



REFUGEE MENTAL HEALTH

EDITED BY: Stephan Zipfel, Monique C. Pfaltz and Ulrich Schnyder
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REFUGEE MENTAL HEALTH

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The focus of this Research Topic is on research that aims to understand the relationships between pre-migration stressors and potentially traumatic experiences, post-migration living difficulties, and mental health in refugees of both sexes throughout the lifespan. We know very little about how concepts of assessing and treating mental health conditions actually work when applied to traumatized refugee populations from different cultures (e.g., the Yazidis people from northern Iraq). Moreover, there is also a great need to better understand the relationship between mental health and refugees' integration in their host countries' societies (acquiring language skills, fitness for work, economic independence, private life, etc.). This Research Topic will also focus on the issue of culture—the extent to which concepts of mental health care can translate and be implemented in different social, economic, and cultural settings around the world.

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Editorial: Refugee Mental Health

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Editorial on the Research Topic

Refugee Mental Health

Humans have been migrating across the globe since they first occurred in evolution millions of years ago (1). The reasons for human migration were, and still are, manifold: draughts and other ecological changes; curiosity and the drive to explore the world; plagues; population growth; economic hardship and hope for a better life; struggle for power and dominance; etc. However, fleeing from warfare, persecution and suppression has kept constituting an important, and particularly unpleasant driving force over the centuries: many people leave their habitat and migrate within their country or across the border to escape life-threatening, humiliating, or otherwise unbearable situations.

The ever growing numbers of migrants globally are a challenge to humankind. An estimated one billion people are on the move currently, of which about 65–70 million have been forcibly displaced (2, 3). This is a phenomenon of fundamental relevance to our society. It challenges our identities and our value systems, and we are more and more urgently confronted with questions that will not be easy to respond to: What is it that constitutes my identity? Since in many cases, it is no longer the place where I was born and raised, and the language my parents spoke, what is it? And given that an increasing number of people who live in my neighborhood do not share my cultural values, what is actually at the core of my value system?

According to the 1951 Refugee Convention of the United Nations High Commissioner for Refugees (UNHCR), a refugee is “a person who, owing to well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country” (4).

The term “refugee mental health” has been established to describe mental health issues related to various aspects of becoming, being, or having been a refugee, such as traumatic exposure in one’s home country that led to the person’s flight, adverse experiences during the flight, as well as the various challenges refugees are frequently exposed to post-flight, when trying to integrate in their host country’s society. Of note, from a mental health perspective, refugee mental health does not apply to refugees in a legal sense exclusively but equally to asylum seekers and internally displaced persons, i.e., persons who have fled their homes but never crossed an international border.

Frontiers in Psychiatry is a journal for mental health professionals, and we as guest editors are in no position to find answers to fundamental societal questions that are beyond the range of our professional expertise and experience. We therefore focused on mental health issues in various refugee populations, hoping to make a small contribution to humankind’s attempt at dealing with an extremely complex phenomenon of which mental health is but one of many ramifications. Refugee mental health constitutes a major public mental health issue (5). Additionally, given the strong associations between trauma exposure, trauma-related psychopathology, and physical health (6), we also need to view refugee mental health as a public health issue in a much broader sense.

Refugee mental health is understudied for various reasons. First and foremost, there is the language barrier. The fact that the costs for professional translators to facilitate mental

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health service provision are not covered in virtually all, and even the most highly developed healthcare systems worldwide, is no less than a scandal. Many asylum seekers and refugees don't speak the locally spoken language of their host country. Using professionally trained translators is not only cost-intensive and time-consuming, and thus burdens research budgets. It also raises questions about the reliability of psychometric data (7, 8). This being said, without being able to communicate adequately, we will never be able to conduct meaningful research, nor will it be possible to provide effective treatment. Secondly, studying traumatized refugees' mental health means to take into account cross-cultural aspects which adds to the complexity of this field of research but also makes it particularly interesting (9). When collecting a heterogeneous clinical sample of people from various cultural backgrounds, issues of representativity need to be dealt with. Conversely, when studying a group of people with the same ethnicity, race, or religious beliefs, generalizability will be very limited as well.

We still know very little about how evidence-based concepts of assessing and treating mental health conditions actually work when applied to traumatized refugee populations. This is particularly true with regard to children and adolescents, especially when they are unaccompanied by their caregivers, and maybe even more so with regard to elderly refugees. Also, the interplay between pre-migration adverse or potentially traumatic experiences, various stressors during the flight, post-migration living difficulties, and mental health is far from being understood. Assessment and treatment of mental health conditions in traumatized refugees may require specific cultural adaptations. There is also a great need to better understand the link between mental health and refugees' integration in their host countries' societies.

This is why we launched the research topic (RT) on refugee mental health. In a total of 14 contributions to our RT, we deal with different target groups. The spectrum ranges from asylum seekers (Womersley and Kloetzer) to the largest group of refugees and post-conflict survivors (e.g., Killikelly et al.) to the group of immigrants (Lanzara et al.) There are papers with a special focus on the group of children and the question

of their mental health status (Buchmüller et al.) as well as research results on the group of extremely traumatized children and adolescents and their mothers from the group of Yazidi people who have become victims of extreme violence by the so-called Islamic State (Rometsch-Ogioun El Sount et al.). In addition to the findings in the Yazidis, from which the Nobel Peace Prize winner of 2018 Nadia Murat emerged, there are also contributions on possible secondary traumatization in caregivers (Denkinger et al.; Rometsch-Ogioun El Sount et al.). With regard to the geographical fields of conflict, there are not only contributions from northern Iraq but also from the "hot spots" Syria (Georgiadou et al.) and East Africa (Schneider et al.). The spectrum of contributions also includes systematic reviews (Killikelly et al.; Lanzara et al.; Morina et al.), assessments of mental health and distress (e.g., Nickerson et al.; Kaltenbach et al.) as well as initial intervention studies in group format for traumatized male refugees (Zehetmair et al.) or app-based e-mental health interventions for Syrian refugees (Burchert et al.).

We would like to thank all colleagues who, by submitting their manuscripts and sharing their expertise and experiences in this highly relevant but also difficult field, make it possible for us as both psychotherapists and researchers to keep up with the dramatic developments of recent years and to develop evidence-based, effective strategies and interventions for the highly stressed group of forcibly displaced persons as an important step toward faster and better integration into their new home countries (Schick et al.).

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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The Assessment of Grief in Refugees and Post-conflict Survivors: A Narrative Review of Etic and Emic Research

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Background: Prolonged grief disorder (PGD) is a new mental health disorder that will be recognized by the World Health Organization's disorder classification, the ICD-11, in 2018. Current assessment measures of PGD are largely based on North American and European conceptualizations of grief (etic i.e., from the perspective of the observer). However, research is emerging from communities outside of the Global North, in particular, conflict-exposed communities, exploring local models (emic i.e., from within the cultural group), assessment measures and symptoms of grief. Several reviews have found that refugees have higher rates of mental illness, defined by etic standards as depression, post-traumatic stress disorder (PTSD), anxiety disorders and psychotic symptoms. Yet, presently there are no reviews documenting the assessment of PGD in refugees and post conflict survivors.

Method: This narrative review will provide an overview of studies that assess grief in refugees to (1) identify current assessment measures of grief in refugees (i.e., type and frequency of questionnaires used, whether Global North-based, etic, or locally developed, emic, and the level of cultural adaptation) and (2) to document the variety and rate of grief symptoms identified with Global North standard measures and/or local measures (i.e., the endorsement of standard symptom items and the identification of culturally specific symptoms of grief).

Results: This review revealed 24 studies that assessed disordered grief in refugee or post conflict samples. Studies were heterogeneous in their assessment methods; the majority ($n = 17$) used an etic approach, four used a combined etic/emic approach, and three used a predominantly emic approach. The rate of disordered grief was high depending on cultural adaptation approach (31–76%) and when standard etic measures were used the disordered grief rate was 32%.

Conclusion: These findings will help to guide future studies to provide accurate assessment of grief in refugee and post conflict populations and has implications for improving cultural knowledge in clinical practice.

Keywords: narrative review, refugees, post conflict survivors, prolonged grief disorder, assessment, ICD-11

INTRODUCTION

As the number of displaced people increases above 60 million (United Nations High Commissioner for Refugees UNHCR, 2017), researchers have mobilized to provide up to date and extensive knowledge on the physical and mental health of refugees, asylum seekers, displaced persons and forced migrants as well as post-conflict survivors. Several reviews have found that refugees have higher rates of mental disorders such as depression, post-traumatic stress disorder (PTSD), anxiety disorders (Fazel et al., 2005; Porter and Haslam, 2005) and psychotic symptoms compared to non-refugee migrants (Heeren et al., 2014; Hollander et al., 2016). Yet, there remains one mental health concern that is often not explicitly or consistently evaluated in refugees and post conflict survivors: prolonged grief disorder (PGD). Despite the knowledge that refugees are highly likely to experience severe and repeated exposure to violence, traumatic loss, abuse of human rights and to witness the death of family and friends (Chen et al., 2017; Miller and Rasmussen, 2017), presently there are no reviews documenting the assessment of PGD or disordered grief in refugees or post conflict survivor samples.

In societies of the Global North (i.e., formerly labeled as Western societies), PGD is an abnormal reaction to loss and is recently recognized as a new disorder in the ICD-11 diagnostic criteria (Maercker et al., 2013)—note: with a somewhat different concept from PGD described by Prigerson et al. (2009). Previously disordered grief was also identified as pathological grief, complicated grief, or in recent US research as persistent complex bereavement disorder (PCBD) (Wagner and Maercker, 2010); the DSM-5 included PCBD in the section of disorders requiring further study (American Psychiatric Association, 2013). Building on these previous definitions and conceptualizations, the ICD-11 criteria for PGD has been refined to be clinically useful, valid and reliable (Maercker et al., 2013; Maciejewski et al., 2016). The symptom structure was simplified to consist of two main symptoms related to longing and persistent preoccupation with the deceased, emotional distress, functional impairment and a consideration for different cultural norms and practices. For example, the criteria state that symptoms should be present for at least 6 months, however, this will defer to clinical opinion and cultural norms i.e., within the German context 1 year of mourning or ‘Trauerjahr’ is considered normal and this should be considered when assessing patients in the German context (Hays and Hendrix, 2008). Evidently, although these criteria were developed within the North American and European psychiatric context, the simplified structure and cultural caveats that aim to assess PGD across different populations, in particular refugees and post conflict samples, are essential for mobilizing support and providing effective treatment (Killikelly and Maercker, 2018). The construct validity (the ability to measure what is thought to be measured within the particular context) (Nunnally and Bernstein, 1994) of ICD-11 PGD criteria has yet to be validated in different cultural contexts. As stated by Lewis-Fernandez and Kleinman: ‘We cannot assume that an assessment measure developed for North America and European populations will be valid and

accurate in a different context’ (Lewis-Fernandez and Kleinman, 1995).

Presently, it is unknown if the new ICD-11 PGD symptom structure defined above is applicable to refugee populations. Until now, the range of grief reactions in refugees, including differences and similarities with the North American and European based psychiatric criteria, have not been systematically documented. For many years there has been a reliance on assessment measures developed in North America and Europe. A review by Hollifield et al. (2002) found that 78% of studies relied on measures developed in the Global North to examine refugee mental health. We cannot assume that an assessment measure developed for North American and European populations will be valid and accurate in a different cultural context (Lewis-Fernandez and Kleinman, 1995; Summerfield, 1999). For example, several studies have documented grief and loss in refugees with varying prevalence rates: 41% of West Papuan refugees experienced the traumatic loss of a beloved family member (Tay et al., 2015); and the prevalence of PGD in refugees ranges from 8% among Rwandan war widows and orphans (Schaal et al., 2010) to 54% in resettled Bosnian refugees (Craig et al., 2008). The broad range of prevalence could indicate that symptoms of grief vary significantly between cultures, i.e., that different cultures have more severe symptoms of grief than others, or it could indicate that some assessment measures are more sensitive to capturing ‘true’ symptoms of grief in some cultures but not in others. Although there may be common psychopathological responses to distress a better understanding of specific culturally relevant symptoms may afford better communication, more effective mental health interventions and stronger alliance with health care professions (Summerfield, 1999; Aggarwal et al., 2014). Additionally, the culture of the health care setting may impact on the expression of grief symptoms. For example, Zhou et al. (2016) determined that in a group of Chinese outpatients with depression, the presence of somatic symptoms (e.g., headache) could indicate the felt bodily experience of depression, or it could be a more socially acceptable way of presenting distress. The inclusion of local meanings and culturally bound syndromes can improve the validity and reliability of assessment measures.

In cross-cultural psychology, the term *etic* is used when behaviors are studied from outside a culture with the goal of finding universal patterns, whereas *emic* refers to an approach where behaviors are studied from within a culture to understand the unique aspects of that phenomenon (Fernando, 2012). Alternatively formulated, *etic* research takes the perspective of an outside observer, in contrast to the *emic* perspective, from inside the culture (Rasmussen et al., 2014). The balance between *etic* and *emic* perspectives is often missing in current discussions, despite it being a crucial issue, not only for practitioners, but also for researchers (Fernando, 2012). Lewis-Fernandez and Kleinman (1995) assert that any culturally congruent psychiatric assessment should aim to blend *emic* or insider perspective with an *etic* perspective on mental health. Furthermore, the authors stated that the relationship between symptoms and illness is complex and that finding a superficial resemblance among symptom

clusters across cultures does not guarantee that the same disorder is being validly identified.

Indeed, recent reviews have revealed unique and important findings through cultural adaptation using an emic or combined emic/etic approach. Rasmussen et al. (2014) reviewed 55 studies with data of 32 Non-European countries to investigate PTSD in emergency settings outside North America and Europe. In their review, the following explicit emic approaches in the 55 studies were used: unspecified ethnography, key informant interviews, ethnographic interviewing, surveys, free listing, participant observation, focus groups, clinical interviews and observation, life histories, presenting or eliciting clinical vignettes, and comparison tasks. The most notable result they found was the variety of cultural concepts of distress (CCD's) associated with PTSD, e.g., “ataque de nervios” as panic-like disorder in Latino Caribbean (Lewis-Fernández et al., 2010) or spirit possession characterized by dissociation in African studies (Betancourt et al., 2009; Ventevogel et al., 2013). Contrary to previous assumptions that PTSD symptoms are universal, this review emphasizes the fact that there is substantial cross-cultural variation of posttraumatic symptom presentations and that future research should include emic literature to improve cultural validity.

In recent years, several authors have used and adapted North American and European measures to be used in different refugee populations. Currently there are no reviews of grief assessment, of either etic or emic methods, for refugees or post conflict survivors. This narrative review will review recent studies of grief in refugees and post-conflict survivors in terms of the type of approach to cultural adaptation (etic or emic), the unique culturally relevant symptoms of grief revealed and the rates of disordered grief identified across the different etic and emic approaches.

MATERIALS AND METHODS

Study Design and Inclusion Criteria

In this narrative review, the following PICOS standards (Higgins and Green, 2008) for inclusion criteria were defined: (1) the sample consisted of adult (>18 years) refugees/migrants/asylum seekers/people living in a (post-) conflict zone. (2) The article has been published in a peer-reviewed journal and (3) the article's language was English. Furthermore, (4) a measurement of grief symptoms was used.

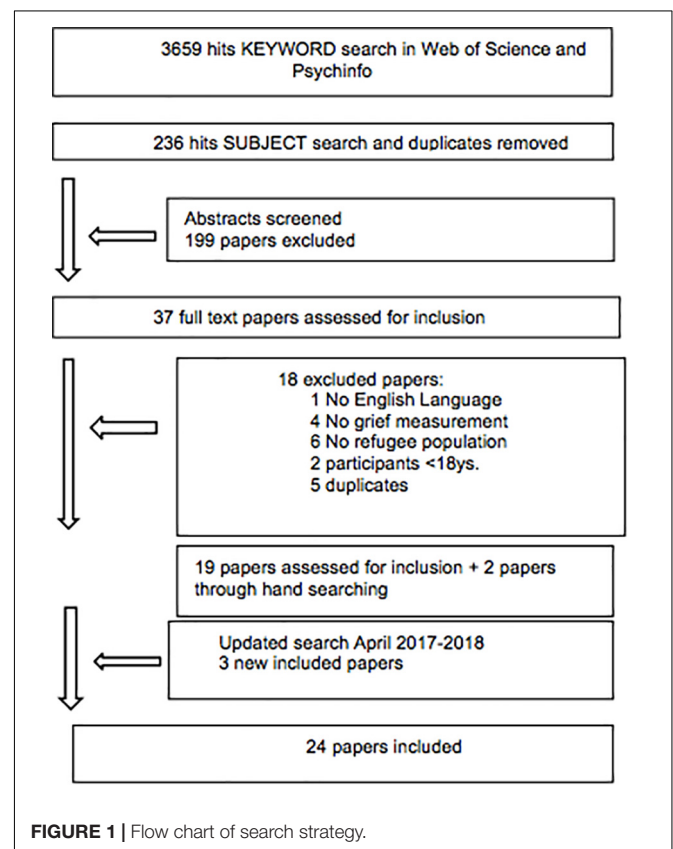
Search Strategy

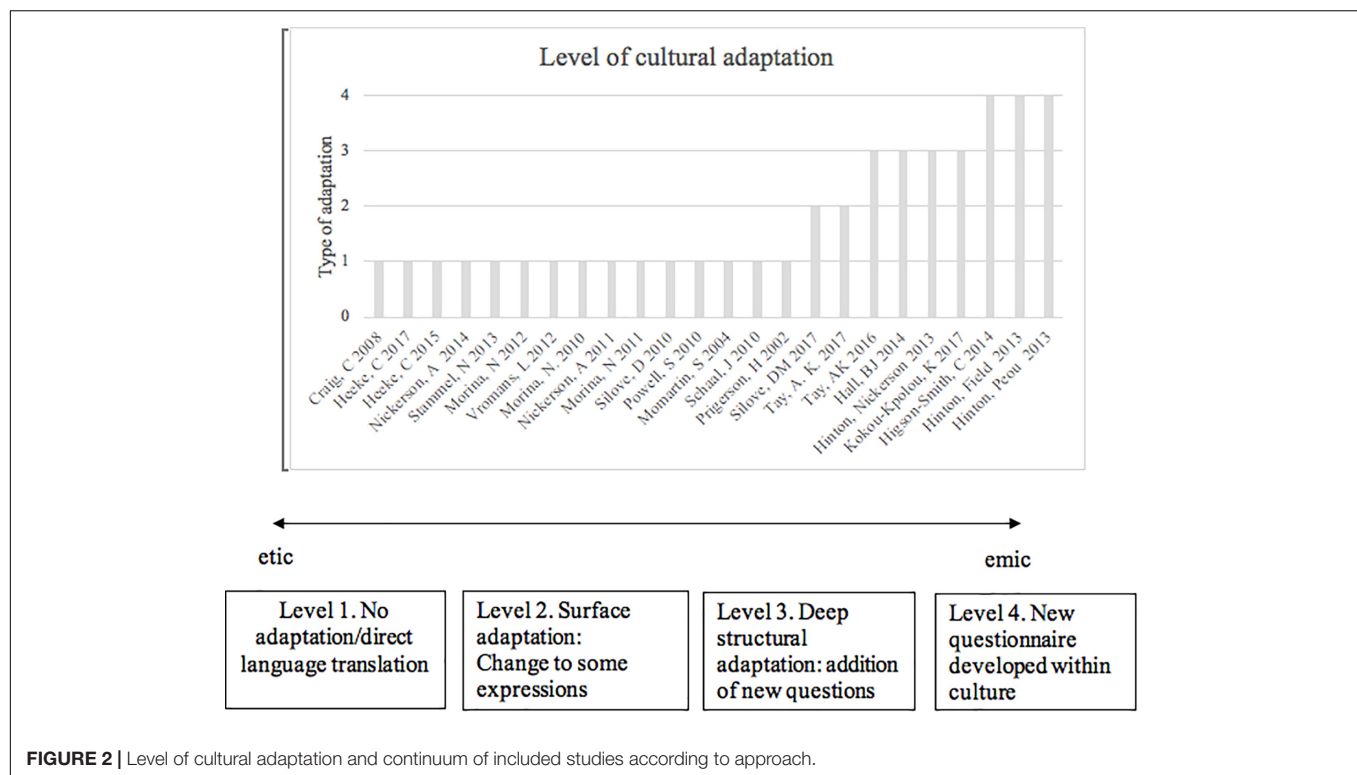
The search was conducted within the time frame 2000 until April 2018, on two separate subject specific databases for psychological material Web of Science and PsychINFO. As the aim of the review is to provide an up to date account of the state of the field papers before 2000 were not included. Web of Science and PsychINFO databases were chosen as they are major literary databases in the field of psychiatry and psychology. Keyword searches were executed with distinct combinations of search terms: (grief OR griev* OR bereave* OR loss OR mourn*) AND (refuge* OR migrant* OR asylum seek*). The

selected search terms provided 2010 hits in Web of Science and 1649 hits in PsychInfo (Figure 1). To refine the search, the following limiters were used: no conference proceedings or books, research articles only, English language, adults over 18 (since child and adolescents grief expressions and symptoms vary greatly). A subject category search selecting the relevant subjects (excluding basic science categories, e.g., chemistry, physics, environmental sciences, mathematics, engineering) was conducted in Web of Science and PsychINFO. Duplicates were removed and the articles to be screened were reduced to 237 hits. CK and SB screened titles and abstracts according to the inclusion criteria. 200 papers, that did not meet the criteria, were excluded, resulting in 37 potentially relevant articles. Full texts were downloaded and reviewed. Eighteen were excluded. An update of the search was conducted from April 2017 until April 2018 and revealed three unique new articles to include. In total, 24 studies were included in the final analysis (see Figure 1).

Data Extraction

A standard form was used to extract data from selected studies to create two results tables (please see Appendixes A, B). The first results table (Appendix A) included information on the study characteristics including: study date, first author, study title, study country, description of population (refugees, displaced or people living in a conflict zone), population origin, sample size, male, female, gender distribution and country





of residence. The second table (**Appendix B**) consists of time since loss, type of bereavement, grief measure, rates of disordered grief, cultural specific adaptation and psychometric properties. All included articles were read thoroughly and systematically screened for the above data. If there were several publications of the same study all publications were included if they used different assessment measures or methods for cultural adaptation of grief measures. Additionally, studies were coded for the cultural specific symptoms of grief and the level of cultural adaptation. The level of cultural adaptation was assessed using a standard form with criteria developed and amended following a continuum for developing culturally appropriate interventions (Okamoto et al., 2014). Four levels of adaptation were coded (1) no adaptation, but direct translation using standard translation practices, including consultation with locals or experts (2) surface adaptation: small changes are made to the structure or content of the original questionnaire or interview for the purposes of including some cultural expressions, idioms or beliefs within the original questionnaire, methods including field testing and piloting (3) deep structural adaptation: use of systematic methods to develop culturally appropriate questions and content in addition to the original questionnaire, e.g., the inclusion of new unique content or questions, methods include interviews and focus groups (4) Culturally grounded adaptation: the development and refinement of a unique questionnaire specifically tailored to a particular cultural group (see **Figure 2**). Coding was completed by both CK and SB. Disagreement between researchers was dealt with by consensus with a senior member of the research team (AM).

RESULTS

Study Characteristics

A total of $n = 8600$ individuals participated in the included studies (see **Table 1**), 43% males ($n = 3701$) and 57% females ($n = 4899$). The mean sample size was $M = 358$ participants. The smallest sample consisted of $n = 60$ and the largest of $n = 2964$ participants. The mean age across all studies was $M = 42$ years, with a range from 18–80 years. When indicated, the mean time since loss was $M = 14.2$ years, with a range from 6 months to more than 45 years. Data were obtained from 12 different countries including samples from Africa ($n = 3$), Americas ($n = 2$), Eastern Europe ($n = 7$), Asia

TABLE 1 | Demographic characteristics of study participants across 24 included studies.

		N	%
Number of bereaved	Total	8600	
Gender	Male	3701	43
	Female	4899	57
Type of Loss per study	Traumatic/conflict related	24	100
	Sickness/health	5	22
	Disappearance, unknown	3	13
	Disaster/Accident	3	13
		M	Range
Mean sample size		358	60–2964
Mean age (years)		42	18–80
Mean time since loss (years)		14.2	0.5 to >45

($n = 8$), Middle East ($n = 4$). Samples included refugees ($n = 10$), post conflict survivors ($n = 9$), internally displaced people ($n = 2$), or a combination of migrants, refugees and internally displaced people ($n = 3$).

All of the 24 included studies measured traumatic or conflict-related loss. In addition, several studies also measured sickness or health-related loss (5), disappearance or unknown loss (3) and disaster or accident related loss (3). This exemplifies that the majority of measurement is focused on traumatic and conflict related loss in refugee and post conflict survivor samples (see **Table 1**).

Approach to Grief Measurement

The methodological approach to measuring grief varied along the *etic-emic* continuum described above. Fifteen studies used a direct translation approach, two studies conducted surface adaptation, four studies conducted deep structural adaptation and three studies conducted culturally grounded adaptation (see **Table 2**). The following sections synthesize the results in terms of the three main approaches used to assess grief: predominantly etic (direct translation and surface adaptation), combined etic/etic (deep structural adaptation) and predominantly emic (culturally grounded) approaches. The main findings in terms of rates of disordered grief are presented for each approach.

