS

Table 1 shows the absolute numbers and percentages of German and foreign national patients treated in prison hospital psychiatry and high security hospitals.

Table 2A displays disparities in diagnosis related to the nationalities of patients treated in prison hospital psychiatry. **Table 2B** exhibits the adjusted odds ratios which predict the probability of receiving the respective diagnosis. The type of disorder did not differ significantly between foreign national and German patients in prison hospital psychiatry after adjusting for age at admission, marital status, and substance abuse.

TABLE 1 | Citizenship of patients in high security hospitals and prison hospital psychiatry.

	Prison hospital psychiatry		High security hospitals		*P* (Fisher's exact test)
	n = 567		n = 1,883		<0.001
German	329	(58.0%)	1,449	(77.0%)	
Non-German	238	(42.0%)	434	(23.0%)	

TABLE 2A | Main Diagnoses in prison hospital psychiatry patients.

	German n = 323[1]		Non-German n = 233[1]		*P* (χ^2-test) 0.094
Substance abuse disorders	20	(6.19%)	11	(4.72%)	
Schizophrenia and psychotic disorders	150	(46.4%)	127	(54.5%)	
Affective mood disorders	27	(8.36%)	20	(8.58%)	
Neurotic, stress-related disorders	87	(26.9%)	63	(27.0%)	
Personality disorders	24	(7.43%)	7	(3.00%)	
Other	15	(4.64%)	5	(2.15%)	

[1]*Eleven patients with missing diagnoses were excluded from analyses.*

TABLE 2B | Odds ratios (95% CI) for diagnoses in foreign national patients compared with German patients in prison hospital psychiatry.

Variable	Unadjusted	Adjusted[1]	*P* (Wald test)
Diagnosis, ref. = F1			
Psychotic disorders	1.46 (0.67, 3.18)	1.51 (0.67, 3.38)	0.316
Mood affective disorders	1.28 (0.5, 3.28)	1.22 (0.45, 3.26)	0.699
Neurotic/stress-related disorders	1.25 (0.56, 2.81)	1.01 (0.43, 2.36)	0.981
Personality disorders	0.5 (0.16, 1.55)	0.46 (0.15, 1.49)	0.197
Other	0.58 (0.16, 2.02)	0.57 (0.16, 2.11)	0.404

[1]*Adjusted for age, marital status and substance abuse.*

Table 3A shows the last assigned main diagnosis in foreign national patients compared with German patients treated in high-security hospitals. **Table 3B** illustrates the odds ratios which predict the probability of receiving the respective diagnosis. Foreign national patients were more likely to have been diagnosed with schizophrenia and psychotic disorders (adjusted OR = 2.06), neurotic and stress-related disorders (adjusted OR = 6.06), and less likely with personality disorders (adjusted OR = 0.33) compared to the reference value (substance abuse disorders) than German patients after adjusting for age at admission, marital status, and substance abuse.

Table 4 presents the adjusted odds ratios which predict the probability of receiving mental health care in high-security hospitals rather than prison hospital psychiatry for foreign nationals. After adjusting for diagnosis, age and marital status at admission, and substance abuse, we found that foreign national patients were half as likely (adjusted OR = 0.5, $P < 0.001$) to be

TABLE 3A | Main Diagnoses in high security hospital patients.

	German n = 1,445[1]		Non-German n = 431[1]		*P* (χ^2-test) < 0.001
Substance abuse disorders	872	(60.3%)	230	(53.4%)	
Schizophrenia and psychotic disorders	370	(25.6%)	168	(39.0%)	
Affective mood disorders	29	(2.01%)	8	(1.86%)	
Neurotic, stress-related disorders	2	(0.14%)	5	(1.16%)	
Personality disorders	85	(5.88%)	7	(1.62%)	
Other	87	(6.02%)	13	(3.02%)	

[1]*Seven patients with missing diagnoses were excluded from analyses.*

TABLE 3B | Odds ratios (95% CI) for diagnoses in foreign national patients compared with German patients in high security hospitals.

Variable	Unadjusted	Adjusted[1]	*P* (Wald's test)	*P* (LR-test)
Diagnosis, ref. = F1				< 0.001
Psychotic disorders	1.74 (1.37, 2.19)	2.06 (1.58, 2.7)	< 0.001	
Mood affective disorders	1.06 (0.48, 2.34)	1.02 (0.45, 2.34)	0.956	
Neurotic/stress-related disorders	9.56 (1.84, 49.6)	6.06 (1.11, 33.07)	0.038	
Personality disorders	0.31 (0.14, 0.69)	0.33 (0.15, 0.73)	0.006	
Other	0.58 (0.32, 1.05)	0.66 (0.35, 1.27)	0.216	

[1]*Adjusted for age, marital status, and substance abuse.*

treated in high-security hospitals than in prison hospital psychiatry. Similar results were found for foreign national patients with schizophrenia and psychotic (adjusted OR = 0.57), affective (adjusted OR = 0.18), and personality disorders (adjusted OR = 0.29).