Approach 1: Predominantly Etic

The majority of the studies used standard grief questionnaires, developed in the Global North, to measure disordered grief in refugee populations (Prigerson et al., 2002; Momartin et al., 2004; Craig et al., 2008; Morina et al., 2010, 2011; Powell et al., 2010; Schaal et al., 2010; Silove et al., 2010, 2017; Nickerson et al., 2011, 2014; Morina and Emmelkamp, 2012; Vromans et al., 2012; Stammel et al., 2013; Heeke et al., 2015, 2017; Tay et al., 2017). Data was collected using the Prolonged Grief Disorder scale, PG-13 (Prigerson et al., 2009) ($n = 6$), the Inventory of Complicated Grief and the Inventory of Complicated Grief-Revised, (ICG/ICG-R) (Prigerson et al., 1995; Prigerson and Jacobs, 2001) ($n = 7$), the Inventory of Traumatic Grief (ITG) (HG. Prigerson et al., 1999) ($n = 2$), and the Core Bereavement Items (CBI) ($n = 2$) (Burnett et al., 1997). Where reported, the rates of disordered grief varied across these standard assessment measures with an average of 32% (range 8–69) of participants scoring in the disordered or severe range (see **Figure 3**). Additionally one study used an idiosyncratic Grief Questionnaire to assess refugees from Burma in Australia (Steel et al., 2007 in Vromans et al., 2012) and one study the UCLA Grief Inventory (Saltzman et al., 2001 in Powell et al., 2010) ($n = 1$). Vromans et al. (2012) found that 98% of participants endorsed interpersonal grief (mean of 2.97 measured on a 5 point scale) and 58% of participants reported loss distress. In Powell et al. (2010b), the UCLA Expanded Grief Inventory found mean scores of 3.03 and 2.40 for existential and traumatic grief respectively.

In terms of cultural adaptation several studies ($n = 15$) used previously translated measures or followed a standard protocol for translation including forward and back translation along with consultation with local participants and experts (e.g., Bontempo, 1993). Two studies conducted surface cultural adaptation. For

example, after the direct translation of the questionnaire, Silove et al. (2017) field-tested a pool of items from the ICD-11 PGD criteria (Maercker et al., 2013) in a community sample of Timor-Leste locals. Four items were determined to be most common and understandable in the community. These were assessed in a sample of 677 couple-dyads ($n = 1354$ individuals): persistent yearning/longing (endorsed by 73.95% of participants), bitterness about the death (endorsed by 44.55%), feelings of emptiness (endorsed by 40.65%) and functional impairment (endorsed by 65.8%). A follow up study (Tay et al., 2017) followed the same surface cultural adaptation procedure and found similar rates for $n = 2964$ individuals: persistent yearnings or longing for the deceased (endorsed by 73.5%), feelings of bitterness about the death (43.6%), and feelings of emptiness (38.9%), functional impairment associated with grief symptoms (32.3%).

As mentioned above Vromans et al. (2012); Silove et al. (2017), and Tay et al. (2017) examined the rate of endorsement of single items of yearning or loss distress on standard grief measures (e.g., ICD-11 and idiosyncratic grief questionnaire) which were deemed acceptable in the local community. The percent of participants endorsing these specific items, here labeled yearning/distress item, is substantially high (68.4%).

Approach 2: Etic/Emic

Four studies utilized a combined etic/emic approach by significantly amending or adding to the structure and content of a standard grief measure to reflect culturally specific symptoms of grief (Hinton et al., 2013b; Hall et al., 2014; Tay et al., 2016; Kokou-Kpolou et al., 2017). Also referred to in this review as deep structural adaptation, Tay et al. (2016), conducted focus groups with West Papua refugees and local psychiatrists to determine the acceptability and comprehensibility of symptom items of the proposed ICD 11 criteria for PGD and the PCBD DSM-5 criteria. The construct of disordered grief was identified to strongly correspond to the indigenous construct 'Duka Cita' or *grief reaction* in Bahasa Indonesian. Along with the PGD and PCBD symptom item list, consultation with locals also revealed other commonly endorsed symptoms including confusion, diminished sense of identity and difficulties planning for the future, the latter two also appear in the PCBD disorder definition. These were subsequently added to the grief measure. This resulted in an 18 item grief measure with endorsements ranging from 38.7% for strong feelings of yearning/longing for the person who is dead, to 5.2% for difficulty or been reluctant to plan for the future.

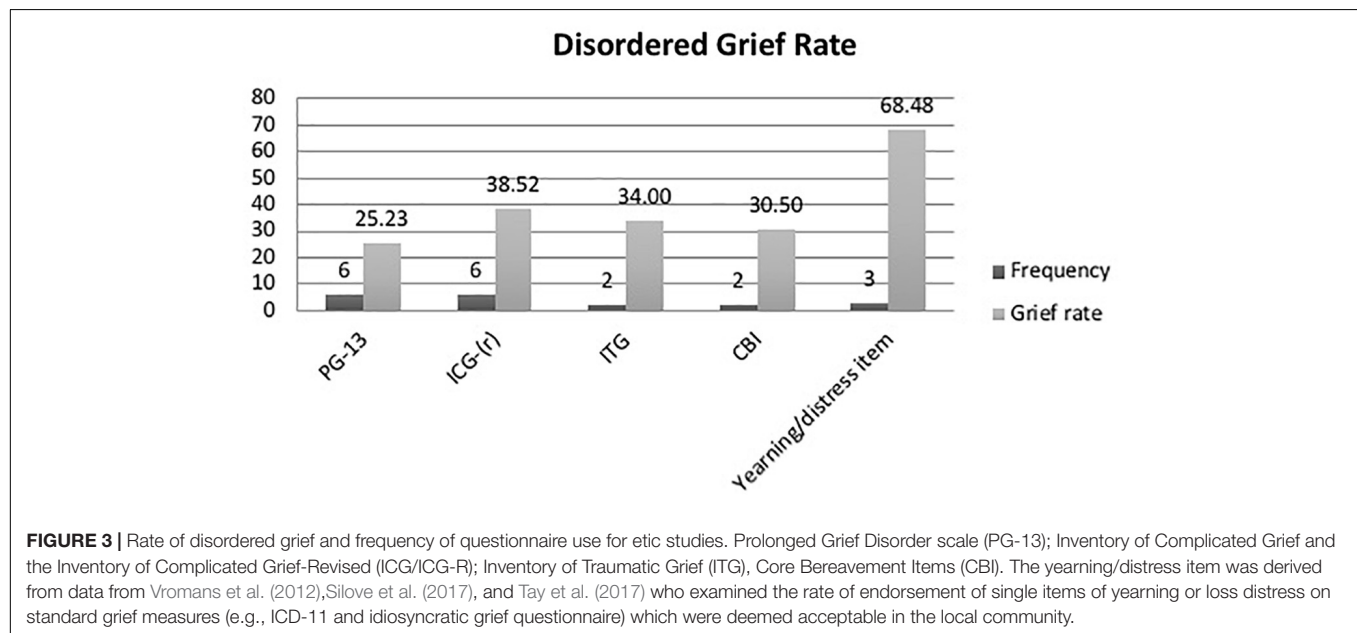
Hall et al. (2014) used an established protocol for cultural adaptation developed by Bolton (2008). A mixed methods approach was used; qualitative interviews were conducted with the local Kurdistan population to identify culturally specific symptoms of grief. This was assessed alongside the items of the Inventory of traumatic grief (Prigerson et al., 1999). This method resulted in a 12-item traumatic grief scale with 11 items from the ITG and one symptom specific to the Kurdish local population, 'Imitating behaviors of someone who had died.' Mean scores on this measure were 8.89/36.

Hinton et al. (2013a,b,c) conducted a series of studies examining grief and trauma in a refugee community in

TABLE 2 | Cultural specific items revealed from emic deep structural and grounded adaptations.

First Author, Year	Culturally specific item	Rate of grief-related distress	Level of adaptation
Tay et al., 2016	'Duka Cita' or grief reaction in Bahasa Indonesian	38.7% strong feelings of yearning/longing	Deep structural
Hall et al., 2014	the Kurdish local population, 'Imitating behaviors of someone who had died'	Mean scores on adapted ITG were 8.89/36	Deep structural
Hinton et al., 2013b	Cambodian Khmer language the term 'nuk sreunoh': to recall with nostalgic longing and CSM-G; 'In this last month when you thought about the deceased, how much did it cause you to feel not well in your mind or body?	PG-13 endorsed by 8%, CSM-G endorsed by 31%	Deep structural
Kokou-Kpolou et al., 2017	Feelings of guilt related to the context of the death of the loved one and open ended questions about reasons for guilt feelings.	Mean scores on the ICG-R were for migrants and refugees 31.33 vs. 40.20 respectively. Scores on the additional grief items were the most highly endorsed items for both refugees and migrants (mean 2.85 and 2.15 out of 4 respectively).	Deep structural
Higson-Smith, 2014	Bereaved clients (compared to non bereaved) were more likely to experience elevated symptoms of distress such as crying easily, suicidal thoughts, pounding heart and headaches.		Grounded
Hinton et al., 2013c	(1) tdaay haong: or bad death (2) rebirth: (3) dreams of the dead 'khyal attack': distress and anxiety type somatic symptoms	76% pained remembering of the deceased. 72% concerns over spiritual status of the dead, 73% cried when recalling the dead, multiple somatic symptoms from 67 to 88%, 70% of participants attributed distress triggered by pained recall of the deceased to a <i>khyal attack</i>	Grounded
Hinton et al., 2013a	Dreams of the dead questionnaire	52% of participants had dreamed of the deceased in the past month. The frequency of dreams was significantly correlated with scores on the PG-13 ($r = 0.59$)	Grounded

PG-13, Prolonged Grief Disorder scale; ITG, Inventory of Traumatic Grief; ICG-r, Inventory of Complicated Grief-revised; CSM-G, Culturally Specific Measurement Grief.



Cambodia. After translation into the local Khmer language the term 'nuk sreunoh' meaning to recall with nostalgic longing, was used to define the index death. The PG-13 (Prigerson et al., 2008) was used to assess symptoms of grief with an important addendum (Hinton et al., 2013b). Based on previous research (Hinton et al., 2009) by the authors

'concerns about the deceased not yet being reborn' were added to the scale. Additionally, participants completed a culturally sensitive measure of grief related distress (CSM-G); 'In this last month when you thought about the deceased, how much did it cause you to feel not well in your mind or body?'

This item was developed based on the first authors' clinical experience with Cambodian refugees through extensive interviews prior to the study. 8% of the refugees were found to meet criteria for PGD based on the PG-13, however 31% of the sample scored in the severe range (4/5) on the CSM-G.

After a preliminary survey of the refugee community in France, (Kokou-Kpolou et al., 2017) added two questions to the standard grief measure ICG-R (Prigerson et al., 1995; Prigerson and Jacobs, 2001). The first question was feelings of guilt related to the context of the death of the loved one and the second question was open ended and inquired about reasons for guilt feelings. Additionally, they developed an idiosyncratic measure of 'Death and Ritual information.' Participants were asked about funeral rites, ceremonies, repatriation of the body, participation in rituals and other cultural ceremonies. Mean scores on the ICG-R were compared for migrants and refugees (31.33 vs 40.20 respectively). Scores on the additional grief items were the most highly endorsed items for both refugees and migrants (mean 2.85 and 2.15 out of 4 respectively). Additionally, for those who participated in bereavement rituals their scores were significantly lower on the ICG-r.

Approach 3: Predominantly Emic

Few studies ($n = 3$) employed a predominantly emic approach. Higson-Smith (2014) conducted a mixed methods approach and reviewed data from case files of 85 torture survivors in Sub-Saharan Africa. A thematic analysis on the content of the case files was conducted to collect quantitative and qualitative data on the mental health and trauma history of help-seeking patients in a local treatment center. It emerged from the review that sudden and violent bereavement was very common and symptoms of disordered grief frequently reported. Bereaved clients (compared to non-bereaved) were more likely to experience elevated symptoms of distress such as crying easily, suicidal thoughts, pounding heart and headaches. Additionally, semi-structured interviews with 14 torture survivors revealed that bereavement was a key concern for participants. The results of the qualitative interviews revealed key findings relevant to the assessment of disordered grief; for those who entered treatment 1 year after bereavement they had significantly worse distress on all symptoms compared to those with earlier treatment; yearning for the deceased was a common theme along with social and emotional stressors, and the moral responsibility that clients might feel should be openly discussed.

Hinton et al. (2013c) conducted semi-structured interviews to examine spiritual beliefs about death and rebirth in a group of Cambodian refugees. The interviews revealed key aspects for a new ontology of bereavement for this cultural group including (1) *tdaay haong*: or bad death, a traditional belief that a violent death may indicate a past 'demerit' and prevent rebirth, (2) rebirth: is an essential component of the Cambodian belief system and those who died violently may not be reborn but wander in a purgatory state, (3) dreams of the dead are indicators of the person has not been reborn, especially 1 year after the death. Based on these factors a bereavement questionnaire was developed to assess the following: painful recall of the loved one, self-perceived severity of pained recall, frequency of pained recall, dreams and pained

recall, spiritual concerns, crying during pained recall, somatic distress and pained recall, trauma and pained recall, culturally specifically labeling and treatment of episodes of pained recall (Hinton et al., 2013c). A specific cultural interpretation of distress '*khyal attack*' was also assessed (Hinton et al., 2013c). This has been translated as wind attack and refers to the belief that distress and anxiety type somatic symptoms are caused by a disruption of the flow of *khyal* which is a wind-like substance that flows through the body with the blood. When severe, these attacks can cause death and are treated by placing coins in 'wind oil' and pushing these on the skin. Results from the culturally grounded questionnaire indicated that 76% of participants experienced pained remembering of the deceased. In terms of other cultural specific factors, 72% had concerns over the spiritual status of the dead, 73% cried when recalling the dead, along with multiple somatic symptoms experienced to high degree ranging from 67–88% (e.g., blurry vision, palpitations respectively) depending on the symptom. Past trauma was brought to mind in 90% of participants and 70% of participants attributed distress triggered by pained recall of the deceased to a *khyal attack*. 78% of participants did coining to treat these attacks. Based on these findings the centrality of dreams to bereavement for Cambodian refugees was assessed. An idiosyncratic dream measure was developed to assess the frequency of dreams, who was dreamed about, types of dreams and the spiritual state of the deceased. It was found that most dreams (80%) were about someone who had died in the conflict and 25% involved trauma, 13% were nostalgic and 62% were a visitation. This scale was assessed in an additional study (Hinton et al., 2013a). 52% of participants had dreamed of the deceased in the past month. The frequency of dreams was significantly correlated with scores on the PG-13 ($r = 0.59$).

DISCUSSION

This narrative review revealed three main findings. Firstly, three different approaches to grief assessment were documented; predominantly etic, combined emic/etic, and predominantly emic. Secondly, the rate of disordered grief or PGD varied depending on the type of measure used, yet overall rates of PGD were high across standard etic measures (32%). Thirdly, deep structural and grounded cultural adaptation occurred in seven studies. This revealed unique culturally specific symptoms of grief and higher rates of grief symptoms on these symptoms (ranging from 31 to 76%). Our findings support previous reviews that show important cross-cultural differences in symptomatology for other stress related disorders. Hinton and Lewis-Fernández (2011) and Rasmussen et al. (2014) found 'substantial cross cultural variation' in PTSD symptomatology. Here we find important variations in assessment measures and symptoms of grief across both emic and etic research methodologies.

Despite variability in the types of etic questionnaires used, the rate of disordered grief is high for refugee and post conflict samples. A pooled rate of 32% of participants scored in the severe or disordered range. This is much higher than prevalence studies of general population samples. For example, recent studies of the rates of disordered grief in the Global North find

prevalence rates ranging from 3.7% (Kersting et al., 2011) to 9.8% (Lundorff et al., 2017). The current high rate of disordered grief in refugee and post conflict survivor samples is supported by previous findings that war-related bereavement/traumatic bereavement result in higher risk of disorder. Several reviews of refugee health have consistently found higher rates of distress and disorder across both physical and mental health conditions (Fazel et al., 2005; Porter and Haslam, 2005). The largest review of 81,866 refugees found rates of 30% for depression and PTSD in refugee populations (Steel et al., 2009). The strongest predictors of disorder were the number of traumatic events experienced and exposure to torture. In a representative population-based German sample, those bereaved by a violent death had a disordered grief rate of 20% (Kersting et al., 2011). In the current review all 24 studies examined grief in the context of trauma or conflict related loss, it is therefore not surprising to find a similarly high rate of disordered grief.

This raises the important issue of 'normality' and what defines the distinction between a pathological response and a normal response within a cultural context. Normality could be defined quantitatively, e.g., if a high number of the sample experience these symptoms, then perhaps this is a cultural norm, however we would argue that clinical opinion and the context of the symptoms should be taken into account. The finding that 68% of the refugee samples experienced intense yearning and distress could indicate that this is a 'norm,' however, when considering the context violence and trauma and the implications it is more likely that this high number reflects the multiple traumas experienced by these individuals within this specific post-conflict context and should not be considered a 'norm.'

Refugees experience many losses, not only the loss of a loved one, but also the loss of homeland, cultural group, employment, housing, and security. It is to be expected that being bereaved is only one of many losses that may impact on mental health. The Multidimensional Loss Scale (MLS) (Vromans et al., 2012) is one of the first instruments designed specifically to index *Experience of Loss Events* and *Loss Distress* across multiple domains (cultural, social, material, and intrapersonal) relevant to refugee settlement. Assessed in recently settled Burmese adult refugees ($N = 70$) the scale has five dimensions of loss: Loss of Symbolic Self, Loss of Interdependence, Loss of Home, Interpersonal Loss, and Loss of Intrapersonal Integrity. This provides a promising framework for documenting the multiple losses and wider context of grief in refugees. Similarly, Miller and Rasmussen (2017) propose an ecological model of refugee distress. They assert that conflict-related loss and trauma are not the only events that can precipitate a mental health disorder. There are several post-migration stressors such as loss of social networks, isolation, unemployment, poverty, discrimination and lack of basic resources and safety that may have a significant effect on mental health (Miller and Rasmussen, 2017). As identified by Hinton et al. (2013c) and Kokou-Kpolou et al. (2017), the inability to perform culturally specific death rites and rituals post-migration was associated with higher severity of grief symptoms. The socio-cultural context of post-migration and resettlement may provide a backdrop that may hinder or help recovery from conflict-related bereavement and loss.

The level of cultural adaptation varied with few studies using a combined emic-etic approach ($n = 4$) or a culturally grounded emic approach ($n = 4$). However, when these approaches were used culturally unique and meaningful symptoms were revealed. The emic adaptations pointed to three new symptom categories that should be considered in future cross-cultural grief assessment; somatic symptoms, spiritual concerns and dreams or re-experiencing the deceased. The one-item scale CSM-G (Hinton et al., 2013b) and the "khyal attack"-item (Hinton et al., 2013c) measured physical discomfort associated with grief. These items were well understood by participants as a culturally sensitive way of determining the extent of self-perceived severity of grief. Cross-cultural research indicates that physical symptoms (e.g., palpitations, headaches and tinnitus, etc.) are often mentioned when assessing disordered grief (Hinton et al., 2013c). Physical symptoms are also endorsed in studies conducted with non-refugee populations in the Global North. Several studies have reported a greater occurrence of physical health complaints in bereaved people (compared with matched controls), ranging from physical symptoms such as headaches, dizziness, indigestion and chest pain (Stroebe et al., 2007). Interestingly, a recent study presented a phenomenon identified as 'Ulysses syndrome' or the psychosomatic disorder of modern migrants (Bianucci et al., 2017). The authors describe how migrants experience multiple stressors and this can lead to debilitating somatic complaints such as irritability, headache, migraine, nervousness, insomnia, fear and general discomfort. These findings and the culturally specific somatic items identified in this review point to the fact that somatic symptoms are not overtly part of –or are at least underrepresented– in the most standard grief measures. If somatic symptoms continue to be excluded from assessment measures this could lead to the mislabelling and misidentification of common and recognizable of mental health disorders such as depression, PTSD and PGD.

This underrepresentation is similar for spiritual concerns. Spiritual beliefs, such as 'rebirth concerns' (Hinton et al., 2013b) may be more important for mental health outcomes than previously assumed. For instance, religious beliefs can foster resilience during bereavement both by providing a stable, shared belief system and by providing affiliation and social support from the religious community (Bonanno et al., 2002). Furthermore, dreaming of the deceased was found to be an important indicator of grief symptoms in a Cambodian refugee population; it is strongly connected to spiritual beliefs about rebirth and reincarnation after death (Hinton et al., 2013a,b). A typology of dreams was developed as the type of dream (i.e., trauma reliving or visitation dream) may indicate the severity of grief distress. Indeed, the frequency of dreams was significantly correlated with PGD severity. Dreaming of the deceased seems to be a universal part of the grieving process and dreaming of the loved person in a positive state can be comforting for the bereaved (Kübler-Ross and Kessler, 2005). It is therefore imaginable that positive dreams of the deceased reduce the risk of developing prolonged grief symptoms or indicate adaptive recovery while dreaming of the deceased suffering is likely to produce negative feelings in the dreamer and add to the risk of disordered grief development.

In Global North samples, dreaming of the deceased was originally one of the 30 symptoms proposed as a key intrusive symptom of complicated grief (Horowitz et al., 1997), but is not used in the more recent Inventory of Complicated Grief (Prigerson et al., 1995). A study in a German sample found that dreaming of the deceased had poor ability to identify people with complicated grief and the authors suggested it should be dropped from the criteria (Langner and Maercker, 2005). However the ICG has other intrusive items such as “I hear the voice of the person who died speak to me” or “I see the person who died stand before me” and attests to the importance of assessing some form of re-experience of the deceased, whether in dreams, voices or hallucinations. As several authors have attested, grief can come with a strong desire to continue the bonds with the deceased (Currier et al., 2015). Hallucinations and visions of the deceased person are often experienced in both Western and Eastern populations (Zisook and Shear, 2009; Shimizu et al., 2017) and many take comfort in retaining objects or carrying on the legacy of the one who has died. “Imitating some of the same behaviors or characteristics of people who have died” was an item found to be specific for a Kurdish sample (Hall et al., 2014). It would be interesting to assess this symptom in a broad variety of cultures. In modern psychology, imitating the behaviors or characteristics of deceased loved ones can be seen as maladaptive yet has also been seen as a normal stage of “looking for the deceased followed by separating” of Kast’s four stage model of normal grief (Kast, 1982). This again, could be a form of re-experiencing the deceased that should be taken into account in the assessment of disordered grief. It may be important to clarify whether dreams and re-experiencing the dead is an important indicator of distress across cultural groups, especially in those cultures where dreaming is perceived to have specific and elaborate cultural meaning.

This review illustrates that there is substantial global variety among conceptualizations of what constitutes grief and what symptom endorsements it entails. The findings suggest that physical and spiritual symptoms should be a more familiar theme within the research of disordered grief. This should be undertaken on one hand for improved cultural sensitivity; on the other hand, a more comprehensive approach of symptom endorsements might also be applicable for Global North populations. In any case, future research should explore a broader variety of grief symptoms with a focus on cultural sensitivity. Physical symptoms should be assessed as well as patients’ religious/spiritual beliefs and the nature of their beliefs (e.g., belief in an afterlife), dreams (e.g., nightmares of deceased loved ones) or philosophical belief systems (e.g., believing in a just world) and re-experiencing the dead (Bonanno et al., 2002; Hinton et al., 2013a). The presence or absence of some of these symptoms and belief systems could become additional valid predictors of disordered grief vulnerability.

There are several studies that have attempted to develop cross-cultural adaptation guidelines and quality assessment tools, however, most of these apply to intervention studies. For example, Harper Shehadeh et al. (2016) conducted a systematic review and meta-analysis to evaluate the extent of cultural adaptation and the effectiveness of interventions for common mental health disorders. They developed a questionnaire to assess

the level of adaptation for each study. This included questions such as ‘did you translate the intervention to local language?’, ‘did you consider metaphors in the cultural adaptation of your intervention?’ They found that the level of adaptation had a positive effect on the effectiveness of the intervention. The UN Inter Agency Standing Committee Guidelines on Mental Health and Psychosocial Support in Emergency Settings states that health care workers must not use assessment measures that are not validated for the local context. Presently several research groups have developed cross cultural assessment measures for mental health, including the Cultural Assessment Tools for Mental Health and Cultural Assessment from McGill University (Kirmayer et al., 2014), the Cultural Formulation Interview for the DSM-5 (Aggarwal et al., 2014), the Harvard Trauma Questionnaire (Mollica et al., 1992), and guidance for Culturally sensitive Assessment of Trauma (Good and Hinton, 2015). These research assessment tools should be adapted to include items relevant to disordered grief. Indeed both the DSM-5 and ICD-11 disorder definitions now include cultural caveats such as ‘the duration and severity of the grief response must exceed expected socio-cultural norms.’ Both of these disorder definitions provide a starting point for cross cultural considerations and comparisons.

Strengths and Limitations

This is the first review of the assessment methods and rates of disordered grief in refugee post conflict survivor populations. It provides a comprehensive overview of published articles having used a valid grief measure on adult bereaved refugees. However, there are several noteworthy limitations to this review.

By only including English articles from peer-reviewed journals, valuable emic literature might have been excluded. As we did not use search terms in other languages we did not find and subsequently exclude any studies based on language. In the future, researchers should conduct the initial literature search using terms in several different languages, in order to capture important literature from around the world. This will provide a broader pool of research from which we may find more emic research. The current study found very few emic studies and the findings are limited to specific refugee groups such as West Papua and Cambodia. Given the recent influx of refugees from the Middle East, including Iraq, Afghanistan and Syria future research should focus on grief related distress in these refugee groups.

The second limitation concerns the time criterion. In order to diagnose PGD, at least 6 months since the loss have to have passed. Not all selected articles provided an exact time since loss, but this was counterbalanced by the time criterion that was, in most cases, inherent in grief instruments applied. Thirdly, this review did not assess the relationship to the deceased, which could have provided valuable information about predictors of severity of grief response. Only 14 out of 24 included articles indicated a disordered grief rate, which made it difficult to find accurate pooled PGD rates. This review benefits from an up to date overview of the most relevant and noteworthy papers in the field. In addition we provide a framework for future assessment of cross-cultural research along the etic/emic continuum. This could

provide the foundations for further combined etic-emic research in cross-cultural populations.

Future Research and Implications

As research and clinical practice involving refugee and migrant populations remains a pressing issue, future researchers and clinicians should use a combined etic/emic approach for grief assessment that is culturally valid and clinically sufficient. There is increasing recognition for the importance of including cultural concepts of distress or idioms of distress within the format of North American and European mental health assessments (Rasmussen et al., 2014). In summary, this is the first narrative review to evaluate grief measures and rates of disordered grief in the refugee population. The results indicate the assessment of PGD to be methodologically heterogeneous, which makes it difficult to compare results. Future research should aim at methodological alignment and always provide a rate of disordered grief. The implementation of the suggested criteria for PGD for the new

ICD-11, particularly in terms of the new socio-cultural caveats (Maercker et al., 2013), could aid in this process of cross cultural knowledge sharing and alignment.

AUTHOR CONTRIBUTIONS

CK conceptualized the main content, conducted the literature search, analysis, and wrote the main body of the manuscript. SB conducted the literature search and wrote parts of the manuscript. AM conceptualized the content of the manuscript and edited the manuscript.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpsyg.2018.01957/full#supplementary-material>

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Psychiatric Disorders in Refugees and Internally Displaced Persons After Forced Displacement: A Systematic Review

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Background: Protracted armed conflicts not only shape political, legal, and socio-economic structures, but also have a lasting impact on people's human migration. In 2017, the United Nations High Commissioner for Refugees reported an unprecedented number of 65.6 million individuals who were displaced worldwide as a result of armed conflicts. To date, however, little is known about these people's mental health status. Therefore, we conducted a systematic review of the prevalence of psychiatric disorders among forcibly displaced populations in settings of armed conflicts.

Methods: We undertook a database search using Medline, PsycINFO, PILOTS, and the Cochrane Library, using the following keywords and their appropriate synonyms to identify relevant articles for possible inclusion: "mental health," "refugees," "internally displaced people," "survey," and "war." This search was limited to original articles, systematic reviews, and meta-analyses published after 1980. We reviewed studies with prevalence rates of common psychiatric disorders—mood and anxiety disorders, psychotic disorders, personality disorders, substance abuse, and suicidality—among adult internally displaced persons (IDPs) and refugees afflicted by armed conflicts.

Results: The search initially yielded 915 articles. Of these references 38 studies were eligible and provided data for a total of 39,518 adult IDPs and refugees from 21 countries. The highest prevalence were for reported for post-traumatic stress disorder (3–88%), depression (5–80%), and anxiety disorders (1–81%) with large variation. Only 12 original articles reported about other mental disorders.

Conclusions: These results show a substantial lack of data concerning the wider extent of psychiatric disability among people living in protracted displacement situations. Ambitious assessment programs are needed to support the implementation of sustainable global mental health policies in war-torn countries. Finally, there is an urgent need for large-scale interventions that address psychiatric disorders in refugees and internally displaced persons after displacement.

Keywords: mental health, psychiatric disorders, refugees, internally displaced people, epidemiology, war, systematic review

INTRODUCTION

“War should be understood as an *actual, intentional, and widespread* armed conflict between political communities [...], defined as those entities which either are states or intend to become states [...]” (1). Whether considered from a philosophical, sociological, or legal perspective, war remains one of the most complex and devastating human enterprises (1). In 2016, according to the *Department of Peace and Conflict Research* at the University of Uppsala, 51 ongoing armed conflicts were reported worldwide and well over 100,000 people were killed in organized violence (2). Beyond this sole number, the entire ecology of war has dramatically changed over the past two decades. Altogether less frequent, armed conflicts have reached low- and middle-income countries (LMICs) more frequently and become predominantly intrastate and disproportionately protracted in nature (3).

Intrastate, irregular, and protracted armed conflicts have drastically influenced recent figures of global displacement (4). In its 2017 *Global Trends Report*, the United Nations High Commissioner for Refugees (UNHCR) announced an estimated 10.3 million newly displaced individuals—Syria being the most affected country—and an overall number of 65.6 million forcibly displaced people worldwide (5). While UNHCR refugee statistics have demonstrated a substantial stabilization of the number of out-of-country refugees over the past 10 years, numbers of internally displaced people (IDP) have reached unparalleled levels representing more than 65% of the displaced population globally (6). In 2016 alone, conflict and violence gave rise to 6.9 million new IDPs, which disproportionately came from LMICs.

Organized violence has profound and catastrophic structural effects on already fragile developing countries, where 84% of the world's refugees live (5); political and economic structures are undermined, laws are overstepped, fundamental rights of individuals are often abused, and healthcare services shattered (3, 7, 8). Quantifying the magnitude of these consequences on people undoubtedly remains an intricate challenge (7). However, numerous public health studies in complex humanitarian settings have shown that armed conflicts critically affect mental health (6, 9–11).

Reliable assessments of mental health needs in humanitarian settings should be viewed as a public health priority. In fact, no mental health policies can be efficiently implemented without an accurate assessment. This seems particularly true today: numbers of global displacement related to conflicts are increasing dramatically, common camp-based models of displaced populations are becoming outdated—60% of IDPs are currently living in urban areas without any international protection—and the heavy burden of psychiatric diseases in LMICs are being acknowledged (3, 12).

Based on the assumption that conflict-affected populations will be traumatized, most studies have singularly focused on PTSD whilst largely ignoring other psychiatric disorders. Considering psychological trauma or depression as main research objectives in settings of generalized violence or unresolved conflicts is a major intellectual misapprehension. It fails to appreciate the extent of *global* repercussions on

mental health, that is, the risks of intense psychological distress in otherwise healthy individuals and increased neuropsychiatric diseases or the worsening of chronic mental illnesses due to an aggravated lack of medical resources (13–15). Additionally, these risks interact with several environmental factors that directly influence mental health such as forced evacuation of homes and separation from family members, interpersonal tensions, or loss of employment opportunities (13–15).

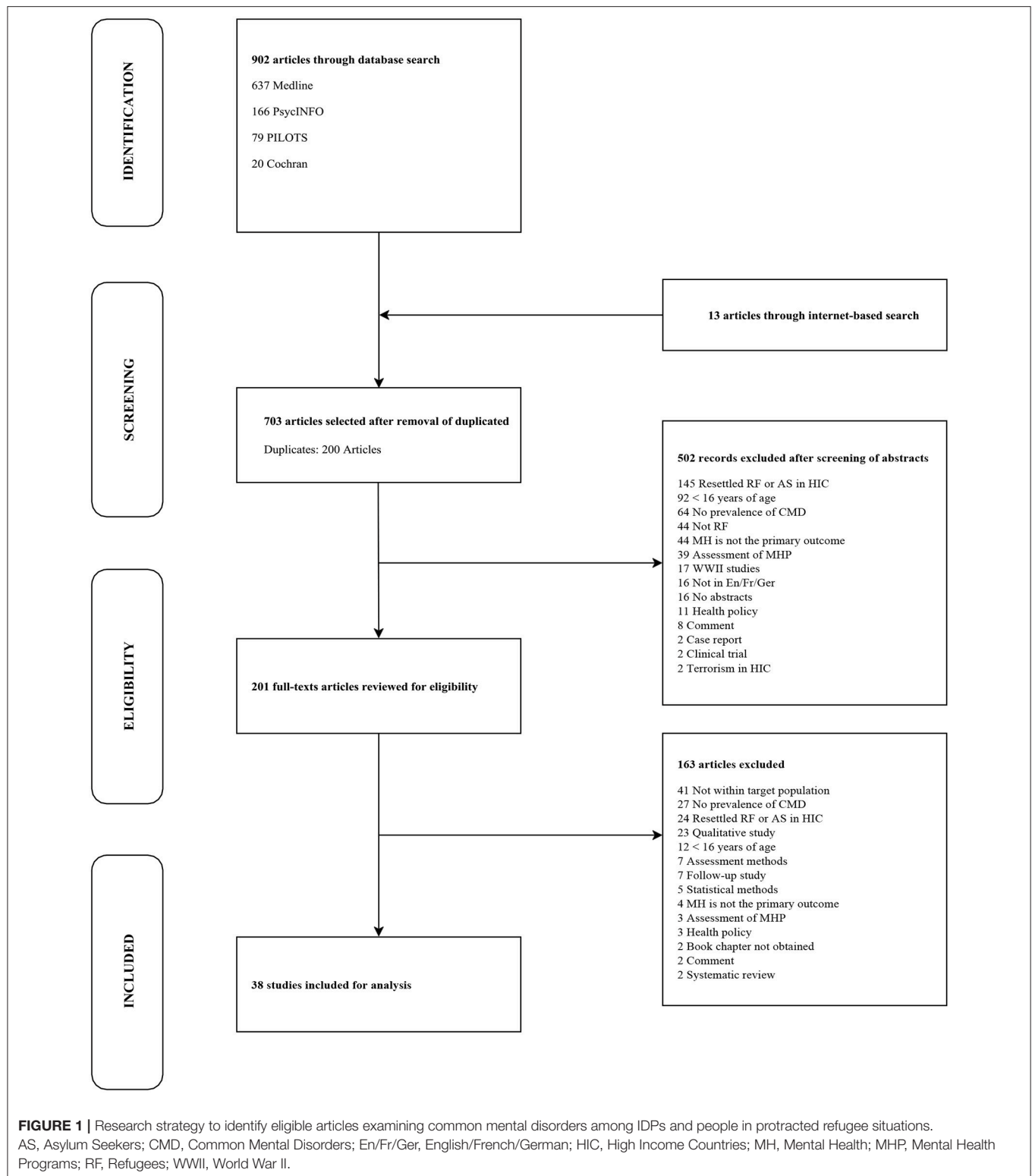
Two previous systematic reviews have evaluated prevalence rates of psychiatric disorders in refugee populations. Steel et al. (16) conducted a systematic review and meta-analysis finding higher prevalence rates of PTSD and depression in conflict-displaced refugees globally. Another review from Ezard et al. (17) observed the rates of substance abuse among refugees displaced by conflict and reported on associated risk factors and outcomes. There is still a paucity of data on the epidemiology of mental illness in populations displaced by armed conflicts. This is especially true for less common psychiatric disorders such as psychotic disorders. Therefore, we conducted a systematic review to summarize the prevalence of common psychiatric disorders, as well as more severe—uncommon—psychiatric disorders in IDPs and refugees still residing in LMICs. We also report on the methods of assessing mental illness, number, and types of traumatic events, and the duration of the displacement experience.

METHODS

To ensure the highest standardized methods of reviewing process, the conduct of this research was guided by the PRISMA guidelines for systematic reviews and meta-analyses (18).

Search Strategy

We undertook a sequential database search using MEDLINE via PubMed, PsycINFO, PILOTS, and the Cochrane library of systematic reviews. Medical Subject Headings with related text-based search terms were used with a combination of the following terms and concepts: “*mental health*,” “*refugees*,” “*prevalence*,” and “*war*.” In addition, articles indexed by “*internally displaced people*” were identified using the method of single keywords. Similarly, in the PILOTS database, an online index collecting the literature on PTSD and mental health consequences of traumatic events (19), a combination of single keywords and their synonyms was used to identify pertinent studies: “*mental health*,” “*refugees*,” “*internally displaced people*,” “*war*,” “*prevalence*,” and “*humanitarian settings*.” Relevant gray literature (unpublished articles, international reports, or non-governmental epidemiological surveys) was retrieved through an internet search. Lastly, citations from relevant articles and systematic reviews were also screened. This initial process yielded an overall number of 915 articles: 902 were generated through systematized database search, while 13 were retrieved from the gray literature and article/systematic review bibliographies (Figure 1).



Inclusion and Exclusion Criteria

Studies were considered eligible for the review if they assessed the prevalence of common mental disorders among internally displaced people and refugees afflicted by armed conflicts in

a war region or unstable country. Original articles written in English, French, and German were included. The issue of internally displaced or refugee children and adolescents should be addressed separately (20–23) and therefore, an age limit of

≥ 16 was selected as an inclusion criterion. We also limited our research to articles published after 1980 as interests about global mental health in war-torn countries emerged after 1980 when mental health progressively became an integral part of the field of public health (24). The status of conflict and displacement were other important inclusion criteria. We only included studies that reported results from or were completed in countries where conflicts were unresolved at the time of investigation and if study samples consisted of populations in protracted displacement situations. However, the UNHCR definition of “*protracted refugee situations*”— $\geq 25,000$ people gathered outside of their country of residence for ≥ 5 consecutive years—was not considered as part of the selection process (25). In this context, we did not restrict article selection according to the numbers of IDPs or refugees and years of displacement, since many authors did not report this information. Furthermore, we only included studies from LMICs defined according to the Gross National Income per capita classification proposed by the World Bank (26). We did so for two principal reasons. On the one hand, mental disorders among resettled refugees in Western high-income countries (HIC) have been investigated to a great extent in the light of PTSD, depression, and anxiety disorders (27). On the other hand, contextual factors such as a lower likelihood of being exposed to an ongoing conflict and its myriad consequences, resettlement in stable accommodations, greater economic or educational opportunities uniquely distinguish resettled refugees in HIC from displaced populations in LMICs (28). Finally, case reports, qualitative studies, systematic reviews, meta-analyses, and articles reporting consequences of natural disasters on mental health were excluded.

In order to precisely define the term *refugee*, the 1951 *Refugee Convention* was considered (29, 30): a refugee is a person who has crossed the international borders of his or her country of origin due to a “well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion,” and “is unable to, or owing to such fear, is unwilling to avail himself of the protection of that country.” Related to this, *internally displaced people* are “persons or groups of persons who have been forced or obliged to flee [...] their homes [...], in particular as a result or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights [...] or human-made disasters, and who have not crossed an internationally recognized state border” (12).

Study Selection and Data Extraction

Study selection and data extraction were completed independently by two reviewers (LL & AA) in duplicate; disagreements between them were resolved by a third reviewer (NM). The following study characteristics were extracted: type and year of study, regionality, sample size, sampling method (when available), and type of assessment method of psychiatric disorders. With regard to assessment, different potential situations were examined: clinical diagnosis provided by a mental health care specialist according to the *Diagnostic and Statistical Manual of Mental Disorders* [DSM; (31)] or the *International Classification of Disease* [ICD; (32)], clinical

assessment provided by a trained interviewer using various methods such as the *Harvard Trauma Questionnaire* [HTQ; (33)], or the *Hopkins Symptom Checklist-25* [HSCL-25; (34)], and mental health evaluation by means of a self-administered questionnaire. We extracted prevalence rates of mental disorders but scores of scales were not used. More importantly, we did not restrict the extraction to disorders such as PTSD, depression, or anxiety disorders but included also general neuropsychiatric illnesses and, when applicable, general distress. Additional data extracted covered: type, year, and country of conflict (the total duration of conflict was inferred); status, country, and length of displacement; average number of experienced and/or witnessed traumatic events; mean age of study participants, and male to female ratio. In order to compare countries in terms of severity of conflicts, levels of generalized violence, and political instability, we introduced the *Political Terror Scale* [PTS; (35)], an 5-level score developed by the American non-governmental organization (NGO) *Freedom House* in the early 1980s. This score uses data provided by *Amnesty International* and the *U.S. Department of State*. Countries with a PTS score equal to 1 are legally and politically stable, whereas countries with PTS scores equal to or greater than 4 are notably characterized by extensive human rights violations and increasing levels of politically and ideologically motivated violence.

RESULTS

We investigated 38 eligible original studies (Table 1) reporting data from a total population of 39,158 adult IDPs and refugees.

Origin of Studies

Conflict-affected regions and host countries of displaced populations were unevenly represented: six original studies were conducted in the Middle East (Iran, Syria, Jordan, Lebanon, and Turkey) (44, 59, 67, 68, 70, 71), two were conducted in Latin America (Mexico, Colombia) (10, 55), six in Central and Eastern Europe (Croatia and Georgia) (38, 40, 61–63, 66), eight in Asia (Thailand, Myanmar, Sri Lanka, Nepal, China, and Cambodia) (36, 37, 41, 43, 45, 48, 54, 60), and 16 in Africa (Sudan, Uganda, Liberia, Nigeria, Kenya, The Gambia, Senegal, and Ethiopia) (11, 39, 42, 46, 47, 49–53, 56–58, 64, 65, 69). The majority of studies were conducted in countries with a PTS score of 4 ($n = 13$) or 5 ($n = 18$).

Demographics

With regard to demographic factors, 26 studies (10, 11, 36, 38–41, 45, 47, 50, 51, 54–56, 58–66, 69–71) reported on samples that consisted of a majority (50–75%) of internally displaced or refugee women. Mean age ranged between 30 and 40 years in 21 studies (10, 11, 36, 38, 39, 42, 43, 46, 47, 49–52, 58, 60, 63–65, 68, 69, 71). In terms of status of displacement, our systematic research yielded quasi-similar results: IDPs and refugees were the primary population of interest in 16 countries (11, 48–51, 53–56, 58, 60–65) and 16 studies (10, 11, 36, 38, 40, 42, 43, 45–47, 52, 57, 59, 66, 67, 69), respectively. The mean duration of displacement ranged from 6 months to 18 years (10, 36, 38, 42, 43, 45, 47–59). Although the strict UNHCR concept of *protracted situation* was

TABLE 1 | Detailed analysis of studies meeting inclusion criteria ($N = 38$).

Author	Design	Population of interest	Study characteristics	Outcome	Assessment methods	Results	PTS
Mollica et al. (36)	Household survey	993 Cambodian refugees on the Thailand-Cambodian border (1975–1979)	Women: 61% Age: 18–34 y (57% of participants) Duration of displacement: >5 y (82% of participants)	PTSD Depression	HTQ HSL-25 Administered by trained interviewers in native language	PTSD: 15% Depression: 55%	Cambodia (1979): 5/5
Allden et al. (37)	Semi-structured Interviews	104 Burmese political dissidents in Thailand registered with the UN High Commission (1999)	Women: 21% Age: >23 y (62% of participants)	PTSD Depression	HTQ HSL-25 Administered by Burmese research assistants in native language	PTSD: 23.1% Depression: 38.5%	Burma (1999): 4/5
Mollica et al. (38)	Cross-sectional survey	534 Bosnian refugees in a camp established by the Croatian government near the city of Varazdin, Croatia (1996)	Women: 59% Mean age: 50 y Exposure to traumatic events: 6.5 Duration of displacement: >3 y (30% of participants)	PTSD Depression	HTQ HSL-25 Administered by trained interviewers in native language	PTSD alone: 26% Depression alone: 39% Depression and PTSD: 21%	Croatia (1996): 3/5
Peltzer et al. (39)	Cross-sectional survey	100 Sudanese residing in 2 refugee camps (1), 44 ex-soldiers (2), 60 refugees attending camp health facilities (3), and 63 refugees attending traditional healers' (4) in Northern Uganda (1994–1996)	(1)Women: 58% Mean Age: 37 y (2)Mean Age: 32.3 Median exposure to traumatic events: 12 (3)Mean age: 30 y Mean exposure to traumatic events: 5 (4) Mean age: 40 y Median exposure to traumatic events: 7	PTSD Depression	HTQ HSL-25 Administered by trained interviewers in native language	(1)PTSD: 32% Depression: N/A (2)N/A (3)PTSD: 13% Depression: 20% (4)PTSD: 26% Depression: 39%	Sudan (1996): PTS-A 4/5; PTS-S 5/5
Kozarić-Kovacic et al. (40)	Structured interviews	368 displaced individuals in several refugee camps near the city of Zagreb, Croatia (2000).	Women: 57% Mean age of men/women: 39 y/38 y Exposure to traumatic events: 3.8 Mean duration of displacement: 2.5 y	PTSD Alcohol dependence	Structured clinical interviews/Watson's PTSD (DSM-III-R)/Modified HTQ based on previous work on field Structured clinical interviews / CAGE questionnaire Administered by general practitioners Clinical interviews and diagnoses made by a psychiatrist (DSM-III-R)	PTSD: 50% (Men); 36 % (Women) Alcohol dependence: 60% (Men); 8% (Women)	Croatia (2000): 1/5
Lee et al. (41)	Structured questionnaires	170 North Korean refugees at the Yanbian Korean Autonomous Prefecture in China (1999)	Women: 52% Mean age: 32 y Exposure to traumatic events: 12 Duration of displacement: >1 y (76% of participants)	PTSD Depression Anxiety	HTQ HSL-25 Administered by trained interviewers in native language	PTSD: 56% Depression: 81 % Anxiety: 90%	North Korea (1999): 5/5
Tang et al. (42)	Refugee camp survey	80 Senegalese refugees from the Casamance region in The Gambia (2000)	Women: 49% Exposure to traumatic events: 11.28 Mean duration of displacement: 34 months	PTSD Depression Anxiety	HTQ HSL-25 Administered by trained interviewers in native language	PTSD: 10% Depression: 59% Anxiety: 46%	The Gambia (2000): 3/5

(Continued)

TABLE 1 | Continued

Author	Design	Population of interest	Study characteristics	Outcome	Assessment methods	Results	PTS
Van Ommeren et al. (43)	Refugee camp survey	A mixed population of 810 tortured and non-tortured Bhutanese refugees in Nepal (1997)	Women: 25% Mean age: 44 y Mean duration of displacement: >5 y	Lifetime and 12-month prevalence of psychiatric disorders	CIDI (ICD-10) Administered by trained interviewers in native language	Lifetime prevalence (non-tortured refugees) PTSD: 14% PPD: 29% MDD: 8% GAD: 12% SP: 29% DD: 5%	Nepal (1997): 4/5
Kalafi et al. (44)	Structured interviews	81 Afghan refugees residing in the city of Shiraz, Iran (2002)	Women: 0% Mean age: 29y	Depression Psychiatric Problems	GHQ-28 Administered by medical student in native language	Depression: 34.6% Psychiatric Problems: 34.6%	Afghanistan (2002): PTS-A 4/5; PTS-S 5/5
Sabin et al. (10)	Cross-sectional, household survey	170 Guatemalan refugees in 5 Mayan camps in Chiapas, Mexico (2000)	Women: 58% Mean age: 38y Exposure to traumatic events: experienced 8.3 vs. observed 9.7 Mean duration of displacement: 8 years	PTSD Depression Anxiety	HTQ (Algorithm based on DSM-IV to determine out-of-points for PTSD diagnoses) HSC-25 Administered by trained interviewers in native language	PTSD: 12% Depression: 39% Anxiety: 54%	Mexico (2000): 3/5
Lopes Cardozo et al. (45)	Stratified, systematic, random sampled survey	495 Karen (Burmese) refugees in 3 Thai-Burmese border camps (2001)	Women: 58% Age: 15–34 y (61% of participants) Mean duration of displacement: 6–10 y (49% of participants)	PTSD Depression Anxiety	Constructed questionnaire including an adapted, event-specific version of the HTQ, 16 questions for PTSD symptoms according to the DSM-IV HSC-25 Administered by trained interviewers in native language	PTSD: 5% Depression: 41% Anxiety: 42%	Myanmar (2001): 4/5
Karnau et al. (46)	Refugee camp survey	A mixed population of 1,852 African refugees in Kakuma, Northwest Kenya (1997–1999)	Sudanese 60% Somali 25% Ethiopian 15% Other demographics N/A	Incidence of CMD	Diagnosis was based on DSM-IV Interviews conducted by trained mental health workers in native language	PTSD: 39% Anxiety: 23% Psychosis: 12% Depression: 11% Others: 9%	Kenya (1999): 4/5
Karunakara et al. (47)	Cross-sectional survey	3,323 Ugandan nationals, Sudanese nationals, and Sudanese refugees in northern Uganda and southern Sudan (1999–2000)	Women: 75% Mean age: 30 y >1 episode of forced displacement (78% of participants)	PTSD	PCL-C (DSM-IV) Administered by trained interviewers in native language	PTSD Sudanese nationals: 48% Sudanese refugees: 46% Ugandan nationals: 18%	Uganda (2000): 4/5 Sudan (2000): 5/5
Thapa et al. (48)	Cross-sectional, household survey	290 Nepalese internally displaced people in Nepal (2003)	Women: 39% Mean age: 41 y Exposure to traumatic events: 4.6 Mean duration of displacement: 28.6 months	PTSD Depression Anxiety	Modified HTQ; PCL-C HSC-25 Generalized anxiety, depression and PTSD modules of CIDI in order to validate the HSC-25 and PCL-C Administered by trained interviewers in native language CIDI modules administered by a trained physician	PTSD: 53% Depression: 80% Anxiety: 81%	Nepal (2003): 4/5
Kim et al. (49)	IDPs camp survey	1,274 internally displaced adult females in 6 registered IDPs camps in Nyala District, Darfur Province (2005)	Mean age: 34 y Mean duration of displacement: 6 months	Depression Suicidal ideations Suicide attempts (over the previous year)	PHQ-9 Administered by trained interviewers in native language	Depression: 31% Suicidal ideation: 5% Attempted suicide: 2% Committed suicide: 2%	Sudan (2005): 5/5