We further discovered that, compared to German patients, a significantly greater number of foreign nationals who were treated in prison hospital psychiatry had committed self-harm (see **Table 5A**, $P < 0.005$); however, no significant disparities related to citizenship were found in high-security hospitals ($p = 0.177$) (see **Table 5B**).

TABLE 4 | Odds ratios (95% CI) for treatment in high security hospitals in foreign national patients compared with German patients.

Variable	Unadjusted	Adjusted[1]	*P* (Wald's test)	*P* (LR-test)
All diagnoses	0.41 (0.34, 0.5)	0.5 (0.39, 0.65)	< 0.001	< 0.001
Psychotic disorders	0.54 (0.4, 0.72)	0.57 (0.41, 0.77)	< 0.001	< 0.001
Mood affective disorders	0.37 (0.14, 0.99)	0.18 (0.05, 0.63)	0.008	0.003
Personality disorders	0.28 (0.09, 0.88)	0.29 (0.09, 0.94)	0.038	0.041

[1]*Adjusted for age, marital status, and substance abuse.*

TABLE 5A | Self-harm in foreign national and German patients in prison hospital psychiatry.

	German patients	Foreign national patients	*P* (Fisher's exact test)
No self-harm	318 (96.7%)	216 (90.8%)	0.005
Self-harm	11 (3.34%)	22 (9.24%)	

TABLE 5B | Self-harm in foreign national and German patients in high security hospitals.

	German patients	Foreign national patients	*P* (Fisher's exact test)
No self-harm	1,398 (96.5%)	425 (97.9%)	0.177
Self-harm	51 (3.52%)	9 (2.07%)	

DISCUSSION

Compared to their share among the general population, foreign nationals are clearly overrepresented in both institutions. In prison hospital psychiatry, foreign nationals accounted for 42% of all patients, which is significantly higher than the average of 33.2% foreign nationals in the Berlin penal system (not including remand prisoners) and 13.6% in the general population, as reported in the reference period (7, 46). In high-security hospitals, however, foreign nationals accounted for 23% of all patients, indicating an underrepresentation compared to the percentage of foreign nationals in the Baden-Wurttemberg penal system (average of 35%) (47), yet an overrepresentation compared to the general population (average of 12.1%), as reported in the reference period (7).

In discussions of the high rates of ethnic minorities, immigrants, or foreign nationals in prison psychiatry compared to community-based mental health care, the factors of deinstitutionalization, culturally influenced behavior patterns, and the drawbacks of migration and deprivation are often referenced (15, 18, 27, 48). Among these groups, access to voluntary psychiatric treatment services is scarce, especially non-acute outpatient services, supposedly owing to culturally influenced perceptions and assessments of psychiatric symptoms, the patient's lack of confidence in the foreign country, insufficient experience in medicating these patients among public healthcare professionals, and the social marginalization experienced by patients (20, 22, 49–52). When "forensification" is present, referring to the failure to adequately treat severely mentally ill patients in general psychiatry, thus resulting in their incarceration and subsequent treatment in forensic psychiatric institutions (53), Leese et al. (21) stated that the consequential "revolving-door" practice might be even more accurate when describing the mental health care received by ethnic-minority patients.

In our study, the clearest disparity in the treatment of mentally ill foreign national patients is related to the institution providing the mental health services. Compared to German patients, we found that foreign nationals were half as

likely to be treated in high-security hospitals rather than in prison hospital psychiatry, after adjusting for diagnosis, age at admission, marital status, and substance abuse (adjusted odds ratio = 0.5). The odds ratios were even lower for foreign nationals with affective mood and personality disorders.

In Germany, referrals to high-security hospitals are based on a psychiatric assessment conducted during the prosecution of a serious crime (28, 31). The treatment setting of patients requiring intensive treatment is therefore primarily bound to the outcome of the court procedure (32, 34, 35). This could imply that foreign nationals commit less serious crimes (e.g. immigration-related offenses), as we did not adjust for this variable due to the limited amount of data available.

Our findings revealed that foreign nationals in prison hospital psychiatry were at a significantly higher risk of committing self-harm than German patients, whereas we observed no significant differences concerning citizenship in high-security hospitals. This gives rise to the assumption that the symptoms of mental disorders displayed by foreign national patients, either before or during trial and also in custody, remain undetected or are susceptible to misinterpretation. Symptoms that are overlooked or misinterpreted could prevent the appropriate referral to mental health care. In a study conducted by Borrill and Taylor (45), the authors evaluated the self-inflicted death of 20 foreign national patients in England and Wales in 2007. Two of the outlined risk factors were difficulties expressing health symptoms due to language barriers and insufficient treatment of trauma patients.