(Continued)

TABLE 1 | Continued

Author	Design	Population of interest	Study characteristics	Outcome	Assessment methods	Results	PTS
Vinck et al. (50)	Multistage, stratified, random cluster survey	2,585 internally displaced people in 4 districts (villages and camps) of northern Uganda (2005)	Women: 50% Mean age: 37 y 61% of participants live in camps Exposure to traumatic events: 3.8	PTSD Depression	PCL-C HSCL-25 Administered by trained interviewers in native language	PTSD: 74% Depression: 44%	Uganda (2005): 5/5
Roberts et al. (51)	Multistage, stratified, random cluster survey	1,210 internally displaced people in 2 districts of northern Uganda (2006)	Women: 60% Mean age: 35 y Exposure to traumatic events: 8 (49% of women, 71% of men) Duration of displacement: 5–10 y (40% of participants)	PTSD Depression	Culturally adapted HTQ HSCL-25 Administered by trained interviewers in native language	PTSD: 54 % Depression: 67%	Uganda (2006): 4/5
Onyut et al. (52)	Cross-sectional survey	1,425 Somali and Rwandese Refugee in Nakivale, southwestern Uganda (2003)	Mean age: 32 y Exposure to traumatic events: 9 (Rwandese refugees) vs. 12 (Somali refugees) Mean duration spent in camps: >4 y	PTSD Depression Anxiety	PDS HSCL-25 Appropriate CIDI modules used in order to validate the PDS and HSCL-25 Administered by trained interviewers in native language CIDI administered by a clinician	<i>PTSD</i> Somali refugees: 48% Rwandese refugees: 32% Depression: N/A Anxiety: N/A	Uganda (2003): 4/5
Roberts et al. (11)	Cross-sectional, random cluster survey	1,242 refugees and internally displaced people in Juba, southern Sudan (2007)	Women: 51% Mean age: 33 y Status: 13% previously displaced as refugees; 10% previously displaced as IDP; 12% displaced more than once Exposure to traumatic events: ≥ 1 (92% of participants) vs. ≥ 8 (23% of participants)	PTSD Depression	HTQ HSCL-25 Administered by trained interviewers in native language	PTSD: 36% Depression: 50%	Sudan (2007): 5/5
Hamid and Musa (53)	IDPs camps survey	430 internally displaced persons in north and south Darfur (2005)	Women: 49% Mean age: 34 y Duration of displacement: > 1 y (83% of participants)	PTSD General distress	PCL-C Administered by trained interviewers in native language	PTSD: 54%	Sudan (2005): 5/5
Husain et al. (54)	Cross-sectional multistage cluster sample survey	1,409 internally displaced people in Jaffna District, Sri Lanka (2009)	Women: 62% Mean age: 40 y Exposure to traumatic events: 2.6	PTSD Depression Anxiety	HTQ HSCL-25 Administered by trained interviewers in native language	PTSD: 7% Depression: 22% Anxiety: 33%	Sri Lanka (2009): 5/5
Richards et al. (55)	Cross sectional survey	109 internally displaced people in Medellín, Colombia (2008)	Women: 60% Mean age: 38 y Duration of displacement: 1 y (22% of participants)	PTSD Depression Anxiety	Culturally validated 24-items PTSD Checklist Zung Depression Scale Zung Anxiety Scale Self-administered	PTSD: 88% Depression: 41% Anxiety: 59%	Colombia (2008): 5/5

(Continued)

TABLE 1 | Continued

Author	Design	Population of interest	Study characteristics	Outcome	Assessment methods	Results	PTS
Roberts et al. (56)	Cross-sectional multistage cluster sample survey	1,206 internally displaced people in 2 northern Uganda districts (2006)	Women: 60% Mean age: 35y Exposure to traumatic events: >8 (58% of participants) Mean duration of displacement: >5y (70% of participants)	General Alcohol disorders	AUDIT Questionnaire Administered by trained interviewers in native language	Alcohol disorders: 32% (Men), 7% (Women)	Uganda (2006): 4/5
Akinyemi et al. (57)	Cross-sectional survey	Mixed population of 971 refugees and non-refugees (46% of refugees; 57% of non-refugees) in the only UNHCR camp in South-western Nigeria (2012)	Women: 40% Mean age: 35 y Mean duration of displacement: 8.6 y	Common mental disorders (CMD)	MINI Administered by trained interviewers in native language	<i>Refugee populations:</i> Depression: 45% PTSD: 34% Obsession: 34% Mania: 26% Auditory hallucinations: 21% Visual hallucinations: 13% Alcohol abuse: 13% Drug abuse: 20% Suicidal ideation: 11% <i>Refugee populations:</i> MDE: 24% GAD: 23% Dysthymia: 20% Social phobia: 14% PTSD: 12% Agoraphobia: 6% PD: 5% OCD: 5% HE: 3% Alc. Dep./SD: 2%/1% Psychosis: 1.0% APD: 1% Suicidality: 0.5%	Nigeria (2012): 4/5
Salah et al. (58)	Cross-sectional survey	1,876 internally displaced people in 2 settlements in Central Sudan (2010)	Women: 56% Median age: 35 y Mean duration of displacement: 18 y	CMD	MINI (DSM-IV, ICD-10) Administered by trained interviewers in native language	Sudan (2010): 5/5	
Doocy et al. (59)	Cross-sectional survey	8681 Iraqi refugees in Jordan and Syria (2008-2009)	Women: 52% Mean age: 56 y Mean duration of displacement: 2 y 87% of participants displaced by conflict in Iraq	Depressive symptoms	HSCI-25 Administered by Iraqi and Jordanian interviewers in native language	<i>Overall mental disability</i> Jordan: 2% (81% conflict related) Syria: 5% (95% conflict related) <i>Depression (% cases of mental disability)</i> Jordan: 72% Syria: 75% CMD: 19% SD: 14% DS: 7% MDD: 5% PTSD: 3% AD: 1% Drug use: 1% PTSD: 23% Depression: 13% Anxiety: 11% Hazardous alcohol use: 7% Episodic heavy drinking: 3%	Jordan (2008): 4/5 Syria (2008): 4/5
Siriwardhana et al. (60)	Cross-sectional survey	450 internally displaced people in Sri Lanka (2011)	Women: 63% Mean age: 47 y	CMD PTSD	PRIME-MD PHQ CIDI Administered by trained interviewers in native language	Sri Lanka (2011): 5/5	
Makhashvili et al. (61), Roberts et al. (62), Cornellas et al. (63)	Cross-sectional survey	A mixed population of 3600 IDPs and former IDPs in Georgia (2011)	Women: 65% Mean age: 38 y Exposure to traumatic events: >3 (34%)	PTSD Depression Anxiety Alcohol disorders	TSQ PHQ-9 GAD-7 AUDIT Administered by trained interviewers in native language	Georgia (2011): 3/5	

(Continued)

TABLE 1 | Continued

Author	Design	Population of interest	Study characteristics	Outcome	Assessment methods	Results	PTS
Elhaby et al. (64)	Cross-sectional survey	74 internally displaced people in the Nyala Province, South Darfur	Women: 89% Mean age: 33 y Exposure to traumatic events: NA Mean duration of displacement: NA	Axis-I mental disorders	SCID-I (DSM-IV-TR) Administered by psychiatrists	PTSD: 15% Depression: 11% PTSD and depression: 8% Schizophrenia: 4% Depression with psychotic features: 3% Somatization: 3% Adjustment disorders: 3% Separation anxiety: 1% Alcoholism: 1%	South Sudan (2013): 5/5
Sheikh et al. (65)	Cross-sectional survey	258 internally displaced people in Kaduna, Northwestern Nigeria (2013)	Women: 52% Mean age: 39 y Exposure to traumatic events: 11-15 (68%)	PTSD Depression	HTQ CIDI Administered by trained interviewers in native language, under the supervision of medical professionals	PTSD: 42% PTSD and depression: 27% Depression: 9%	Nigeria (2013): 4/5
Vukovic et al. (66)	3-year follow-up with clinical interviews	534 Bosnian refugees in Varazdin, Croatia (1996-1999)	Women: 59% Age: 35-54 y (34%)	PTSD Depression	HTQ HSCL-25	PTSD and depression: 21% Depression: 18% PTSD: 6%	Croatia (1996): 3/5
Lusa et al. (67)	Cross-sectional survey using a double-sampling method	326 selected refugees in Burj el-Barajneh camp, Lebanon (2010)	NA	Axis-I mental disorders	MINI Clinical reappraisals by an experienced psychologist after general screening by trained interviewers. All interviews conducted in native language	Crude prevalence: MDD: 31% (lifetime) Dysthymia: 4% (current) Suicidality: 12% (current) Manic Episode: 5% (lifetime) HE: 2% (lifetime) PD: 41% (lifetime) Agoraphobia: 2% (current) Social phobia: 1% (current) OCD: 4% (current) PTSD: 4% (current) Psychotic disorders: 7% (lifetime) Mood with psychotic features: 1% (current) GAD: 8% (current)	Lebanon (2010): 3/5
Alpak et al. (68)	Psychiatric interviews	352 Syrian refugees in a tent city in Gaziantep city, Turkey (2013)	Women: 49.1% Mean age: 38 y Exposure to traumatic events: 3.7 Duration of displacement: 6.52 m	PTSD	PTSD (DSM-IV-TR) — Psychiatric interview Administered by trained psychiatry resident in native language	PTSD: 45.2% lifetime prevalence, 33.5% current prevalence	Syria (2013): 5/5
Feyera et al. (69)	Cross-sectional survey	847 adult Somali refugees in Mekadida, Southeast Ethiopia (2014)	Women: 54% Median age: 33 y Exposure to traumatic events: 4-7 (41%)	Depression Substance abuse	PHQ-9 Semi-structured questionnaire Administered by trained interviewers in native language	Depression: 38% Current substance use (i.e., last 3 months): Alc. 3%, Khat 31%, Cigarette 23%	Ethiopia (2014): 4/5

(Continued)

TABLE 1 | Continued

Author	Design	Population of interest	Study characteristics	Outcome	Assessment methods	Results	PTS
Neja et al. (70)	Cross-sectional survey	310 Syrian refugees registered with selected NGOs in Beirut and Mount Lebanon, Lebanon (2014)	Women: 61.2% Age: 25–44 (66% of participants)	Depression	MINI Administered by trained interviewers in native language	Depression: 43.9%	Syria (2014): 5/5
Kazour et al. (71)	Household survey	452 Syrian refugees in 6 refugee camps in Central Bekaa region, Lebanon (2017)	Women: 55.8% Mean age: 35 y Duration of displacement: 10m	PTSD Substance abuse disorders	MINI Administered by mental health professionals in native language	PTSD: 35.4% lifetime prevalence, 27.2% current prevalence Substance abuse disorders: 1.99% lifetime prevalence, 0.66% current prevalence	Syria (2016): 5/5

^aRoberts et al. (62), Mekhashvili et al. (61), and Comellas et al. (63) use the same subjects from a cross-sectional survey

^bMekhashvili et al. (62) used results from 3,025 subjects who completed the cross-sectional survey.

Alc. Dep./SD, Alcohol Dependence/Substance Dependence; AD, Anxiety Disorders; Audit, Alcohol Use Disorder Identification Test; APD, Antisocial Personality Disorder; CMD, Common Mental Disorders; CIDI, Composite International Diagnostic Interview; DD, Dissociative Disorder; DS, Depressive Syndromes; DSM, Diagnostic and Statistical Manual of Mental Health Disorders; GAD-7, Generalized Anxiety Disorder Instrument; HE, Hypomanic Episode; HSCL-25, Hopkins Symptoms Checklist 25; HTQ, Harvard Trauma Questionnaire; IDP(s), Internally Displaced People/Persons; MINI, Mini-International Neuropsychiatric Interview; MDD, Major Depressive Disorder; MBE, Major Depression Episode; N/A, Non Available; OCD, Obsessive Compulsive Disorder; PCL-C, PTSD Checklist–Civilian Version; PD, Panic Disorder; PDS, Post-traumatic Diagnostic Scale; PHQ-9, Patient Health Questionnaire; PPD, Persistent Pain Disorder; PRIME-MD PHQ, Primary Care Evaluation of Mental Disorders Patient Health Questionnaire; PTS, Political Terror Scale; PTSD, Post-Traumatic Stress Disorder; SCID-I, Structured Clinical Interview for DSM-IV axis I disorders; SD, Somatoform Disorders; SP, Specific Phobia; SRQ, Self Reporting Questionnaire; TSQ, Trauma Screening Questionnaire; UNHCR, United Nations High Commissioner for Refugees.

not used as an inclusion criterion, nine studies selected in this review described durations of displacement >5 years (10, 36, 43–45, 51, 56–58). Levels of traumatic exposure among forcibly displaced populations were significant and reached an average number of seven experienced and/or witnessed traumatic events per participant (10, 11, 37, 38, 40, 42, 48, 50–52, 54, 56, 61, 65, 69). These events included different forms of psychological stressors: witnessing the murder of a family member, friend, or stranger; being close to death, tortured, beaten, or arbitrarily imprisoned; being violently separated from family or isolated from other social groups, raped or sexually abused, and forced to accept ideas against one's will (11, 46).

Assessment Methods

Most eligible studies included in our review used well-established mental health questionnaires administered by trained lay interviewers or medical practitioners. Questionnaires were systematically assessed for cultural validity, translated, and administered in the participants' native language. The HTQ (33) was the preferred assessment method and was used in almost 50% of the studies looking into the prevalence of PTSD [15 of 33 studies; (10, 11, 36–42, 48, 51, 54, 65, 66)]. Anxiety disorders and depression were mostly assessed through the HSCL-25 [17 of 31 studies; (34)] (10, 11, 36–39, 41, 42, 45, 48, 50–52, 54, 59, 66). With regard to PTSD, depression, and anxiety disorders, several authors also reported the Composite International Diagnostic Interview [CIDI; (72)] as a cross-culturally validated assessment method consisting of structured clinical interviews based on DSM-IV and ICD-10 diagnostic criteria (43, 48, 52, 60, 65). In two distinct studies, clinicians administered specific CIDI modules in order to validate the diagnoses mentioned above (48, 52). Common mental disorders were assessed either by means of the Mini-International Neuropsychiatric Interview (MINI) (57, 58, 67, 70, 71), a structured clinical diagnostic interview according to the DSM-IV and ICD-10, or the CIDI (43, 60). One group of experts based their evaluation of axis-I mental disorders on the Structured Clinical Interview for DSM [SCID-I; (64)]; administered by trained psychiatrists. Definitive clinical diagnoses were based on validated diagnostic methods such as DSM-III-R, DSM-IV, DSM-IV-TR, and ICD-10 (40, 46, 68). Seven studies measured alcohol related problems and reported five different screening methods: the CAGE questionnaire (58), the AUDIT questionnaire (40)—a more detailed set of questions developed by the World Health Organization (WHO) to detect hazardous drinking—MINI standard interviews (56, 62), structured psychiatric interviews focused on alcohol abuse based on the DSM-III or DSM-IV (50, 57, 71), and the SCID-I (40).

Prevalence of Psychiatric Disorders: PTSD, Depression, and Anxiety Disorders

PTSD, depression, and anxiety disorders were the most common psychiatric illnesses investigated. However, prevalence rates of PTSD were disproportionately represented in 30 studies and consistently high: data varied between 2.2 and 88.3% (64). We found depression and anxiety disorders to be the second and third most commonly reported mental disorders among IDPs and refugees: specific estimates varied from 5.1 to 81% for

depression (10, 11, 36–43, 45–48, 50–55, 57, 58, 60–65, 68, 71) and from 1 to 90% for anxiety disorders (10, 11, 36–39, 41, 42, 44–46, 48–52, 54, 55, 57–67, 69, 70). Estimates of more precise diagnoses of anxiety disorders were compatible with the high prevalence of unspecified anxiety among displaced populations. One study showed that generalized anxiety disorder, social phobia, and obsessive-compulsive disorder affected 23, 14, and 5%, respectively, of a sample of 1,876 long-term IDPs in Central Sudan (58).

Prevalence of Psychiatric Disorders: Common Mental Disorders

Fifteen studies looked beyond the general concepts of trauma, PTSD, anxiety, and depression in settings of conflict-related forced displacement (40, 43, 44, 46, 49, 56–64, 67, 69, 71). These studies considered additional conditions such as substance abuse, psychosis, suicidality, personality disorders, and other forms of mood and anxiety disorders.

Alcohol use disorders were the most common type of substance abuse reported and were particularly prevalent among displaced men (2–60%) (40, 56–58, 62, 64). A Croatian study described rates of non-comorbid alcohol dependence as high as 60.5% (40). Conversely, although drug abuse reached 20% in one recent survey assessing common mental disorders (CMD) in a mixed population of IDPs and refugees in South-western Nigeria (57), drug abuse generally did not exceed 2% (58, 60, 71).

Psychotic disorders were explored in two different samples of African IDPs and refugees and one selected group of refugees in Lebanon: data were heterogeneous and prevalence ranged between 1 and 12% (46, 58, 67). Psychotic symptoms such as visual or auditory hallucinations, however, presented in one African study were as high as 13 and 21%, respectively (57).

We identified four studies completed in Sudan, Southwestern Nigeria, and Lebanon that investigated suicidality, representing a population of 4,447 adult IDPs and refugees (49, 57, 58, 67). In one recent study conducted in a refugee camp in Lebanon by the French NGO *Médecins sans Frontières*, current rates of suicidality reached 12% (67). Similar results were observed in a Nigerian refugee camp (57). A survey examining the health status of internally displaced adult females in Darfur reported a prevalence rate of 2% for more specific suicidal behaviors, namely attempted or committed suicide (49).

Prevalence of pain disorders was 29% in a group of 392 non-tortured Bhutanese refugees in Nepal (43). Similarly, somatoform disorders were examined in only one survey, conducted in Sri Lanka, and found to affect 14% of 450 IDPs (60).

DISCUSSION

In recent years, there has been a growing interest in research activities related to the psychiatric health sequela of armed conflicts. The high number of people affected globally by organized violence and the low level of available knowledge justify the growth in both quality and quantity of these activities. This systematic review examined for the first time the prevalence of common and uncommon psychiatric disorders among IDPs

and refugees displaced as a consequence of armed conflicts in LMICs. The results suggest that PTSD, depression and anxiety disorder are highly prevalent after displacement and armed conflicts. This association can be partially accounted for by distinct psychosocial vulnerabilities of IDP and refugee populations.

This review highlights a lack of studies assessing the prevalence of mental health disorders among forcibly displaced populations in conflict-affected middle-eastern countries as only six studies originated from these regions. This result is particularly striking in view of the ever-changing and ever-increasing figures of worldwide forced migration. For example, according to a 2017 UNHCR report (60), countries such as Turkey, Pakistan, Lebanon, or the Islamic Republic of Iran hosted more than 28% of the world's refugees, people who had been affected from the ongoing conflicts in the Syrian Arab Republic or Afghanistan.

The detailed analysis of the studies included in this review showed a high variability in the duration of displacements between studies. However, we observed that the UNHCR definition of *protracted situation* was never used as a strict methodological consideration. Rates of trauma exposure were found to be not only high in terms of prevalence but also in terms of recurrence and intensity: all participants included in the reviewed studies had experienced or witnessed at least one serious traumatic event. Thirty-one studies were conducted in populations displaced from countries with a PTS score of four or five. Although prevalence of disorders reported across these countries were heterogeneous, the point estimates for those displaced from countries with a PTS score of less than three were on average lower than those in the highest two PTS quintiles. Understanding how unstable political situations with forced displacement relate to heightened rates of CMDs could inform the development of targeted interventions. Women tended to be over-represented in the studies included in this review, irrespective of their displacement status. This is in line with other literature in refugee and IDP populations (73). The traumas faced after displacement differ between men and women, and the effects of these traumas may manifest different (74). Additionally, this may have caused variance in the reported prevalence's of common psychiatric disorders, which have been shown to differ between men and women (e.g., substance-abuse disorders and depression) (75).

Our findings confirm a long-standing inclination of mental health research toward PTSD, depression, and anxiety disorders in settings of complex emergencies. Public mental health research conducted over the past 20 years has largely focused on the immediate psychological aftermaths of armed conflicts in light of the well-described associations between these psychiatric disorders, displacement, and generalized forms of violence. Demographic and socio-economic characteristics of displaced populations are known to be potent moderators of mental health: migration, especially internal displacement, protracted conflict situations, and economic instability are strongly associated with poor mental health outcomes (5).

We point out a *substantial* lack of data concerning the general mental health conditions of forcibly displaced populations

in LMICs, which might be caused by different mechanisms (28): (1) stigma of mental disorders in developing countries, (2) disproportionate under-representation of several conflict-affected regions in the literature—such as Latin America, Central and Eastern Africa, Central Asia—(3) cultural or political barriers to assessment *and* implementation of mental health programs and policies such as insufficient funding of mental health research, (4) over-centralization of mental health resources, (5) severe shortage of adequately trained mental health staff, and, finally, (6) weak public health leadership in the field of mental health. The very few estimates about substance abuse, other mood and anxiety disorders, psychosis, or suicidality are higher than figures from the general population studies conducted in LMICs (13, 14, 76–84).

Lastly, there is a relative consensus on how to assess common mental disorders among IDPs and refugees. Structured questionnaires such as the HSCL-25, HTQ, PCL, and CIDI are largely favored for the evaluation of PTSD, depression, and anxiety disorders; they are also systematically examined for cultural validity, translated into the participants' native language, and administered by trained lay people, mental health specialists or medical practitioners. Conversely, other forms of mental disturbances such as psychosis or suicidality are assessed through MINI or SCID interviews with the help of the DSM or ICD for diagnosis validation.

LIMITATIONS

This review has a number of limitations and should therefore be interpreted cautiously. Despite our systematic search strategy, it is likely that certain unpublished or non-indexed studies have not been included. We did not establish direct contacts with authors in order to identify additional studies. Furthermore, the generalizability of our results to the entire IDP or refugee population is limited. Most research groups have favored the cross-sectional study that has been repeatedly criticized for its limitations in terms of selection bias and causality analysis (85–87). The proportion of psychiatric cases pre-existing the conflict and directly caused or at least influenced by armed conflicts and subsequent displacements remains unclear due to a lack of mental health programs in LMICs.

The presented results were extracted from studies conducted in several regions that differ greatly in terms of population characteristics, culture, social traditions, religion, language, and even types of conflict or duration of displacement. No meta-analysis has been undertaken, therefore, inter-study variability and publication bias have not been examined, and heterogeneity has not been significantly reduced. Moreover, the cross-cultural aspect of a majority of studies may have influenced the final results (88).

The HSCL-25 and HTQ have been extensively used to assess depression, anxiety disorders, and PTSD among IDP sub-populations and refugees, but not validated for general populations in LMICs (89). Many validation studies have been conducted in novel contexts for these scales and others, but it is imperative that cultural adaptations be completed prior

to their use in novel contexts (33, 90). In addition, both the HSCL-25 and the HTQ only report on symptoms. Therefore, it remains unclear to what extent these symptoms would correlate with formal clinical diagnoses based on the DSM or ICD.

Finally, some of studies did not specify whether any cultural adaptation was undertaken to formulate diagnostic criteria. Psychiatric presentation and diagnosis (including the criteria outlined in the DSM and ICD), are known to exhibit cross-cultural differences (91). Due to the recent refugee and humanitarian crises, psychometric measures and clinical interviews used to ascertain the presence of CMDs (i.e., depression, anxiety, and PTSD) in refugee populations have been widely studied and validated (92). In relation to the severe and uncommon disorders reported in this study, there is a paucity of research in the refugee context. As such, it is possible that authors used culturally unadapted methods to determine diagnosis and that estimated prevalence rates may not be representative of the true values in the populations studied.

PRACTICAL IMPLICATIONS AND CONCLUSION

Wars and other forms of organized violence generally draw the attention of policymakers, mass media, and non-governmental organizations. Mental health and public health experts tend to consider this selective and often temporary attention as an opportunity to raise awareness about the psychological consequences of armed conflicts, namely PTSD, to warn about the disastrous mental health situation in low- and middle-income countries. With the numbers of displaced individuals reaching unprecedented levels, a more global mental health approach is necessary to effectively support affected nations. In places where violence is seen as a necessary factor in achieving peace, ongoing armed conflict, and displacement will likely contribute to continued psychological impairment and suffering among those affected (50). Allowing for a better understanding of the effects that the aftermath of war have on the psychological well-being will allow for interventions not only targeting mental illness but also attitudes toward reconciliation and justice and reduction of future violence (93).

In sum, this systematic review indicates that the heterogeneity in prevalence rates is caused by methodological differences between studies and differences between conflict-affected IDP and refugee populations. We recommend that future public mental health research goes beyond the assessment of PTSD, depression, and anxiety disorders and consider a broader inclusive definition of the psychological consequences of armed conflict as additional key concept. In addition to that questionnaires assessing more severe disorders (e.g., psychotic disorders) which are often ignored need to be developed and validated for use in LMICs.

Ambitious and locally coordinated assessment programs of mental health should be implemented as well as non-centralized mental health policies and their systematic qualitative evaluations (94). Lastly, the on-going crises indicate that there is an urgent need for scalable interventions that are appropriate for war-torn contexts in which resources are limited. The World Health Organization is currently spearheading this with the so called low-intensity intervention Problem Management Plus [PM+; (95)] being the most evidence-based release to date (96, 97). On-going research is aiming to increase the scope of this intervention to allow for group-based and application-based administration. However, the most critical challenge will be to translate these promising intervention programs into sustainable public mental health policies in countries so deeply weakened by protracted conflicts, destruction of fragile pre-existing health care structures, and political instability. Finally, it is unfortunately common that refugees and IDPs are not being treated fairly wherever they end up seeking protection and support, and are

subjected to ongoing humiliating, traumatizing, or otherwise damaging circumstances. From a societal and ethical viewpoint, changing these circumstances may even constitute a higher priority than diagnosing and treating trauma-related mental illness.

AUTHOR CONTRIBUTIONS

All authors contributed to the study conception and design. AA and NM conducted literature search and data extraction. NM and AA performed data analyses and drafted the manuscript. All authors contributed to and approved the final version of the manuscript.

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A Longitudinal Investigation of Moral Injury Appraisals Amongst Treatment-Seeking Refugees

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There is currently an unprecedented number of forcibly displaced people worldwide. Understanding psychological mechanisms that contribute to the mental health of refugees and asylum-seekers is important for informing the development of effective interventions for these populations. Moral injury appraisals represent an important potential cognitive mechanism that may contribute to psychological symptoms following exposure to persecution, war, and displacement. In the current study, we investigated the longitudinal association between moral injury appraisals related to one's own perceived transgressions (moral injury-self), others' perceived transgressions (moral injury-other), and PTSD and depression symptoms. Participants in this study were 134 refugees receiving treatment at two outpatient clinics in Switzerland who completed survey measures investigating these concepts. Of these, 71 were followed up 2 to 4 years later. Path analyses revealed that greater depression symptoms were associated with subsequent increases in moral injury-self appraisals ($\beta = 0.25$, $SE = 0.08$, 95% CI [0.11, 0.43], $p = 0.002$). In contrast, greater moral injury-self appraisals were associated with subsequent decreases in PTSD symptoms ($\beta = -0.23$, $SE = 0.11$, 95% CI = [-0.44, -0.31], $p = 0.035$). Findings suggest that different types of moral injury appraisals may be associated with differential psychological outcomes. These results have important potential implications for policy and treatment of refugees and asylum-seekers, highlighting the importance of targeting cognitive factors in the maintenance and treatment of psychological distress, and considering the post-migration context when working with refugees.

Keywords: moral injury, refugees, posttraumatic stress disorder, depression, trauma

INTRODUCTION

The number of people who have fled their homes as a result of war and persecution internationally is currently over 68 million (1). Compared to the general population in host countries, refugees report elevated rates of psychological disorders including posttraumatic stress disorder (PTSD) and depression (2, 3). The development of targeted interventions to reduce the psychological burden of refugees would be greatly aided by understanding the processes underlying psychopathology in these groups. To date, however, relatively little is known about the psychological mechanisms underpinning the mental health of refugees.

One psychological mechanism that has been consistently demonstrated to impact posttraumatic mental health both cross-sectionally and longitudinally is cognitive appraisals (4–7). Models of PTSD posit that the way in which the trauma survivor interprets their experiences, symptoms, and the broader context influences the development of symptoms in the aftermath of a potentially traumatic event [PTE; (8–10)]. The types of PTEs to which refugees are typically exposed (e.g., prolonged, repeated, human-instigated) are likely to engender cognitive change regarding the self and broader society, which may, in turn, contribute to psychopathology (11, 12). Despite a strong theoretical rationale, however, there is relatively little available evidence regarding cognitive appraisals that may arise from refugee experiences nor how these interact with mental health.

One framework that may be useful in conceptualizing the cognitive impact of the refugee experience is moral injury (13, 14). Moral injury can be defined as “the lasting psychological, biological, spiritual, behavioral, and social impact of bearing witness to acts that transgress deeply held moral beliefs and expectations” (15). This construct was initially developed to describe the effects of being exposed to moral transgressions in the context of combat (15); however, it is increasingly being applied to non-military settings (16–20). While moral injury is often conceptualized in terms of the nature of a specific event (e.g., killing in the context of warfare, betrayal by a superior officer) (15, 21), we posit that it can also be considered as a cognitive interpretation relating to refugee experiences, whereby the *appraisal* of an experience as morally injurious might give rise to psychological symptoms (13). This is broadly consistent with the construct of “moral pain,” proposed to describe the cognitive and emotional response to potentially morally injurious events (22). For example, in a refugee context, one individual being forced to leave behind a family member may consider this action a serious transgression of important values; while to another, it may be perceived as a necessary step in moving one’s immediate family to safety. Consistent with cognitive models of post-trauma mental health, these appraisals may then give rise to different psychological outcomes, with the former potentially contributing to psychological symptoms, and the latter to better post-trauma adaptation (8).

Research conducted in military settings has focused on two types of moral injury that may be especially relevant to refugees— that related to one’s own actions (which we term moral injury-self) and that related to the actions of others (moral injury-other) (23, 24). Mixed findings have emerged regarding the association between these two types of moral injury and psychological outcomes in military samples. Currier et al. (24) found that both types of moral injury were associated with greater PTSD and depression symptoms. Although Bryan et al. (23) also found that moral injury-other was linked to higher levels of PTSD symptoms, only moral injury-self was associated with higher levels of hopelessness and anger. Held et al. (25) found that negative beliefs about others, negative beliefs about the self and self-blame mediated the association between moral injury-self (but not moral injury-other) and post-traumatic symptomatology in treatment-seeking veterans. Overall the differential association between different types of

morally injurious events, appraisals, and psychological outcomes remains unclear.

To date, there have been two empirical investigations of moral injury appraisals in refugees. The first found that higher levels of moral injury-other were associated with greater PTSD and depression symptoms, explosive anger, and lower mental health-related quality of life in treatment-seeking refugees, over, and above the impact of PTE exposure, post-migration living difficulties (14). This study did not investigate moral injury-self. The second study investigated both moral injury-self and moral injury-other in a sample of 222 resettled refugees from diverse backgrounds (13). This study found that moral injury-self and moral injury-other were both predicted by greater trauma exposure, and associated with more severe anger and depression. While moral injury -other was associated with greater PTSD symptoms across all symptom clusters, moral injury -self was related to lower intrusive symptoms. Taken together, these findings indicate that that moral injury -self and moral injury -other may represent distinct constructs in a refugee context, and are differentially associated with psychological outcomes. To date, however, moral injury appraisals in refugees have only been investigated cross-sectionally. Without understanding how these types of moral injury appraisals relate to one another and psychological symptoms over time, it is difficult to ascertain the mechanistic role they may play in psychopathology in refugee groups.

The current study builds upon the Nickerson et al. study (14) to conduct the first longitudinal investigation of moral injury in refugees, with participants in this study being assessed 2 to 4 years after the first study. In addition, in this study both MI-other and MI-self were examined to elucidate their interrelationship as well as their relationship with important psychological outcomes. Understanding how moral injury appraisals might change over time, and their association to psychological symptoms, affords a unique opportunity to investigate the potentially mechanistic role of moral injury in the development and maintenance of psychological disorders.

In this study, we employed path analyses to investigate the association between moral injury appraisals and mental health over time. We hypothesized that:

(1) Greater exposure to PTEs and post-migration living difficulties would predict higher moral injury-self and moral injury-other appraisals. We based this prediction on the strong association between PTEs, post-migration living difficulties and psychological symptoms in the literature (26, 27), and the findings from Hoffman et al. (13) that greater trauma exposure was associated with higher moral injury-self and other appraisals.

(2) Higher moral injury-other appraisals at Time 1 would be associated with higher moral injury-self appraisals at Time 2, and vice versa. We based this prediction on findings from Hoffman et al. (13) that MI-self and MI-other were positively related cross-sectionally.

(3) Higher moral injury-other appraisals at Time 1 would be associated with greater PTSD and depression symptoms at Time 2. We based this prediction on findings from both Nickerson et al. (14) and Hoffman et al. (13) that MI-other was related to higher PTSD and depression cross-sectionally.

(4) Higher moral injury-self appraisals at Time 1 would be associated with greater depression (but not PTSD symptoms) at Time 2. We based this prediction on the finding from Hoffman et al. (13) that moral injury-self was associated with greater depression cross-sectionally, but not related to PTSD symptom sub-scales of avoidance, negative alterations in cognition and mood or hyperarousal.

MATERIALS AND METHODS

Participants

Participants in this study were 134 refugees who, at the first time-point, were receiving psychological treatment at two outpatient clinics in Zurich and Bern, Switzerland. Exclusion criteria included current psychotic symptoms, severe dissociative symptoms, or active suicidality, which were assessed upon intake into the clinic by the treating psychiatrist or psychologist. At Time 1, participants in this study comprised 105 males (78.4%), with a mean age of 42.44 years ($SD = 9.8\%$). Marital status of the sample was as follows: single $n = 40$ (29.9%), in a relationship/married $n = 78$ (58.2%) and divorced or widowed $n = 16$ (11.9%). The highest level of educational attainment was as follows: not completed primary school $n = 17$ (12.7%), completed primary school $n = 43$ (22.1%), completed high school $n = 31$ (23.1%), completed a Bachelor's Degree or technical college diploma $n = 22$ (23.9%) and completed a postgraduate degree $n = 10$ (7.5%). The employment status of the sample was as follows: engaged in full-time employment $n = 9$ (6.7%), engaged in part-time employment $n = 17$ (12.6%), unemployed $n = 82$ (61.2%) and retired or homemaker $n = 23$ (17.1%). At Time 1, participants had been in Switzerland for a mean of 9.01 years ($SD = 6.7$). Participants at Time 1 were from a number of ethnic backgrounds, including Turkey ($n = 71$, 53%, with $N = 58$, 43.3% being Kurdish), Iran ($n = 15$, 12%), Sri Lanka ($n = 11$, 8%), Bosnia ($n = 6$, 5%), Iraq ($n = 6$, 5%), Afghanistan ($n = 5$, 4%), and other ($n = 20$, 13%). At Time 1, participants had received treatment for a mean of 37.67 months ($SD = 28.5$). Inclusion criteria for this study comprised: (a) aged 18 years or older, and (b) speaking one of the study languages (German, Turkish, Arabic, Farsi, or Tamil).

Time 2 data collection commenced 2 years after Time 1, and 71 participants completed the second survey a mean of 2.81 ($SD = 0.42$) years after the Time 1. The distribution of ethnicities at Time 2 were as follows: Turkey ($n = 42$, 59.2%), Iran ($n = 6$, 8.5%), Sri Lanka ($n = 6$, 8.5%), Iraq ($n = 4$, 5.6%), and other ($n = 13$, 18.3%). Differences in the groups who completed the survey at Time 1 only, compared to those who completed the survey at Time 1 and Time 2 are presented in **Table 1**. Compared to those who completed only Time 1, participants who completed both time-points were significantly older [$t_{(132)} = -3.13$, $p = 0.002$], had lived in Switzerland longer [$t_{(132)} = -2.65$, $p = 0.01$] and included proportionally more males than females [$\chi^2_{(1)} = 4.24$, $p = 0.04$], than participants who only completed Time 1.

Measures

Gold-standard translation and back-translation procedures were implemented for measures in this study (28). Measures were

first translated from English into the study languages (German, Turkish, Arabic, Farsi, or Tamil) by accredited translators, and were then translated back into English by translators who had not seen the original versions of the questionnaires. Discrepancies, in the form of minor language inconsistencies, were rectified jointly by the research team and bilingual individuals with experience working with mental health-related information.

Exposure to Potentially Traumatic Events

We indexed exposure to PTEs using a measure developed for this study. The trauma event lists of two standardized questionnaires, the Harvard Trauma Questionnaire (29) and the Posttraumatic Diagnostic Scale (30) were amalgamated, and the final scale comprised 23 items which indexed exposure to PTEs typically experienced by refugees. Example events included witnessing the death of loved ones, lack of food and water, and torture. PTE exposure was indexed by a count of the number of types of traumatic events experienced by each participant.

Post-migration Stressors

Post-migration stressors were assessed using the Post-Migration Living Difficulties Checklist (31, 32), which was adapted to the Swiss context. This scale comprised 17 items detailing common difficulties experienced by refugees in their host society (e.g., language difficulties, financial difficulties). Participants indicated the extent to which each of these stressors had been a problem over the past 12 months on a five point scale (0 = *not a problem* to 4 = *a very serious problem*). Items that scored 2 (*a moderately serious problem*) or more were considered significant stressors, and a total count of living difficulties was derived.

PTSD Symptoms

We measured PTSD symptoms using the Posttraumatic Diagnostic Scale (30). As data collection commenced prior to the release of the updated version of this scale, four items were added to encompass new DSM-5 criteria for PTSD and one item from the obsolete DSM-IV criteria removed, resulting in a 20-item scale (33). Participants rated items on a 4-point scale (0 = *not at all/ only once* to 3 = *five or more times a week/ almost always*). We used a total sum score to represent PTSD symptom severity. This scale has been used to assess PTSD in refugees (34–36), and has strong psychometric properties (37). The internal consistency for this scale was $\alpha = 0.94$.

Depression Symptoms

Depression was measured using the 15-item depression subscale of the Hopkins Symptom Checklist (38). Items were measured on a 4-point scale (1 = *not at all* to 4 = *extremely*), and a total sum score used to represent depression symptom severity. The HSCL has been used on numerous occasions with refugees (36, 39), and has strong psychometric properties (38). Internal consistency for this scale was $\alpha = 0.89$.

Moral Injury Appraisals in Refugees

A 6-item scale indexing moral injury was developed for this study (14). This scale comprised two subscales, namely moral injury relating to one's own actions (MI-Self) and moral injury relating to others' actions (MI-Other). All items were rated on a 4-point scale (0 = *not at all*, 3 = *very much*). For each subscale,

TABLE 1 | Differences between participants who completed time 1 and time 2 survey measures, and participants who completed only time 1 survey measures (*t*-tests).

Variable	Completed T1 & T2 <i>M</i> (<i>SD</i>)	Completed T1 only <i>M</i> (<i>SD</i>)	<i>t</i>	<i>df</i>	<i>p</i>	95% <i>CI</i>
Age	44.83(8.96) [<i>n</i> = 71]	39.75(10.12) [<i>n</i> = 63]	3.08	132	0.002	1.82, 8.35
PTE exposure	12.49(4.34) [<i>n</i> = 71]	11.97(4.79) [<i>n</i> = 63]	0.67	132	0.507	−1.04, 2.09
LDC	10.03(4.26) [<i>n</i> = 71]	9.48(4.06) [<i>n</i> = 63]	0.77	132	0.445	−0.87, 1.98
Length of time in [edited out for blind review]	10.41(6.70) [<i>n</i> = 71]	7.44(5.96) [<i>n</i> = 63]	2.65	132	0.010	−0.73, 5.20,
PTSD	1.73(0.68) [<i>n</i> = 64]	1.64(0.69) [<i>n</i> = 55]	0.77	132	0.442	−0.14, 0.33
Depression	2.73(0.58) [<i>n</i> = 68]	2.71(0.66) [<i>n</i> = 59]	0.22	132	0.687	−0.19, 0.24
Anger	1.39(0.75) [<i>n</i> = 68]	1.16(0.66) [<i>n</i> = 59]	1.87	131	0.064	−0.01, 0.47
MI-Self	1.80(1.02) [<i>n</i> = 68]	1.70(0.99) [<i>n</i> = 59]	0.74	125	0.464	−0.18, 0.22
MI-Other	1.07(0.74) [<i>n</i> = 69]	0.86(0.70) [<i>n</i> = 61]	1.67	128	0.097	−0.13, 0.04
Gender (male, female)	(<i>n</i> = 61, <i>n</i> = 10)	(<i>n</i> = 45, <i>n</i> = 18)	$\chi^2 = 4.24$	1	0.400	

t, *t*-statistic; *df*, degrees of freedom; *p*, significance level; 95%*CI*, 95% confidence interval; χ^2 , chi-squared statistic; MI-Other, moral injury appraisals of violations by others; MI-Self, moral injury appraisals of violations by oneself; PTE, potentially traumatic events; LDC, post-migration living difficulties checklist; PTSD, posttraumatic stress disorder.

a mean of items was taken to represent the subscale score. The *MI-Self* subscale comprised two items relating to the individual being troubled because of actions they took or failed to take that transgressed their morals. As Cronbach's alpha provides biased estimates for reliability for two-item scales, a Spearman-Brown coefficient was calculated for this scale, $\rho = 0.71$ (40). The *MI-Other* subscale comprised four items relating to the individual being troubled by the actions of others that transgressed their morals. The internal consistency for this scale was $\alpha = 0.77$.

Procedure

Ethics approval was received for this study from the Ethics Committees of the Cantons of Zurich and Bern. All eligible individuals who were receiving treatment at the Zurich and Bern clinics were invited to take part in the study by their treating therapist or a study team member. Participants were informed that their decision to participate or not would have no impact on the treatment they received at these clinics. Participants attended a 1 to 2 h long research session where they first provided written informed consent. Participants completed questionnaires in their own language using a therapist-assisted computer-based assessment tool (MAPSS) (41). Self-report questionnaires were presented on a tablet in written and auditory form. Psychiatrists, clinical psychologists or masters-level students of clinical psychology supervised the research session. Interpreters were used for sessions where required. Participants were reimbursed CHF 40 (approx. USD 40) for participation. Two to four years after completion of the first session, participants were contacted by the study team to invite them to complete the second survey. The same procedure was followed for the second session.

Data Analysis

Descriptive statistics were generated using SPSS Version 23.0. Path analysis, conducted in Mplus version 7.4, was used to investigate the relationship between demographics, refugee experiences, moral injury subscales, and PTSD, and depression symptoms at Time 1 and Time 2. There was 47.0% attrition at Time 2 due to participants being uncontactable (*n* = 44) or declining to participate (*n* = 19). A full information maximum likelihood (FIML) estimator was implemented. This estimator is ideal for models where there is substantial missing data as it uses other variables in the model to account for missing values (42). Variables on which individuals who dropped out of the study differed from those who completed both time-points were included in the model to create unbiased parameter estimates. The model was initially specified as follows: Step 1: age, gender, length of time in Switzerland, trauma exposure and post-migration living difficulties (all measured at Time 1); Step 2: (MI-self, MI-other, PTSD symptoms, and depression symptoms (measured at Time 1); Step 3: MI-self, MI-other, PTSD symptoms, and depression symptoms. All variables were permitted to influence variables at the subsequent step. Residual error variance was allowed to covary between variables entered at the same step.

Next, model trimming was employed and paths with $p < 0.10$ were removed from the model. Indirect effects were tested using bootstrapping (500 draws), which yields 95% confidence intervals. Model fit criteria included a non-significant chi-square test χ^2 test, a root mean square error of approximation (RMSEA) < 0.06 , Comparative Fit Index (CFI) ≥ 0.90 , Tucker-Lewis Index (TLI) ≥ 0.90 , and standardized root mean square residual (SRMR) < 0.05 (43).

RESULTS

Exposure to Potentially Traumatic Events and Post-migration Living Difficulties

Participants had experienced a mean of 12.25 types of PTEs ($SD = 4.54$). The most frequent types of events experienced were torture (85.1%), imprisonment (76.9%), and enforced isolation from others (76.9%). Participants had also experienced a mean of 9.77 types of living difficulties ($SD = 4.16$). The most frequent types of living difficulties experienced were loneliness, boredom, or isolation (84.3%), worries about family back home (80.6%), and being unable to return to their home country in an emergency (75.4%).

Path Analysis

The initial model in which all paths were specified yielded adequate fit $\chi^2_{(20)} = 23.90$, $p = 0.247$, $RMSEA = 0.04$ (95% CI = 0.00 to 0.09), CFI = 0.99, TLI = 0.95, SRMR = 0.05. After the removal of paths with $p < 0.10$, good model fit was retained $\chi^2_{(31)} = 29.63$, $p = 0.537$, $RMSEA = 0.00$ (95% CI = 0.00 to 0.06), CFI = 1.00, TLI = 1.01, SRMR = 0.06. Standardized parameter estimates of direct effects are presented in **Figure 1** and **Table 2**. Standardized indirect effects are presented in **Table 3**.

Hypothesis 1: Association Between Refugee Experiences and MI Appraisals

Greater exposure to PTEs and living difficulties at Time 1 significantly predicted higher MI-Other but not MI-Self appraisals at Time 2.

Hypothesis 2: Association Between MI Appraisals at Time 1 and Time 2

Higher MI-Other appraisals at Time 1 were associated with higher MI-Self appraisals at Time 2. Higher MI-Self appraisals at Time 1 were associated with higher MI-Other appraisals at Time 2.

Hypothesis 3: Association Between MI-Other Appraisals at Time 1 and Psychological Symptoms at Time 2

Contrary to our hypotheses, MI-Other appraisals at Time 1 were not associated with psychological symptoms at Time 2.

Hypothesis 4: Association Between MI-Self Appraisals at Time 1 and Psychological Symptoms at Time 2

Higher MI-Self appraisals at Time 1 were associated with lower PTSD symptoms at Time 2. Notably, higher depression symptoms at Time 1 were associated with greater MI-Self appraisals at Time 2.

Indirect Effects

There was a significant indirect effect of trauma on MI-Self appraisals at Time 2 via MI-Other appraisals at Time 1. There was a significant indirect effect of living difficulties on PTSD at Time 2 via depression symptoms at Time 1. There was a significant indirect effect of living difficulties on MI-Other appraisals at Time 2 via MI-Other appraisals at Time 1. There were significant indirect effects of living difficulties on MI-Self appraisals on Time 2 via MI-Other appraisals at Time 1, and depression symptoms at Time 1.

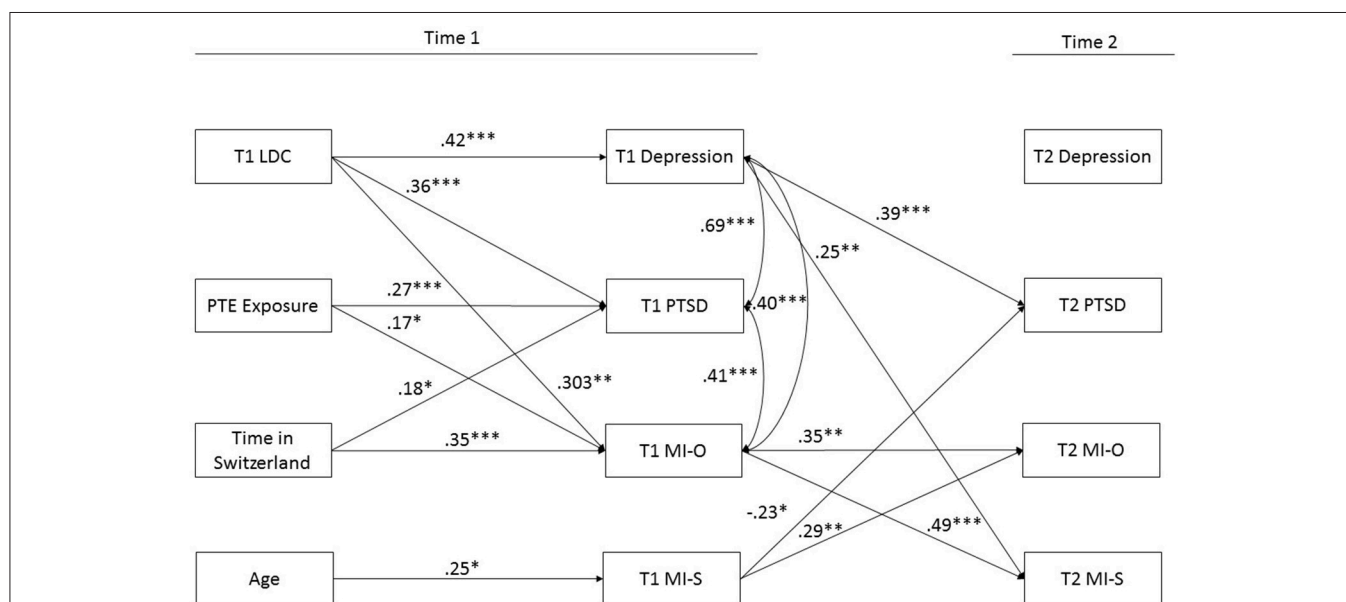


FIGURE 1 | Longitudinal association between refugee experiences, moral injury appraisals and psychological symptoms in traumatized refugees. LDC, Postmigration living difficulties; PTE, Potentially Traumatic Events; T1, Time 1; T2, Time 2; MI-O, Moral injury Other; MI-S, Moral Injury Self. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE 2 | Standardized coefficients for direct effects in path model.