Priebe et al. (22) conducted several surveys evaluating the opinions of healthcare professionals on the current state of health care for migrants across 16 European countries. Eight problem areas were identified, of which five may be easily transferred to the general psychiatric assessment of foreign nationals:

1) Language and
2) Cultural barriers were commonly reported and considered relevant in the misdiagnosing of ethnic-minority patients.
3) Different understandings of illness (and treatment) are considered fundamental to health care. While professionals usually apply a scientific approach, this may diverge greatly from culture-specific approaches to etiopathology.
4) A further issue is the impact of socioeconomic factors including deprivation and traumatic experiences. These factors might greatly influence the formation of (psychiatric) illnesses and, if not recorded in the patient's anamnesis, distort the assessment of symptoms.
5) Lack of trust in staff members was also commonly reported, which impeded patient assessment.

Additionally, mental disorders in patients without previous community-based treatment might remain undetected, as this data is often collected during the first health assessment of prisoners (54, 55).

However, it should also be considered that foreign nationals might be more susceptible to prison circumstances (e.g. elevated risk of isolation, deportation issues), resulting in higher admittance to prison hospital psychiatry and incidences of self-harm (45, 56).

Although there were no significant differences in prison psychiatric diagnosis related to citizenship, after adjusting for marital status, age at admission, and substance abuse, foreign nationals treated in high-security hospitals were more likely to have been diagnosed with neurotic/stress-related disorders (though numbers were very low in general) and schizophrenia/psychotic disorders, yet were less likely to have been diagnosed with personality disorders. Considering the pre-trial assessment, this could imply that ethnic-minority patients might initially be diagnosed with neurotic/stress-related disorders—disorders that are usually not suitable for alternative treatment in high-security hospitals (29)—and schizophrenia/psychotic disorders. Al-Rousan et al. (54) recently pointed out that the mean time intervals between the start of incarceration and the first diagnosis for inmates in Iowa varied broadly depending on the disorder diagnosed. While the mean interval to first diagnosis of psychotic disorders was approximately 14 months, the first diagnoses of depression, PTSD, and personality disorders tended to occur at 26, 21, and 29 months, respectively. It appears that the symptoms of psychotic disorders are more evident and thus they could be less affected by the citizenship-related barriers to assessment.

Some studies have indicated higher levels of psychotic disorders in ethnic, immigrant, or foreign national than in national offenders and associated these disorders with a higher rate of compulsory psychiatry treatment. According to the authors, these discoveries might partly be due to incomplete explorations and understandings of language barriers and cultural knowledge (18, 27, 43, 48, 57–59). In the United States, for example, Perry et al. (27) revealed that African Americans were far more likely to receive psychotic diagnosis and as a consequence, were found not criminally responsible by court. The authors declared that this might have positive effects on the patients' mental health, yet also stated that treatment due to misdiagnosis could be ineffective and stigmatizing.

In Canada, Kirmayer et al. (60) revealed serious deficits in the diagnostics and treatment of ethnic-minority patients, including immigrants and refugees, by applying an expanded version of the DSM-IV Cultural Formulation—a model "assessing cultural identity, cultural explanations of the illness, cultural factors related to the psychosocial environment and levels of functioning, cultural elements of the clinician–patient relationship, and the overall impact of culture on diagnosis and care" [(61), p. 271]. Adeponle et al. (57) demonstrated that, after applying the DSM-IV Cultural Formulation, a substantial percentage of patients initially diagnosed with a psychotic disorder were re-diagnosed with a non-psychotic disorder. As Gara et al. (58) pointed out, misdiagnosis in these patients might worsen treatment response and lower treatment expectations.

The type and severity of disorder diagnosed by a psychiatric expert witness usually plays an essential role when considering high-security hospital treatment for mentally ill offenders (27–29, 31, 43, 48). Research suggests that ethnic-minority patients are susceptible to stereotyping by physicians, psychiatrists, and judges,

which implies that the complexity of their psychiatric assessment might be reduced to prejudiced assumptions about patient adherence to treatment recommendations and to associating signs of mental illness with personality traits rather than actual health disorders (19, 27, 43, 62–65). In a UK study, Mikton and Grounds (63) searched for disparities in the diagnosing of personality disorders by forensic psychiatrists working with different ethnic groups in England and Wales. Their results indicated that antisocial personality disorder was less often diagnosed in African-Caribbean patients compared to White patients. The authors speculated that this was attributed to cross-cultural clinical judgment bias or ethnically insensitive diagnostic testing. Similar measures might apply to pre-trial assessments, as personality disorders were significantly underrepresented in foreign national patients receiving treatment at high-security hospitals.