	β	SE	95% CI	p
ON AGE				
T1 MI-Self	0.248	0.123	(0.004, 0.486)	<0.044
ON TIME IN SWITZERLAND				
T1 Depression	0.163	0.084	(0.018, 0.338)	0.053
T1 PTSD	0.184	0.078	(0.035, 0.337)	0.018
T1 MI-Other	0.349	0.074	(0.194, 0.488)	<0.001
ON PTE EXPOSURE				
T1 Depression	0.157	0.089	(−0.008, 0.325)	0.076
T1 PTSD	0.269	0.086	(0.098, 0.430)	<0.001
T1 MI-Other	0.166	0.079	(0.002, 0.318)	0.036
ON T1 LDC				
T1 Depression	0.419	0.081	(0.268, 0.571)	<0.001
T1 PTSD	0.361	0.086	(0.183, 0.518)	<0.001
T1 MI-Other	0.303	0.096	(0.099, 0.479)	0.002
ON T1 DEPRESSION				
T2 Depression	0.210	0.117	(−0.036, 0.422)	0.072
T2 PTSD	0.391	0.102	(0.183, 0.605)	<0.001
T2 MI-Self	0.252	0.082	(0.110, 0.425)	0.002
ON T1 MI-OTHER				
T2 MI-Other	0.352	0.108	(0.101, 0.542)	0.001
T2 MI-Self	0.491	0.071	(0.327, 0.613)	<0.001
ON T1 MI-SELF				
T2 PTSD	−0.230	0.109	(−0.440, −0.031)	0.035
T2 MI-Other	0.286	0.109	(0.079, 0.495)	0.009

β , standardized Beta coefficients; SE, standard error; 95% CI, 95% confidence interval; p, significance; PTE, potentially traumatic events; LDC, post-migration living difficulties; MI-Other, moral injury appraisals of violations by others; MI-Self, moral injury appraisals of violations by oneself; PTSD, posttraumatic stress disorder.

DISCUSSION

To our knowledge, this study represents the first longitudinal investigation of moral injury appraisals amongst refugees. The key finding from this study was that moral injury-other and moral injury-self appraisals were differentially associated with psychological outcomes in treatment-seeking refugees. Specifically, we found that depression at baseline predicted greater moral injury-self appraisals at Time 2, and moral injury-self appraisals at Time 1 predicted *lower* PTSD symptoms at Time 2. These findings suggest that higher depression symptoms may give rise to increased appraisals that the individual has transgressed their own morals. This is consistent with cognitive models of depression that highlight the powerful role of negative cognitions about the self in this disorder (44, 45). Our finding, that moral injury appraisals at Time 1 did not predict depression at Time 2, is contrary to traditional cognitive models of depression which have posited that maladaptive cognitions contribute to the development of psychological symptoms (44, 46). Other theoretical and empirical accounts, however, have suggested that the relationship between depression and negative cognitions is bidirectional (47), or that negative cognitions arise from, rather than precede, depression symptoms (48, 49).

TABLE 3 | Standardized indirect effects for path model.

	B	SE	95%CI	p
PTE EXPOSURE TO T2 PTSD				
Via T1 Depression	0.061	0.039	(−0.001, 0.154)	0.118
PTE EXPOSURE TO T2 DEPRESSION				
Via T1 Depression	0.033	0.027	(−0.002, 0.100)	0.217
PTE EXPOSURE TO T2 MI-OTHER				
Via T1 MI-Other	0.058	0.033	(0.011, 0.135)	0.078
PTE EXPOSURE TO T2 MI-SELF				
Total indirect	0.121	0.057	(0.002, 0.230)	0.034
Via T1 MI-Other	0.081	0.041	(−0.002, 0.166)	0.049
Via T1 Depression	0.040	0.026	(0.000, 0.101)	0.130
T1 LDC TO T2 PTSD				
Via T1 Depression	0.164	0.055	(0.071, 0.305)	0.003
T1 LDC TO T2 DEPRESSION				
Via T1 Depression	0.088	0.054	(−0.005, 0.213)	0.104
T1 LDC TO T2 MI-OTHER				
Via T1 MI-Other	0.106	0.043	(0.029, 0.194)	0.013
T1 LDC TO T2 MI-SELF				
Total indirect	0.254	0.067	(0.117, 0.372)	<0.001
Via T1 MI-Other	0.149	0.053	(0.054, 0.258)	0.005
Via T1 Depression	0.106	0.043	(0.042, 0.207)	0.013

β , standardized Beta coefficients; SE, standard error; 95% CI, 95% confidence interval; p, significance; PTE, potentially traumatic events; MI-Other, moral injury appraisals of violations by others; MI-Self, moral injury appraisals of violations by oneself; LDC, living difficulties checklist; PTSD, posttraumatic stress disorder.

Accordingly, theorists have posited a reciprocal relationship between negative cognitions and depression, in which a cycle of self-recrimination, rumination, and depressed mood prolongs, and increases symptoms (50–52). Consistent with this, in a trial testing prolonged exposure therapy for PTSD, changes in depression symptoms preceded changes in self-blame cognitions (53). In this study, participants with high levels of depression may have engaged in rumination regarding their previous actions, thus intensifying their distress about perceived moral transgressions. It is important to note, however, that participants in this study were treatment-seeking, and thus these processes may have been influenced by treatment strategies and/or symptom reduction. Further research is required to elucidate the relationship between depressed mood, moral injury-self appraisals, and other cognitive processes such as rumination.

Our results revealed that higher levels of moral injury-self cognitions were associated with subsequent decreases in PTSD symptoms in this sample of treatment-seeking refugees. This is partly consistent with the findings from Hoffman et al. (13) that higher levels of moral injury-self cognitions were associated with lower intrusive (but not avoidance, cognitions and mood and hyperarousal symptoms). This is in contrast to cross-sectional research with military samples indicating that moral injury related to one's own actions is linked to higher PTSD symptoms (15, 21), although it should be noted that Bryan et al. (23) found that moral injury-self was not associated with PTSD in a military sample. While cognitive models of PTSD posit that higher levels

of negative trauma-related appraisals give rise to more severe PTSD symptoms (8–10), evidence regarding the relationship between PTSD and negative appraisals of one's own actions is mixed. Studies conducted with survivors of various types of trauma have documented both a positive relationship between self-blame and PTSD symptoms (54–56), and no relationship between these variables (57–59). Further, consistent with the current findings, Startup et al. (60) found that higher levels of self-blame were associated with lower PTSD symptomatology in survivors of various types of traumatic events. The present findings can be interpreted in multiple ways. Firstly, as our sample were treatment-seeking, it may be that the observed reduction in PTSD symptom severity between Time 1 and 2 was related to psychotherapy received during this period. For example, if participants reported greater cognitions related to moral injury-self at Time 1, this may have led the therapist to focus the treatment on these appraisals, potentially producing a flow-on effect that resulted in reduced PTSD symptoms at Time 2. These findings should be replicated in a non-treatment seeking sample to determine whether these results represent an artifact of treatment. Second, it is possible that these findings point to a specific etiological pathway for the development and maintenance of PTSD. Models of PTSD highlight the protective role of perceived control during the traumatic event against the development of PTSD symptoms (8, 61, 62). Accordingly, in a study with accidental injury survivors, greater perceived responsibility for a traumatic event was associated with lower PTSD symptoms 6 months later (63). It is possible that, in this study, the appraisal that one's actions were transgressive was related to the perception that one could have acted differently during the event. This may have led to greater perceived control during the situation, and lower resulting levels of PTSD symptoms. Alternatively, the appraisal that one has acted against one's moral code may lead the traumatic memory to be experienced in a manner that is qualitatively distinctive. For example, individuals with higher levels of moral injury-self appraisals may experience lower levels of avoidance due to intentionally engaging with the traumatic memory. This may lead to the memory being processed differently, contributing to a unique symptom presentation. These explanations are highly speculative, however, and further longitudinal and experimental work is required to replicate this finding, and determine the mechanism by which it operates.

Contrary to our hypothesis, we found that moral injury-other appraisals did not predict subsequent psychological symptoms, despite being associated with PTSD and depression at baseline in both this study and our previous investigations (13, 14). These results suggest that the extent to which an individual perceives that they transgressed their own moral code may have a stronger association with PTSD and depression over time than the perception that the individual was transgressed against. One possible explanation for this result is that, while the appraisal that others have violated one's moral code is associated with high levels of concurrent symptomatology, this relationship may weaken over time. Another possibility is that moral injury-other appraisals are associated with differential reactions in the long-term, for example, higher levels of humiliation, hostility

or mistrust of others. This is supported by findings from a longitudinal study conducted with survivors of persecution and war in Timor-Leste, which indicated that a sense of injustice relating to past events strongly predicted explosive anger reactions (in addition to PTSD and general psychological distress) (64). Further, Stein et al. (65) found that experiencing morally injurious events perpetrated by others was associated with feelings of humiliation in active duty service members. More research is required to determine the longitudinal psychological and behavioral effects of perceived moral transgressions enacted by others in refugees.

Consistent with our hypotheses, we found that moral injury-other, and moral injury-self were positively associated over time. Accordingly, the extent to which an individual perceives that they has transgressed and been transgressed against appear to be related, and contribute to the strengthening of these beliefs over time. This is consistent with the findings of Hoffman et al. (13), and research indicating that negative cognitions relating to traumatic events cluster together (66–68).

Also in accordance with our hypothesis, we found that greater moral injury-other appraisals were associated with greater exposure to PTEs and post-migration living difficulties. These findings are consistent with a large body of literature which shows a dose-response relationship between PTEs and post-migration living difficulties and negative mental health outcomes in refugees (26, 27, 69). This finding suggests that the more types of traumatic events to which an individual is exposed, the greater they sense of having been transgressed against. This is consistent with results suggesting that greater exposure to trauma was associated with greater perceptions of injustice in survivors of persecution and war (64). The positive association between exposure to post-migration living difficulties and moral injury-other appraisals is notable, as it provides preliminary evidence to suggest that moral injury appraisals may be associated with experiences beyond those that are traumatic in nature. This may be especially relevant to the case of refugees. For example, a refugee may, upon fleeing his or her country, hope that they will be warmly received into the host society, is able to obtain permanent residency, find employment, and support their family financially. If, for instance, the individual is subject to discrimination, temporary visa status, and is unable to get qualifications recognized, they may feel that the host society or representative government has acted in a way that transgresses his or her moral code, giving rise to moral injury-self appraisals. Further research is required to elucidate this finding. However, these results indicate that it may be important to look beyond traditionally conceptualized traumatic events when considering moral injury in refugees.

LIMITATIONS

The current study was subject to several limitations. First and foremost, the measure used to index moral injury was preliminary in that it has not been validated with other populations. The two-item scale representing MI-Self was also limited in the extent to which it comprehensively captured

MI-self appraisals, and the use of a two-item measure is not optimal from a statistical perspective at its reliability cannot be ascertained. Future research focusing on the development of a psychometrically valid measure of moral injury appraisals relating to refugees would be useful. Second, our sample size and, in particular, the number of individuals followed-up from the initial time-point, was small. This may have limited our statistical power in uncovering relationships between variables. Third, participants in this study were treatment-seeking. While this provides an ecologically-valid sample of individuals likely to experience psychological distress arising from moral injury, it is not possible to determine whether the relationships reported in this study were due to naturalistic change over time, as they were likely also influenced by therapeutic processes. Future longitudinal investigation of these variables in a community sample would be valuable. Fourth, there were a number of potential confounding factors that were not indexed in the current study, including the use of psychotropic medication which may have affected psychological symptoms, the varying length of time between baseline assessment and follow-up, which may have influenced results, and the type and frequency of psychological interventions received by participants during the follow-up period. Fifth, due to the small sample size it was not possible to evaluate the psychometric properties of each scale for each language group. Finally, there were a number of constructs of interest that were not investigated in this study. Examining the extent to which psychological processes such as rumination are related to moral injury, and potential outcomes beyond psychological symptoms (i.e., trust, hostility, humiliation) represents a future research direction.

CLINICAL AND POLICY IMPLICATIONS

Results from this study may have important treatment and policy implications. The finding that moral injury-self appraisals were negatively associated with subsequent PTSD symptoms, and positively associated with prior depression symptoms raises important clinical considerations. It may be that these appraisals do not respond optimally to front-line exposure-based interventions for PTSD. This is consistent with findings from a clinical trial indicating that self-blame cognitions show less change during trauma-focused treatments than other cognitions (70), although another study found that reductions in depression symptoms in prolonged exposure therapy preceded self-blame cognitions (53). Nevertheless, moral injury-self appraisals may be more responsive to cognitive-based interventions for depression or PTSD, or specific treatments for moral injury adapted for refugees [i.e., Adaptive Disclosure (71, 72)]. Given the longitudinal association between MI-self appraisals and depression symptoms in this study, it would be useful to investigate whether specific treatment strategies are more effective in reducing moral injury-self and moral injury-other appraisals. From a policy perspective, it is important to note the association between post-migration living difficulties

and moral injury-other appraisals in this study. There is a growing body of evidence highlighting the pivotal role of post-migration stressors in influencing outcomes in resettled refugees [for a review, see Li et al. (26)]. The finding that greater exposure to these stressors is associated with a higher perception of having been transgressed against suggests that it is important for host governments to develop supportive policies and provide adequate resources for refugees upon settlement to promote better adaptation to the new country and positive social outcomes.

CONCLUSIONS

The current study represents, to our knowledge, the first longitudinal investigation of two types of moral injury appraisals (namely moral injury related to one's own and others' transgressions) in refugees. Findings indicated that these two types of appraisals are distinctive in terms of their association to refugee experiences, and to psychological outcomes over time. This research provides preliminary evidence that moral injury may be a useful framework for conceptualizing the cognitive experience of individuals who have been exposed to trauma, persecution, displacement and post-migration stress. Further research is required to elucidate the association between moral injury appraisals and psychological, social, and behavioral outcomes amongst refugees.

ETHICS STATEMENT

The study was approved by the Ethics Committee of the Cantons of Zurich (Project Nr. KEK-ZH-Nr. 2011-0495) and Bern (KEK-BE_Nr. 152/12), Switzerland, and was conducted in compliance with the Code of Ethics of the World Medical Association (Declaration of Helsinki). All participants provided written informed consent prior to study participation.

AUTHOR CONTRIBUTIONS

AN, MS, US, and RB were involved in the conception of the study, the interpretation of the data and the drafting, and revision of the manuscript. JH was involved in the interpretation of the data and drafting and revision of the manuscript. NM was involved in the conception of the study, data collection, analysis, and interpretation of the data, and the drafting of the manuscript. All authors read and approved the final manuscript.

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Exploring Mental Health Status and Syndrome Patterns Among Young Refugee Children in Germany

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Refugee children share a large number of pre-, peri-, and post-migration risk factors, which make them vulnerable for developing mental health concerns. Within the last few years, a large number of families with young children have sought refuge in Germany. However, children's mental health status in Germany is mostly unclear. A central aim of developmental psychopathology is to understand how risk factors lead to the emergence of mental health concerns. One approach to investigating this association is the study of specificity, which describes the idea that specific risk factors are related to specific psychological outcomes. The aim of our study was to assess the mental health status of young refugee children in Germany, and to explore a potential refugee-specific mental health pattern. In two studies, we assessed mental health outcomes of 93 children from Syria or Iraq, aged 1.5–5 years, who recently arrived in Germany. The results were compared to U.S. norm data of typically developing children, and to norm data of a clinical sample in order to explore mental health patterns. In the first study ($n = 35$), we used standardized screening tools for parents (CBCL 1.5–5). In the second study ($n = 58$), mental health states of refugee children were assessed by caretakers (CTRF 1.5–5). In comparison to U.S. norm data of normally developing children, refugee parents reported more mental health concerns for their children, especially on syndrome scales of internalizing difficulties. A comparison to U.S. clinical reference data showed a specific mental health pattern, characterized by increased levels of anxiety/depression, attention problems, and withdrawal behavior. Caretakers, too, reported more mental health problems compared to typically developing children, albeit to a smaller extent. However, a comparison to clinically-referred children only led to partial confirmation of a specific mental health pattern. Our studies offer important insights into the mental health status and pattern of young refugee children, which is essential for preventing the onset of psychopathology and for offering tailored interventions.

Keywords: refugees, specificity, mental health, early childhood, prevalence, PTSD, CTRF, CBCL

INTRODUCTION

In 2015 alone, 65.3 million people, half of them being children, were forcibly displaced worldwide. This represents the highest number of forced displacement documented in history (1). The majority of people sought refuge in the context of the Syrian war (2). Germany became a prominent recipient of new asylum applications, with about 745,000 requests in 2016 (3). Thus, the significance of physical and mental health needs of refugee families gained great attention within the German health care system.

A review by Fazel et al. (4) organizes the negative factors that affect children's mental health outcomes chronologically by stage in the migration process. Risk factors during pre-migration include organized violence and the loss of family members. Peri-migration risk factors encompass disruption of schooling, lack of security, and material poverty. Post-migration risk factors include stigmatization, language barriers, acculturation difficulties, frequent relocations, low socio-economic status, as well as insecurity regarding residence permissions. Even if refugees and immigrants share some risk-factors, the number, severity, and kind of common risks within the refugee population go beyond those immigrants are exposed to. Thus, refugees present a "unique population" in need of tailored research and interventions (5).

Considering the number of risk factors, a negative impact of forced displacement on psychological outcomes can be expected. Indeed, studies on refugees' mental health status report elevated prevalence rates of depression, anxiety, and post-traumatic stress disorder (PTSD) in refugee children as compared to non-refugee children (6). A small, but growing number of studies investigate the mental health status of children in the context of the Syrian war. Children, ages 4–10, were screened in refugee camps near the Turkish-Syrian border (7). According to parent-reports, these children showed increased levels of fear (62%), anxiety and withdrawal (49%), emotional problems (45%), conduct problems (38%), and hyperactivity (20%). Another study conducted in a refugee campsite at the Syrian-Turkish border reported that the vast majority of children had experienced more than one critical life event, such as the loss of a family member (8). In fact, 44% of the children reported five or more war-related critical life events. Furthermore, 45% showed signs of PTSD. Similarly, 44% of the children showed signs of mood disorders, 20% had manifested clinical depression, and 25% reported somatic symptoms (e.g., stomach pain) on a daily basis. Overall, refugee children seem to have higher prevalence rates of mental health concerns. These findings are also supported by studies that investigated mental health outcomes among young refugees in Germany (9–11).

While some studies reported an effect on a wide array of mental health domains (6, 8, 9), other studies found a specific effect concerning symptoms of PTSD (10, 11). Specificity describes the idea that specific risk factors are uniquely related to specific psychological outcomes (12). Evidence remains inconsistent about the influence of experiencing war-related and migration-related violence and deprivation in early childhood on specific outcomes. A large scale retrospective survey showed that emotional neglect in childhood was specifically associated

with affective disorders in adulthood (13). After controlling for comorbidities and adversities Becker-Blease et al. (14) found that young children exposed to victimization (e.g., abuse) manifested more mental health concerns than those experiencing disasters (e.g., flood) in a representative U.S. sample. A review by McMahon et al. (12) subsumes 16 studies which examined the influence of violence on psychological outcomes. Different types of violence were assessed, including domestic violence, war, and community violence. Outcomes included PTSD, depression, general anxiety, aggression symptoms, and internalizing and externalizing symptoms. Half of the studies did not report any evidence for specificity, whereas eight found evidence for specificity. Five of the eight studies reported a specific association between violence exposure and externalizing outcomes, whereas three studies reported a link between the exposure to violence and internalizing behavior. However, the review did not distinguish between types of violence nor did it include war-related violence.

A study by Hodges et al. (15) showed an association between the number of traumatic events and complexity of symptomatology. That is, within a clinical sample of children between 8 and 12 years of age, those children who were exposed to multiple traumatic events demonstrated a higher complexity of symptoms (15). However, only few studies investigated mental health patterns of persons who were exposed to war-related violence. One study showed that comorbidity between PTSD and mood disorder was 13.5 times higher for adult Palestinians who had experienced violence than for Palestinians who had not experienced violence (16). Refugee school children, between 6 and 16 years of age, who were interviewed shortly after the 1994 siege of Sarajevo, showed differences in mental health adjustments depending on the type of violence they were exposed to. Children who were exposed to deprivation and violence showed more withdrawn behavior and anxiety problems compared to children who experienced violence only (17). Hence, a certain type of violence may lead to a specific pattern of syndromes, which might be characterized by a higher symptom complexity.

The present study fills the gap of missing data on mental health outcomes of recently arrived refugee children below 6 years of age. Research on refugee children in this age group is scarce. Considering that these children were exposed to risk factors specific to their population (5), it is likely that they manifest specific mental health patterns. The aim of our study was to assess a variety of behavioral symptoms that are typical of young refugee children who have experienced traumatization and deprivation. Applying an explorative approach, we focused on two research questions: What is the mental health status of young refugee children in Germany compared to typically developing children? Do symptom manifestations differ from clinically-referred children, which might indicate a refugee-specific mental health pattern?

We applied a three-step approach in order to investigate our research questions. First, we conducted a pilot study to assess the feasibility of screening instruments, and to get first insights into the prevalence rates of mental health concerns of this specific population of young, recently arrived refugee children. The findings of the pilot study were used to design Study 1.

In Study 1, we interviewed refugee parents from Syria and Iraq rather than relying on questionnaires. In Study 2, we included a large sample of caretakers from early childhood education and care centers for recently arrived refugee children. As caretakers might have a different perspective on children's behavior, Study 2 was used as a triangulation. The results obtained were compared to norm data of typically developing children and to norm data of children with clinical manifestations. We report the results of the pilot study, and Studies 1 and 2 separately, before integrating the results into the overall discussion.

PILOT STUDY

Methods

Participants

A convenience sample was used. We collected data from 48 children. Due to missing values, and age beyond the range covered by the instruments, 17 children were excluded. The final sample size consisted of 31 children (Age: $M = 2.9$; $SD = 1.3$; female: 56%). Parents had, on average, 10.3 years of education ($SD: 5.0$ years). While most children came from Syria (92%), there were a few from Iraq (8%).

Materials

The Child Behavior Checklist [CBCL 1.5–5 Arabic translation in Lebanese dialect, which is similar to Syrian dialect, a Syrian version was not available; (18)] was administered to measure children's mental health status as reported by mothers. The instrument is validated for children from 1.5 to 5 years of age. The 100 items can be grouped into eight syndrome scales. Four of them (Emotionally Reactive, Anxious/Depressed, Somatic Complaints, Withdrawn) can be combined into the broadband scale of Internalizing Behavioral Problems; two (Aggressive Behavior, Attention Problems) can be combined into the broadband scale of Externalizing Behavioral Problems. Additionally, the CBCL has a scale for Sleep Problems and a scale for Other Problems. Furthermore, a selection of specific items of the CBCL can be used to estimate if a child suffers from PTSD (19). It is considered to be a cost-effective and valid screening tool for the presence of PTSD symptoms in preschool children.

The respondents indicate on a 3-point Likert scale if a problem is either not true (0), somewhat or sometimes true (1), or very true or often true (2), based on the child's behavior over the previous 2 months. Norms of typically developing children and matched clinically-referred children who were considered for mental health services are available from 18. Norms are based on a representative sample from U.S. children and differentiate between boys and girls. While scores are controlled for gender, age shows no effect on the syndrome scales according to the manual. As U.S. children and Arabic children from the United Arab Emirates generally show similar manifestations on CBCL scales, the use of U.S. norms can be considered to be cross-culturally valid (20).

Procedure

In the context of an evaluation project, a team of research assistants visited 44 primary childcare projects (*Bridging Projects*,

German: *Brückenprojekte*) designated for refugee families recently arrived in the German federal state of North-Rhine Westphalia in 2016 and 2017. Projects were free of charge and either in refugee centers or in close proximity in order to provide easy access for families. As enrollment opportunities in regular primary care centers are scarce, this low-threshold approach was implemented by the government to serve as temporary compensation. Caretakers were asked to distribute informed consent forms and questionnaires to Arabic speaking refugee families from either Syria or Iraq, whose children were aged 1.5–5. Subsequently, families passed questionnaires back to the caretakers who returned them to us. The response rate was 29%, i.e., we received less than a third of our distributed questionnaires by the end of the study. Written informed consent was obtained by every respondent who filled out the questionnaire. The study was approved by the Ethics Committee of the Faculty of Psychology of the Ruhr-University Bochum.

Statistical Analysis

Data were processed in SPSS® 25.0 for Windows (IBM Corporation, Armonk, NY, USA). We excluded all cases that had missing values in more than 10% of the CBCL items. For all other cases, missing values were replaced by the mean of the item across participants. Clinical and subclinical cutoff scores were calculated according to the manual (18). The clinical cutoff for the broadband scales was set at two standard deviations above the average score of the norm data of typically developing children. We used the PTSD scale and the proposed cutoff of 9 points to estimate the frequency of children showing signs of PTSD (19).

Effect sizes (Cohen's d , 95% Confidence interval) were calculated comparing the syndrome manifestations of refugee children to typically developing and clinical-referred children (18), respectively. Effect size calculations were conducted using a syntax by Wuensch (21). When effect sizes of refugee children compared to clinical children were similar (using the 95% confidence interval), or refugee children had higher values, we additionally looked at comorbidities between syndrome scales by applying subclinical cutoffs (18). Effect size calculations enable score standardization. Hence, scores between syndrome scales were made comparable.

Results

On average, refugee children showed elevated prevalence rates on the total score (48%), the internalizing scale (48%), and the externalizing scale (48%). They showed elevated prevalence rates in three out of seven syndromes (Anxious/Depressed: 10%, Withdrawn: 20%, Attention Problems: 23%), whereas prevalence rates in the four remaining scales were in the normal range (Somatic Complaints: 3%; Aggressive Behavior: 7%; Sleep Problems: 0%, Emotionally Reactive: 3%). Similar rates can be found applying sub-clinical cutoffs: 19% of the children showed Anxiety/Depression in a subclinical range, 23% Somatic Complaints, 32% Withdrawal, 10% Attention Problems, 10% Aggressive Behavior, 7% Sleep Problems, and 13% Emotional Reactivity. One fifth of the children were above the cutoff on the PTSD scale (PTSD: 20%).

Refugee children had higher manifestations on syndrome scales compared to typically developing children, except for Emotional Reactivity, which only showed a minor mean difference (Anxious/Depressed: $M = 1.8$, $SD = 3.0$, $d = 0.6$ [CI 95%: 0.2; 1.0], Somatic Complaints: $M = 1.1$, $SD = 1.9$, $d = 0.6$ [CI 95%: 0.2; 0.9], Withdrawn: $M = 1.7$, $SD = 2.9$, $d = 0.6$ [CI 95%: 0.2; 1.0], Aggressive Behavior: $M = 0.5$, $SD = 2.9$, $d = 0.1$ [CI 95%: -0.3; 0.4], Attention Problems: $M = 2.2$, $SD = 3.0$, $d = 0.7$ [CI 95%: 0.3; 1.1], Emotionally Reactive: $M = 0.0$, $SD = 2.9$, $d = 0.0$ [CI 95%: -0.3; 0.4]).

Scores on Anxiety/Depression and Attention Problems were also more pronounced compared to norm data of clinically-referred children, whereas Withdrawal was within the clinical range (Anxious/Depressed: $M = 0.6$, $SD = 3.0$, $d = 0.2$ [CI 95%: -0.2; 0.5], Attention Problems: $M = 0.8$, $SD = 3.0$, $d = -0.3$ [CI 95%: -0.6; 0.1], Withdrawn: $M = -0.7$, $SD = 2.9$, $d = -0.2$ [CI 95%: -0.6; 0.1]. All other syndrome manifestations were substantially lower in the refugee group than in the clinical group (Emotional Reactive: $M = -2.3$, $SD = 2.9$, $d = -0.8$ [CI 95%: -1.2; -0.4], Somatic Complaints: $M = -2.0$, $SD = 3.0$, $d = -1.1$ [CI 95%: -1.5; -0.6], Sleep Problems: $M = -1.6$, $SD = 2.1$, $d = -0.7$ [CI 95%: -1.1; -0.3], Aggressive Behavior: $M = -4.2$, $SD = 7.8$, $d = -0.5$ [CI 95%: -0.9; -0.2]).

The comorbidity patterns of elevated syndrome scales in the refugee group (Anxious/Depressed, Withdrawn, Attention Problems) revealed that 16% of the refugee children fell above subclinical cutoffs on all three syndrome scales, and 10% fell above the cutoff on two syndromes (3% Anxious/Depressed & Attention Problems, 7% Withdrawn & Attention Problems). In contrast, 17% of the children fell above the cutoff on only one scale (10% on Withdrawn, 7% on Attention Problems, 0% on Anxious/Depressed).

Discussion

In line with a previous study on adolescent refugees in Germany (9), we found a high number of refugee children showing a total symptom score in a clinical range. Another recent study that assessed PTSD by using a structured interview with parents of very young children also showed increased rates of clinical symptoms (11). We gained a first insight into the pattern of mental health concerns consisting of anxiety/depression, withdrawal, and attention problems. Interestingly, the comorbidity of all three syndromes was high (16%). Do the three syndromes constitute a clinical syndrome pattern that might be characteristic of vulnerable refugee children? This question cannot be answered at the present stage, but should be addressed in future studies.

Unfortunately, demographic information regarding gender of the child, or the family's current living situation was missing in many cases. The feasibility of a questionnaire study in this population might be restricted. Anecdotal reports from educators and Arabic interpreters suggest that parents often have low literacy skills. Moreover, parents often refused participation because of a lack of trust in institutions. This might have led to a selection bias, as parents with a higher education might have been more likely to participate.

Although results have to be interpreted with care as the sample size was limited and background information was missing, they offer a first hint into the prevalence rates of mental health issues among young refugee children. Moreover, the comorbidity pattern and the elevated syndrome manifestations on three scales point to a potential refugee-specific mental health pattern. However, an interview format might ensure a higher degree of feasibility. This avoids a potential selection bias based on literacy and education.

STUDY 1

Methods

Participants

The inclusion criteria were: (1) fluent in Arabic language, (2) country of origin is Syria or Iraq (3) flight within past 3.5 years, (4) child between 1.5 and 5 years of age. Parents were the respondents in all cases (Mother: $n = 27$, Father: $n = 3$).

We collected data on 30 children. Demographic information about the children and the family is shown in **Table 1**. The families of the children came from Syria ($n = 27$), and Iraq ($n = 3$). All responding parents shared one household with their partners and children. On average, families had three children. Data were only obtained for one child per family.

Materials

The CBCL 1.5-5 (Arabic translation) was used (see Pilot Study).

Procedure

To avoid the feasibility problems we observed in the pilot study, we decided to administer the CBCL in the form of an interview. This allowed comprehensibility in a population unfamiliar with psychological assessments and enabled us to introduce inclusion criteria to restrict our assessment to refugee families. The interview was conducted by Arabic-speaking research assistants, who were trained by a clinical psychologist and regularly

TABLE 1 | Demographic information of children and families in Study 1 ($n = 35$).

Demographic variables	<i>M (SD)</i>
Current age of child (years)	3.7 (1.3)
Gender of child: Girls	18 (51)
Age of parent	33.7 (7.0)
Number of children per family	2.9 (1.5)
Education of parent in years ^a	11.6 (4.6)
Age of child during flight (years) ^b	2.2 (1.3)
Duration of flight (months) ^c	11.9 (14.7)
Time in Germany (months) ^d	18.4 (9.7)
Number of mothers pregnant during flight n (%) ^e	9 (26)

M, mean; *SD*, standard deviation; *n*, number of cases.

^a Number of years spent at school, including higher education ($n = 29$).

^b Age of the child when mother left home town in cases where the child was already born ($n = 19$).

^c Time span from leaving home town to arriving in Germany ($n = 31$).

^d Time span from arriving in Germany to interview ($n = 31$).

^e Number of mothers pregnant with target child during flight ($n = 31$).

supervised. All families were recruited through word of mouth by our Arabic speaking research assistants at mosques, cultural centers, refugee camps, and language schools. Interviews were conducted at participants' homes in order to ensure comfort and safety. In addition, interviewers spent an extended time period on introductions and small talk before starting the interview. Subsequently, our research assistants explained the procedure and the purpose of the interview. Afterwards, written informed consent was obtained from all respondents. Interviews included additional questionnaires and tests that are not part of this study. Research assistants estimated the CBCL part of the interview to last approximately 30 min. At the end of the interview, participants had the opportunity to ask questions, and research assistants handed out gift certificates as a gesture of appreciation for taking part in the study. The study was approved by the Ethics Committee of the Faculty of Psychology of the Ruhr-University Bochum.

Statistical Analysis

We applied stricter exclusion criteria regarding missing data than in the Pilot Study. If more than 10% of the items were missing, cases were not considered for statistical analysis. Clinical and subclinical cutoffs were calculated, as in the Pilot Study. The normality assumption of the syndrome scales was explored by conducting a Kolmogorov-Smirnov test ($p_{\text{exact}} < 0.05$).

First, the syndromes scores were normalized by calculating difference scores between the refugee sample and the U.S. norm sample of typically developing children. This yielded an expected value of zero in case of equality of both groups. In a next step, a dependent one-sample t -test was performed. The difference value between refugees and the norm data of typically developing children was compared against zero ($p < 0.05$). We applied Bonferroni corrections in order to control for multiple comparison biases.

Second, we compared the refugee data to clinical norm data, repeating the aforementioned statistical steps. We expected the difference from the clinical norm to be low. Given our sample size, a 5% threshold would lead to low power [required sample size = 128, if $d = 0.3$, $c = 5\%$, (22)]. To avoid an inflation of beta errors, we used effect sizes (Cohen's d) as decision criteria for specificity. If refugees had a) poorer mental health than the clinical group defined as a positive effect size or b) had equal mental health defined as the 95% confidence interval of the effect size ranging from a negative value to a positive value, we considered the syndrome to be refugee-specific.

Third, clustering of syndromes was explored using a Venn diagram. It depicts the percentage of children above the subclinical cutoff, and the comorbidity of the syndromes that were identified as being potentially refugee-specific.

Results

On average, refugee children showed elevated total problem scores when compared to the U.S. norm of typically developing children. Means and inferential statistics are displayed in **Table 2**. Refugees scored higher on the internalizing scale, but did not differ significantly on the externalizing scale. As shown in **Figure 1**, they had elevated scores in four out of seven syndrome

TABLE 2 | Study 1 CBCL syndromes of refugee children compared to norm data of typically developing children.

CBCL syndromes	<i>M</i> (<i>SD</i>) difference	<i>t</i> -Values	<i>p</i> -Values	Effect size <i>d</i> [CI 95%]
Emotionally Reactive	0.3 (3.5)	0.5	1.0	0.1 [-0.3; 0.4]
Anxious/Depressed	3.1 (2.8)	6.5	<0.01	1.1 [0.7; 1.5]
Somatic Complaints	1.7 (2.5)	3.9	<0.01	0.7 [0.3; 1.0]
Withdrawn	1.8 (2.9)	3.6	0.01	0.6 [0.2; 1.0]
Sleep Problems	0.8 (2.9)	1.6	1.0	0.3 [-0.1; 0.6]
Attention Problems	1.1 (2.0)	3.3	0.02	0.6 [0.2; 0.9]
Aggressive Behavior	2.0 (6.4)	1.9	0.73	0.3 [0.0; 0.7]
Total Score	14.5 (22.2)	3.9	<0.01	0.7 [0.3; 1.0]
Internalizing	6.8 (9.9)	4.1	<0.01	0.7 [0.3; 1.1]
Externalizing	3.1 (1.3)	2.4	0.21	0.4 [0.1; 0.8]

CBCL, Child Behavior Checklist; *M*, mean; *SD*, standard deviation; *n*, number of cases; *r*, rank biserial correlations coefficient; *d*, Cohen's d ; *T*-values for t -tests between refugee children and norm data of typically developing children (18), comparison of mean difference to 0; *p*-Values were adjusted for multiple comparisons using the Bonferroni-correction.

scales (Anxious/Depressed, Attention Problems, Withdrawn, Somatic Complaints).

Means and group comparisons with clinically-referred children, as well as prevalence rates of the refugee sample, are shown in **Table 3**. In general, refugee children showed lower psychological difficulties compared to norm data of clinically-referred children (see **Figure 1**). However, levels of behavioral difficulties varied between syndrome scales. Although refugee children had better mental health outcomes than the clinical norm group on most syndrome scales, differences were only marginal on the scales Attention Problems and Withdrawn. However, the effect size for the scale Anxious/Depressed was large, indicating that refugee children exhibited more behavior problems than clinically-referred children.

The comorbidity patterns of elevated syndrome scales in the refugee group (Anxious/Depressed, Withdrawn, Attention Problems) revealed that 9% of the refugee children fell above subclinical cutoffs on all three syndrome scales, while 15% were above the cutoff on two syndrome scales (see **Figure 2**). In contrast, the rest of children were above the cutoff on only one syndrome scale (10% on Withdrawn, 7% on Attention Problems, 0% on Anxious/Depressed).

Discussion

Compared to norm data of typically developing children, refugee children scored significantly higher on the scales Somatic Complaints, Attention Problems, Anxious/Depressed, and Withdrawn, which is indicated by large effect sizes. Somatic Complaints were less pronounced in refugee children than in clinically-referred children, but symptoms of Withdrawn, Attention Problems, and Anxious/Depressed were equal to or higher than in a clinical norm sample. Interestingly, the prevalence rates and affected syndromes in Study 1 bear a great resemblance to the findings of our pilot study. This consistency

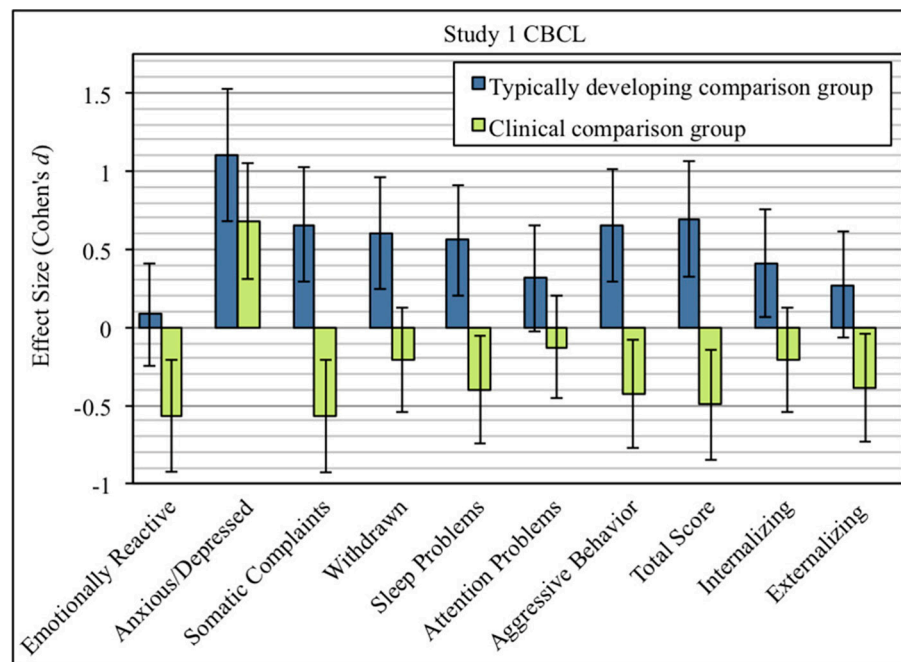


FIGURE 1 | Effect sizes (Cohen's *d*) of CBCL syndrome scales comparing refugee children from Study 1 with typically developing children (blue), and clinically-referred children (green). Error bars indicate 95% confidence intervals of effect sizes.

TABLE 3 | Study 1 CBCL syndromes of refugee children compared to clinical norm data of clinically-referred children.

CBCL syndromes	<i>M</i> (<i>SD</i>) difference	<i>t</i> -Values	<i>p</i> -Values	Effect size <i>d</i> [<i>CI</i> 95%]	Clinical cutoff <i>n</i> (%)	Subclinical cutoff <i>n</i> (%)
Emotionally Reactive	−2.0 (3.5)	−3.4	0.02	−0.6 [−0.2; −0.9]	3 (8.6) ^a	4 (11.4) ^d
Anxious/Depressed	1.9 (2.8)	4.0	<0.01	0.7 [0.3; 1.0]	6 (17.1) ^a	15 (42.9) ^d
Somatic Complaints	−1.4 (2.5)	−3.4	0.02	−0.6 [−0.2; −0.9]	2 (5.7) ^a	9 (25.7) ^d
Withdrawn	−0.6 (2.9)	−1.3	1.0	−0.2 [0.1; −0.6]	8 (22.9) ^a	11 (31.4) ^d
Sleep Problems	−1.2 (2.9)	−2.4	0.24	−0.3 [−0.1; −0.7]	3 (8.6) ^a	5 (14.3) ^d
Attention Problems	−0.3 (2.0)	−0.7	1.0	−0.1 [0.2; −0.5]	1 (2.9) ^a	10 (28.6) ^d
Aggressive Behavior	−2.7 (6.4)	−2.5	0.17	−0.4 [−0.1; −0.8]	0 (0) ^a	4 (11.4) ^d
Total Score	−11.0 (22.2)	−2.9	0.06	−0.5 [−0.1; −0.9]	22 (62.9) ^b	32 (91.4) ^e
Internalizing	−2.1 (9.9)	−1.2	1.0	−0.2 [0.1; −0.5]	9 (25.7) ^b	26 (74.3) ^e
Externalizing	−3.0 (7.6)	2.4	0.28	−0.4 [0.0; −0.7]	20 (57.1) ^b	28 (80.0) ^e
PTSD	—	—	—	—	13 (37) ^c	—

CBCL, Child Behavior Checklist; PTSD, Post traumatic stress disorder; *M*, mean; *SD*, standard deviation; *n*, number of cases; *d*, Cohen's *d*; *T*-values for *t*-tests between refugee sample and clinical norm data (18), comparison of mean difference to 0; *P*-values were adjusted for multiple comparisons using the Bonferroni-correction.

^a Number of refugee children who scored above clinical cutoffs as proposed by Achenbach and Rescorla (18).

^b Number of refugee children who scored at least two standard deviations above the norm (18).

^c Number of refugee children who scored above the cutoff proposed by Dehon and Scheeringa (19).

^d Subclinical cutoffs (18).

^e Number of refugee children who scored at least one standard deviation above the norm (18).

yields further evidence of the observed mental health status and potential pattern.

Data provide some indications for a refugee-specific mental health pattern. Data from Study 1 suggest that the combination of Withdrawn, Attention Problems, and Anxious/Depressed could potentially be regarded as a refugee-specific mental health pattern. As reported by parents, refugee children showed equal or higher levels of mental health problems on these three scales

when compared to clinical norm data. Considering the clustering of these syndromes, they mostly occurred without a comorbid syndrome. However, 24% showed at least one comorbid syndrome within this potential refugee-specific pattern.

The elevated scores on specific syndrome scales on the CBCL are in line with mental health problems reported in previous studies on refugee children, e.g., altered anxiety levels, withdrawal, emotional problems, and attention problems (7).

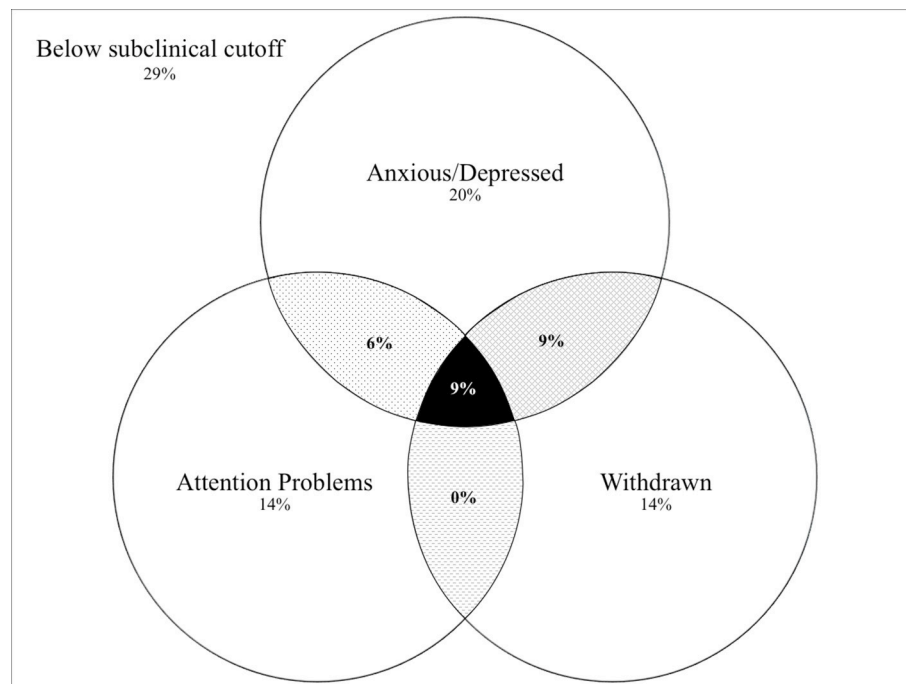


FIGURE 2 | Percentage of refugee children of Study 1 that were above subclinical cutoff according to Achenbach and Rescorla (18) on identified potential refugee-specific syndromes (Attention problems, Anxious/Depressed, Withdrawn) and their comorbidities.

Most studies cluster the symptoms around a broad syndrome of traumatization and PTSD (8). In the present study, 37% of the children were above the proposed cutoff on the PTSD scale (19), making it likely that some of these children may suffer from PTSD. When compared to a clinical group, the different syndrome manifestations on some scales, in addition to the comorbidity of these syndromes found in a subgroup of refugee children, raise the question whether the observed mental health outcome indicates a refugee-specific mental health pattern rather than PTSD.

STUDY 2

Methods

Participants

The total sample of the second study comprised 59 children. One case was deleted because of missing data. Hence, the final sample consisted of 58 children. Of those, 47 families came from Syria and 11 from Iraq. There was no overlap between the children of Study 1 and Study 2. See **Table 4** for demographic information.

Materials

The Caregiver Teacher Report Form [CTRF 1.5-5, German version; (18)] was administered to measure children's mental health status as reported by caretakers. The CTRF consists of 100 items, which largely correspond to the items on the CBCL. Caretakers also indicated their answers to 100 items on a 3-point Likert scale. Both instruments show a similar factor structure,

TABLE 4 | Demographic information of children ($n = 58$) in Study 2.

	<i>M (SD)/n (%)</i>
Age in years	3.6 (1.2)
Girls	33 (57)
Time in Germany (months) ^a	19 (5.7)
Both parents present ^b	50 (86)
Literate parents ^c	49 (83)

M, mean; *SD*, standard deviation; *n*, number of cases.

^a Time span from arrival in Germany to participation in the study as estimated by the caretaker ($n = 27$).

^b Father and mother live in the household of the child estimated by the caretaker ($n = 57$).

^c Estimated by caretakers ($n = 51$).

have good content validity, and show a high cross-information agreement between parents and caretakers (18).

The CTRF has been a valid and reliable tool across countries (20). As for the CBCL, data of norm groups are available. The clinical reference group consists of children who were considered for mental health services and who were demographically matched to the typically developing norm group according to gender, ethnicity, age, and socio-economic background (18).

Procedure

Caretakers were recruited from early childcare centers for recently arrived refugee and immigrant children in the federal state of North Rhine-Westphalia in Germany. Parents were

informed by caretakers about the purpose of the study prior to the assessments. Information was handed out in the form of a letter which was available in relevant languages, i.e., Arabic, English, and German. Parents who did not want their children to be screened for mental health outcomes were asked to inform caretakers within 1 week in order not to be considered for the assessment. Afterwards, caretakers were asked to complete the CTRF for the child, aged 1.5–5 years, they had known for the longest period of time. On average, caretakers indicated that they had known the child for 9.7 months ($SD = 5.1$). Personal information of the children and information of the caretakers were anonymized. The study was approved by the Ethics Committee of the Faculty of Psychology of the Ruhr-University Bochum.

Statistical Analysis

We repeated the same statistical procedure as in the previous study. However, only two scales (Attention Problems and Aggressive Behavior) were approximately normally distributed, whereas the remaining scales deviated significantly from normality using the Kolmogorov-Smirnov test ($p_{exact} < 0.05$). Hence, we used non-parametric one-sample Wilcoxon tests for group comparisons.

Results

Refugee children had higher levels of externalizing problems than the norm. Attention Problems and Aggressive Behavior were elevated compared to U.S. norm data of typically developing children, although not in a significant range. Similarly, there were no differences in any other domains. Medians and group comparisons are shown in **Table 5**.

Compared to clinical norm data, refugee children had lower scores on total problems, and lower scores on all scales with medium effect sizes except for the scale Somatic Complaints, where differences were only marginal (see **Table 6**). Prevalence rates indicate that about one fifth of the refugee children had externalizing problems in a clinical range and about one third in a subclinical range. However, as shown in **Figure 3**, only a small fraction of children showed clinically relevant behavior on specific syndrome scales. However, there was a tendency for syndrome manifestations to be higher when compared to typically developing children, but not when compared to clinically-referred children, except for Somatic Complaints.