Limitations

In our study, we divided patients into groups of nationals and non-nationals according to their current citizenship. Former citizenships or countries of birth were not taken into consideration, as these were not accessible for all patients, thus limiting the results of our study to a certain extent.

It should be noted that no female patients were treated in the Berlin prison hospital, hence female patients treated in high-security hospitals in Baden-Wurttemberg were excluded from our study. Therefore, the outcome of our study may only be considered valid for male patients. Further studies should be conducted to determine the treatment conditions of female patients.

As indicated above, high-security hospitals and prison hospital psychiatry differ substantially depending on admission, period of treatment, and patient records. While patients in high-security hospitals are consistently monitored for years, prison psychiatric patients are only assessed during their irregular and temporary visits to the hospital ward, which does not provide a clear picture of incidents occurring or symptoms displayed during regular incarceration.

This raises the question as to whether multiple admissions to prison hospital psychiatry should be individually compared, thus overweighting patients who are admitted more frequently, or whether the data of each patient should be merged. For reasons of comparability, we decided to follow the latter option, which led to a conflict regarding diagnosis. Since each admission created a new record of administrative data, the patient's diagnosis was potentially altered each time (this was the case in 19 patients). To prevent overvaluation of preliminary diagnoses we decided to focus on each patient's last-assigned main diagnosis. In order to allow better comparison between both institutions, age, and marital status were recorded on initial admission, therefore leading to a discrepancy in the date of the recording of the different variables.

These limitations have influenced our direct comparison between both systems to a certain extent. Furthermore, each institution uses their own database, which are subject to variation due to differing in-house regulations.

Despite these challenges, comparisons between these disparate systems are considered crucial to the rendering of a holistic care concept. Only when both systems complement each other can comprehensive psychiatric care be generated in the German penal system.

CONCLUSION

Although not every offender requiring psychiatric treatment needs to be referred to high-security hospital care, it should be noted that, in contrast to prison hospital psychiatry, these institutions provide a therapeutic environment suited to meet the specific needs of forensic psychiatric patients (34, 35, 66). It is therefore evident that prison psychiatry and the conditions of foreign national patients must be improved. To achieve this, the pre-trial assessment and (mental) health-related aspects of these patients should be further investigated.

There are numerous claims regarding the therapeutic conditions of ethnic-minority, immigrant, and foreign national prisoners, which should likewise apply to the psychiatric assessment of these groups (10, 13, 26, 45, 67). Schouler-Ocak and Aichberger (68) noted that despite wider acceptance among practitioners, the implementation of postulated adjustments—such as intercultural skills, native-speaking impartial interpreters, and regular supervision—remains arduous. It appears that societal structures and the healthcare system are unaware or incapable of coping with the unique requirements of ethnic-minority, immigrant, and foreign national patients, despite multiple publications postulating their relevance (20, 22, 27, 69).

Imprisoning seriously mentally ill patients means depriving them of adequate psychiatric treatment which is unlikely obtained in an environment known to trigger mental health problems by social isolation, sensory deprivation, physical inactivity, mental underload, and overcrowding (29, 70).

Furthermore, prison hospital psychiatry appears structurally incapable of implementing even the first of the Principles of Medical Ethics published by the United Nations (71) which postulates treatment "of the same quality and standard as is afforded to those who are not imprisoned or detained" (34, 70). According to Keppler et al. (70) prison health care does not adhere to approved quality standards such as consistent monitoring, timely implementation of modified treatment guidelines, and sufficient personnel and funding. Additionally, in contrast to high-security hospitals, prison hospital psychiatry lacks specific regulations relating to the admission, treatment, and discharge of patients (29, 33, 34).

As it may be reasonably assumed that insufficient treatment of patients inevitably leads to poor prospects, the overrepresentation of foreign national patients in German prison hospital psychiatry should be assessed critically. Due to rising immigration in recent years, cultural influences on mental health and delinquency are increasingly gaining in significance. Enhancing public and prison health care should not only be seen as a political duty; being responsive to the requirements of different minority groups also involves promoting the process of social integration, maintaining mental health, and preventing the aggravation of psychiatric symptoms (22, 72, 73).

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation, to any qualified researcher. Requests to access the Baden-Wurttemberg dataset should be directed to TR, t.ross@zfp-reichenau.de; requests to access the Berlin dataset should be directed to AO-W, annette.opitz-welke@charite.de.

ETHICS STATEMENT

All data was obtained during routine administration and sufficiently anonymized. Approval for the research has been obtained from the Charité's Ethics Committee.

AUTHOR CONTRIBUTIONS

AO-W, TR, and BN contributed to the conception and design of the study. AO-W and TR organized the databases. BN performed the statistical analysis. BN wrote the sections of the manuscript. All authors contributed to the revision of the manuscript, and they have read and approved the version submitted.

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