Discussion

Assessment of caretakers' views allowed us to incorporate a more comprehensive picture of children's mental health status. All syndrome scales were elevated into a positive direction when compared to data of typically developing children. Externalizing syndromes were especially elevated, with medium effect sizes. In contrast, only Somatic Complaints were increased in comparison to data of clinically-referred children. This provides further partial evidence of the potential mental health pattern proposed in the Pilot Study and Study 1. However, caretakers seemingly observe a wide range of psychological problems in refugee children. The fact that Attention Problems and Aggressive Behavior are the syndromes that are most elevated might

reflect the significance of those behaviors for primary care settings.

GENERAL DISCUSSION

The aim of the study was to explore the mental health status of recently-arrived, young refugee children. We screened for mental health problems in a pilot study and two main studies using applicable methods that have been adopted internationally and two sources of information, parents and caretakers. In all studies, syndrome manifestations were compared to norm data both of typically developing children and of clinically-referred children. In addition, prevalence rates were reported, and comorbidities were calculated for the most pronounced syndrome scales, which revealed first evidence of a potential refugee-specific mental health pattern.

Comparing the reported clinical manifestations of Study 1 and Study 2, two results become the subject of discussion. First, parents reported, on average, more mental health problems than caretakers. Still, the results are not contradictory, as effect sizes across all syndrome scales indicate similar results. Two syndrome scales (Attention Problems and Aggressive Behavior) showed a similar effect size in both studies. The high concordance between the groups of informants on these scales underscores the clinical relevance of our results.

Second, parents reported more internalizing problems, whereas caretakers stressed externalizing problems. It is possible that a systematic bias influenced the concordance between the ratings of parents and caretakers. According to Achenbach and Rescorla (18), parents report internalizing problems with a higher frequency than caretakers, whereas the reverse is true for externalizing problems. In our sample, parents spent significantly more time with their children compared to caretakers, who take care of a group of children for only a few hours a day [for a description of early childhood care centers see Busch et al. (under review)]. Additionally, language barriers may hamper communication between children and caretakers. Hence, children may communicate internalizing problems in a language that caretakers do not understand. The scores on the CTRF may, therefore, underestimate the true manifestations of emotional and behavioral difficulties.

As parents' psychological burden is likely high as well, the accuracy of the ratings for syndrome scales such as "Anxious/Depressed" may be distorted as a consequence (23, 24). A difference between the syndromes could also point to real differences in psychological functioning across situations. In fact, some disorders, such as ADHD, are known to be highly susceptible to situational contexts (25). These rater biases might explain why data from Study 2 was not able to fully confirm the potential refugee-specific pattern found in the Pilot Study and Study 1.

A growing body of research on refugee children worldwide reported elevated prevalence rates of mental health concerns (6–8). A meta-analysis, which included 17 studies on refugee children, found that refugee children have moderately poorer

TABLE 5 | Study 2 CTRF syndromes of refugee children compared to norm data of typically developing children.

CTRF syndromes	Median (IQR) difference	z-values	p-values	Effect size <i>d</i> [CI 95%]
Emotionally Reactive	−0.3 (3.3)	1.4	1.0	0.3 [0.1; 0.5]
Anxious/Depressed	−0.2 (4.2)	0.1	1.0	0.2 [−0.1; 0.5]
Somatic Complaints	−0.5 (1.2)	−0.3	1.0	0.1 [−0.0; 0.5]
Withdrawn	−1.3 (5.1)	0.2	1.0	0.2 [0.0; 0.5]
Attention Problems	0.9 (6.3)	2.6	0.10	0.4 [0.2; 0.7]
Aggressive Behavior	2.1 (13.0)	2.3	0.19	0.4 [0.2; 0.7]
Total Score	−0.1 (42.3)	1.8	0.71	0.3 [0.1; 0.6]
Internalizing	−1.4 (11.0)	0.5	1.0	0.2 [0.0; 0.5]
Externalizing	2.8 (17.2)	2.5	0.12	0.4 [0.2; 0.7]

CTRF, Caretaker Teacher Report Form; M, mean; SD, standard deviation; n, number of cases; d, Cohen's *d*; Standardized z-values for one-sample Wilcoxon-test between refugee children and norm data of typically developing children (18), comparison of median difference to 0; P-Values were adjusted for multiple comparisons using the Bonferroni correction; Confidence interval was calculated using the syntax of Wuensch (21).

TABLE 6 | Study 2 CTRF syndromes of refugee children compared to clinical norm data of clinically-referred children.

CTRF syndromes	Median (IQR) difference	z-values	p-values	Effect size <i>d</i> [CI 95%]	Clinical cutoff <i>n</i> (%)	Subclinical cutoff <i>n</i> (%)
Emotionally Reactive	−2.4 (3.0)	−4.0	<0.01	−0.5 [−0.3; −0.8]	4 (6.9) ^a	6 (10.3) ^c
Anxious/Depressed	−1.8 (4.0)	−2.9	0.04	−0.3 [−0.1, −0.6]	4 (6.9) ^a	6 (10.3) ^c
Somatic Complaints	−0.7 (1.3)	0.5	1.0	0.2 [0.1, −0.4]	5 (8.6) ^a	5 (8.6) ^c
Withdrawn	−3.4 (5.3)	−2.6	0.08	−0.3 [−0.1; −0.6]	4 (6.9) ^a	8 (13.8) ^c
Attention Problems	−2.7 (7.3)	−3.2	0.01	−0.4 [−0.2; −0.7]	4 (6.9) ^a	8 (13.8) ^c
Aggressive Behavior	−10.4 (13.3)	−4.3	<0.01	−0.7 [−0.4, −1.0]	4 (6.9) ^a	10 (17.2) ^c
Total Score	−26.3 (44.7)	−3.8	<0.01	−0.5 [−0.2; −0.8]	8 (13.8) ^b	17 (29.3) ^d
Internalizing	−6.7 (10.5)	−3.2	0.02	−0.3 [−0.1; −0.6]	8 (13.8) ^b	13 (22.4) ^d
Externalizing	−12.6 (20.5)	−4.1	<0.01	−0.6 [−0.3; −0.9]	11(19) ^b	18 (31.0) ^d

CTRF, Caretaker Teacher Report Form; M, mean; SD, standard deviation; n, number of cases; r, point bivariate correlations coefficient; d, Cohen's *d*; Standardized z-values for one-sample Wilcoxon-test between refugee children and norm data of clinically-referred children (18), comparison of median difference to 0; P-values were adjusted for multiple comparisons using the Bonferroni correction; Confidence interval was calculated using the syntax of Wuensch (21);

^a Number of refugee children who scored above clinical cutoffs as proposed by Achenbach and Rescorla (18).

^b Number of refugee children who scored at least two standard deviations above the norm (18).

^c Subclinical cutoffs (18).

^d Number of refugee children who scored at least one standard deviation above the norm (18).

mental health outcomes compared to non-refugee children (26). However, research on young refugee children in Germany is still scarce, which comes as a surprise, as a great number of families with young children has claimed asylum within the last few years (3). Among the first, Soykoek et al. (11) investigated prevalence rates of PTSD among refugee children from 0 to 6 years of age in Germany. Unlike Soykoek et al. (11), we did not conduct clinical interviews for PTSD, but used screening instruments, which allowed us to check for a broad range of clinical syndromes. Each study takes a different perspective when describing similar phenomena, and thus they can be viewed as complementary. While both studies found elevated rates of PTSD/signs of PTSD (26% vs. 37% in our study), we also found various internalizing and externalizing behavioral problems. This suggests that researchers and clinicians should broaden their focus and be aware that refugee children exhibit a variety of mental health problems apart from PTSD.

Considering the fact that recently arrived refugee children are exposed to a large number of specific risk factors (5), we

expected to find a specific early childhood mental health pattern in refugee children. The mental health status on the scales Anxious/Depressed, Withdrawn, and Attention Problems were in a clinical range, whereas mental health status on the remaining scales was better than in a clinical comparison group. Although the syndromes mostly occurred individually, about one quarter of children exhibited them in a comorbid fashion. Thus, parent reports delivered a first hint for a refugee-specific mental health pattern.

Research on specificity regarding the development of psychopathologies yields mixed results (12). Even less is known about the effects of war-related stressors on the development of specific mental health problems. One study on school children reported differences regarding the mental health status, depending on the experience of violence in the context of war (17). Refugee children might show a predominance of internalizing symptoms that differs from other traumatized groups (27). The authors hypothesized that this pattern might be a consequence of acute stress in the context of armed conflicts. However, to confirm the notion of specificity, two conditions

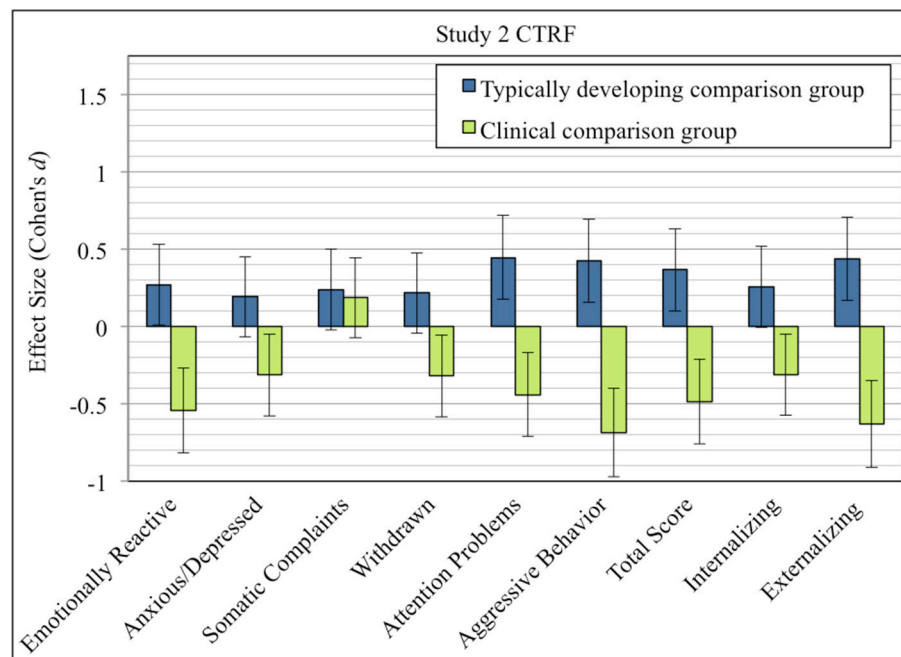


FIGURE 3 | Effect sizes (Cohen's *d*) of CTRF syndrome scales comparing refugee children from Study 2 with typically developing children (blue), and clinically-referred children (green). Error bars indicate 95% confidence intervals of effect sizes.

have to be met: Namely, a specific risk factor (condition 1) must lead to a specific mental health outcome (condition 2) (12).

Two main approaches can be distinguished that describe the mechanisms of how risk factors lead to negative mental health outcomes. According to the cumulative risk approach, each risk factor has an independent additive effect on children's mental health outcomes (28). It is often assumed that negative experiences accumulate until they reach a certain threshold (29). Once the threshold is exceeded, children's mental health outcomes deteriorate rapidly.

A dimensional approach proposed by McLaughlin and Sheridan (30) differentiates between risk factors along two dimensions, threat and deprivation. Threat is defined as an event involving harm (e.g., community violence), whereas deprivation is defined as experiences involving an absence of expected inputs (e.g., neglect). The development of a specific kind of psychopathology may depend on the dimension of risk factors involved. There is evidence that refugee children and their families are not only subject to threatening events, but also to severe deprivation, such as a lack of food, isolation, and a lack of shelter (31). Thus, the refugee-specific mental health pattern might well be interpreted in the context of a dimensional risk approach.

The second condition of specificity relates to mental health outcomes. Research has repeatedly shown that young children may develop PTSD, but symptoms differ in some aspects from those of older populations (32, 33). One third of the refugee children in Study 1 showed signs of PTSD. Although risk factors might differ in severity and type from other traumatized groups,

they might still facilitate the development of PTSD. Furthermore, Hodges et al. (15) showed that the exposure to multiple, different traumatic events leads to a higher complexity of symptoms. This complements our result of a wide range of affected syndromes. However, it is also possible that some refugee children suffer from PTSD, whereas others develop a mental health pattern that is specific to the refugee population. Our explorative study cannot provide an answer to these questions, but can rather be viewed as a starting point for novel specificity research on refugee children.

It is of particular importance to study the effects of traumatization in early childhood, as early experiences may have different negative effects on future outcomes compared to later traumatization. According to Maercker et al. (34), experiencing traumatization in childhood, before the age of 12, increases the risk of suffering from major depression, whereas traumatization beyond the age of 12 increases the risk for PTSD. The authors speculated that the development of PTSD might require a high degree of maturation of the brain in order to be able to organize intrusive memories and process fear stimuli. This may not be possible in young children. However, early exposure to traumatic events may have sensitizing effects on children by causing a dysfunction of the physiological stress axis. This is likely to make children more prone to various psychopathological signs and symptoms over the course of their development (29). Apart from developmental factors, young refugee children may be particularly vulnerable to behavioral difficulties because caregivers were exposed to high levels of stress as well. The onset of mental health

concerns may even be rooted in stressors regarding the prenatal environment. About one quarter of mothers in our first study reported that they were pregnant with the child during their flights. Stressors during pregnancy are likely to have long-lasting effects on children (35, 36). This underscores that the effects of traumatization in an early stage of the development and the high-risk environment of refugees are difficult to disentangle.

Due to their explorative nature and practical obstacles, our studies come with some limitations. The feasibility of the instrument was checked in a pilot study. Nevertheless, a selection bias could not be fully avoided. The mean duration of schooling in our sample in Study 1 was nearly 10 years. This is about twice as long as the average time of schooling in Syria before the war (United Nations Human Development Reports). This might hamper the generalizability of our sample. The possibility of a cultural bias, particularly for the parents' report, cannot be fully excluded either. The CBCL is found to be cross-culturally valid, and norm values between children from the United Arab Emirates and the U.S. have not shown substantial differences (20). Still, cross-cultural validation, particularly with people from Syria and Iraq, is needed. To assess signs of post-traumatic stress, we relied on a PTSD scale derived from CBCL items. This scale shows sufficient sensitivity (19), and is more reliable than comparable PTSD scales derived from the CBCL (37). However, all these PTSD scores derived from the CBCL should be interpreted with care, as they may lack the specificity to differentiate between PTSD and other psychiatric disorders like communication disorders, disruptive behavior disorders, or other anxiety disorders (38, 39).

Refugees share a number of risk factors, and are thus described as a vulnerable population in need of specific research and intervention programs (5). Nevertheless, the similar risk factors should not mask the heterogeneity within the refugee group. A meta-analysis revealed that mental health problems differed substantially between studies because of contextual factors before and after displacement (26). For example, the authors reported that effect sizes depended on economic opportunities and differed between those who were displaced internally and those who were displaced externally. Hence, in order to understand underlying causes of mental health problems in more detail, contextual factors should be addressed in future studies. For young children in particular, parental mental health status potentially constitutes a crucial context for the development of mental health problems (40).

Our studies deliver evidence for mental health problems of young refugee children in Germany. While a significant percentage of children showed signs of post-traumatic stress, we found a broad scope of mental health domains that were affected. Researchers should therefore not exclusively narrow their focus on PTSD symptomatology, but encompass other mental health problems as well. The question of whether or not the striking manifestations of anxiety, depression, withdrawal behavior, and attention problems resemble a refugee-specific syndrome pattern in young children cannot be answered at this point in time. Future studies should follow these hints and explore the mental health pattern in more detail. Revealing a specific pattern is an important step in early diagnosis of mental health concerns in this vulnerable group, in offering tailored intervention, and in preventing the onset of mental disorders as early as possible.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations for psychological research of the Deutsche Gesellschaft für Psychologie (DGP) 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 ethical committee of the Faculty of Psychology at the Ruhr-University Bochum.

AUTHOR CONTRIBUTIONS

TB contributed to the conception and design of the study, to the analysis and interpretation of data, and to drafting the manuscript. HL was involved in drafting the manuscript and contributed to the interpretation of the data. JB was involved in the conception of the study and revised the manuscript. RK revised the manuscript and contributed to the interpretation of the data. BL made contributions to the conception of the study, revised the manuscript, and gave final approval of the version to be published.

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Psychological Burden in Female, Iraqi Refugees Who Suffered Extreme Violence by the “Islamic State”: The Perspective of Care Providers

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Introduction: A large number of refugees suffer from mental disorders such as post-traumatic stress disorder (PTSD). In the context of a special quota project, 1100 Yazidi women from Northern Iraq who had suffered extreme violence by the so-called Islamic State (IS) were brought to Germany to receive specialized treatment. This study aims to investigate the psychological burden and trauma-related symptoms of these female IS-victims from the perspectives of their care providers.

Material and methods: Care providers with various professional backgrounds ($N = 96$) were asked to complete a self-developed questionnaire on a Likert-type scale ranging from 1 (very low) to 7 (very high) analyzing the psychological burden and trauma-related symptoms of the IS-traumatized women since their arrival in Germany. We controlled for potential confounders, namely the care providers' personal experiences of trauma and flight, by using chi-square tests.

Results: The mean psychological burden for the whole period in Germany as perceived by care providers was $M = 5.51$ ($SD = 0.94$). As the main factors of distress the care providers reported: worries about family members in Iraq ($M = 6.69$; $SD = 0.69$), worries about relatives' possibilities to be granted asylum in Germany ($M = 6.62$; $SD = 0.68$), and uncertainties regarding their future ($M = 5.89$; $SD = 1.02$). The most prominent trauma-related psychological symptoms were nightmares ($M = 6.43$; $SD = 0.54$). The care providers reported that somatic complaints have been present among the refugees in the following manifestation: pain ($M = 6.24$; $SD = 1.08$), gastrointestinal complaints ($M = 4.62$; $SD = 1.62$), and dizziness ($M = 4.40$; $SD = 1.59$). The care providers' personal experiences of trauma and flight had no significant influence on their response behavior.

Discussion: Care providers working with IS-traumatized female refugees evaluate the psychological burden and trauma-related somatic and psychological symptom loads of their clients as very high. The results of this study provide important information about

the perceptions of care providers working in a refugee-services context and may provide insights for the progression of specialized treatment programs and interventions for highly traumatized refugees and culture-sensitive training programs for their care providers.

Keywords: refugees, care providers, trauma, PTSD, psychological burden, somatic symptoms, pain, Yazidi

INTRODUCTION

According to the United Nations High Commissioner for Refugees (UNHCR), by the middle of September 2018, 68.5 million people were forcibly displaced worldwide. Of this number, 24.5 million are refugees, half of them under the age of 18 years, with still-growing numbers (1). It is estimated that by the year 2015, one million refugees had entered Germany, mainly from Syria, Afghanistan, and Iraq (2), and that by the year 2016, ~745,545 refugees had applied for asylum in Germany (3). The term “refugee” can be defined as a person who was forced to leave his country of origin because of his race, religion, nationality or political beliefs. Returning to their home country is currently impossible for refugees (4, 5). Migration itself may bring about a drastic change in a person’s life, but not all migrants respond to these experiences in the same way. Furthermore, not every migrant will demonstrate symptoms of mental illness (6). However, refugees are a more vulnerable group of migrants, with prevalence rates of mental disorders twice as high as those identified among labor migrants (7). There are correlations between the compromised mental health of refugees and increased exposure to violence (8). As Zipfel et al. (9) have described, 10–40% of refugees suffer from mental disorders after experiencing serious traumatic events in their country of origin (10, 11). Moreover, refugees are found to have been exposed to more mental distress than non-refugees (12), causing damage to their mental health. Identified risk factors for developing a mental disorder as a refugee can be found in all three phases of migration: (1). Premigration stress: before fleeing, refugees may face traumatic experiences such as torture and persecution or economic hardships. (2). Migration stress: During migration, refugees may be forced to cope with separations from their families and suffer physical harm. (3). Post-migration stress: Refugees may face complex asylum-seeking processes, language barriers, poor socioeconomic conditions (i.e., unemployment) and acculturation issues (13–16). Above all other mental disorders, high incidences of post-traumatic stress disorder (PTSD) were found among refugees (8). PTSD is a mental disorder that can occur after an individual has experienced or witnessed traumatic events such as natural disasters, serious accidents, terrorist acts, war/combat, rape, or other violent personal assaults. Patients with PTSD may suffer from intrusive thoughts about the traumatic experience and hyperarousal expressed in nervousness, difficulty concentrating or sleep disturbances. Moreover, patients with PTSD tend to avoid situations that remind them of the traumatic event (17, 18).

Existing scientific literature addressing mental disorders is heterogeneous due to methodological issues. However, most studies show significantly higher prevalence of mental disorders among refugees, depending on their country and region of origin

(19). Priebe et al. found a higher prevalence of PTSD and depression among refugees compared to the general population of the host country (16). Close et al. (20) reported that the prevalence of PTSD is higher among refugees, with a range from 9 to 36%, compared to the general population with prevalence rates of 1–2% (20). Bozorgmehr et al. identified prevalence rates of 30.6% for PTSD in refugees (11). Furthermore, refugees who have been subjected to torture and/or rape have been found to have the highest PTSD rates (21, 22). Studies of German investigations show a prevalence of PTSD of 23.6% in refugees, with the highest PTSD-prevalence numbers for refugees from Eastern countries (23). For Iraqi refugees with PTSD, the prevalence ranges from 8 to 37.2% (24). Studies focusing on the mental health status of female refugees are rare. In a North Korean female refugee population, significantly higher rates of suicidal ideation and alcohol use were found following sexual violation compared to refugees who had not suffered such traumatic experiences (25).

A large number of studies have also described another important characteristic of traumatized refugees: physical complaints associated with PTSD (26, 27). Hoge et al. (26), as well as Gupta (27), found an association between PTSD and somatic symptoms, including pain occurring in the stomach, head, chest, arms, and legs. Other physical complaints include dizziness, palpitations, shortness of breath, nausea, difficulty sleeping (27), tinnitus, and blurry vision (28). Moreover, there is a well-known high prevalence of comorbidity between PTSD and chronic pain (29).

A group of extremely traumatized women can be found in the community of Yazidi refugees from Northern Iraq. In August 2014, the jihadist terror organization known as the “Islamic State” (IS) attacked the Yazidi community living in the area of Mount Sinjar in Northern Iraq. The Yazidi community has been subjected to killings, enslavement, forced conversion to Islam, systematic rape, and other forms of torture perpetrated by the IS. Yazidi men and young boys have been killed, separated from their families, and forced into IS training camps. Yazidi women and girls have been sold at markets, held in sexual slavery, and forced to marry IS fighters (9, 30–33). The UN estimates that ~6300 Yazidis (3,537 of them women) were abducted (30) and another 3200 Yazidi women and children are still being held in captivity by the IS (1). As a result, the State Ministry of Baden-Württemberg entered into a cooperative arrangement with the Iraqi Kurdish Government and the International Organization of Migration (IOM) to develop an initiative with the aim of ensuring these victims a safe place and the opportunity to receive adequate medical and psychological support in Germany (9, 30). In 2015/2016, a Special Quota Project called the Baden-Württemberg Humanitarian Admission Program (HAP) (30) brought ~1,100 especially vulnerable Yazidi women and children

to 22 local districts in Germany (31, 34). The traumatized women receive language courses, education and medical and psychological treatment to enable their long-term integration in Germany. A project with a similar structure is conducted in Canada (35, 36). The women's care providers are mainly from five different professional backgrounds (social workers, interpreters, physicians, psychotherapists and administrators) (9, 30, 34, 37). Due to this highly structured program, the care providers, especially social workers, have the chance to work very closely with each refugee.

Although there are many studies focusing on the psychological and medical burden of refugees in general, e.g., (38, 39), this cross-sectional study aims to explore the specific determinants of psychological burden and medical symptoms of IS-traumatized women from Northern Iraq. However, there are several difficulties in addressing this research question: First, by questioning highly traumatized women, there is a possibility that specific questions serve as a trigger for the participants' trauma contents. This could be a destabilizing experience for the participants and an obstacle in their recovery. Second, for highly traumatized people it can be very hard to concentrate on long questionnaires. The language barrier is an additional issue. Furthermore, the IS-traumatized refugees of the HAP come from the rural area of the Sinjar District, where illiteracy in women is common. A survey using written questionnaires is therefore not feasible in this sample. Moreover, most of the refugees coming from rural areas like the Sinjar District are not familiar with answering questionnaires or research questions, especially when asked to rate medical and psychological symptoms on Likert-scales. Getting meaningful data could therefore pose a challenge.

Following these ethical and practical considerations, we chose to assess the care providers' perspective on the topics in question instead of questioning the refugees directly. Due to their close work with refugees, the care providers are presumed to have deep insights into the psychological burden and trauma-related symptoms from which the refugees suffer. In addition, the perceptions of professional care providers including social workers and psychotherapists with experience in working with refugees from different contexts adds a more objective point of view to the study. The care providers' notion of the refugees' psychological burden, factors of distress and trauma-related symptoms provides implications for treatment and support offers for traumatized refugees as well as for the needs and requirements of both refugees and care providers. Furthermore, an explorative data analysis of the care providers' perspective can build the foundation for addressing the challenge of a specific, hypothesis-driven survey with the refugees themselves.

The purpose of this investigation is to analyze the perspectives of care providers on the psychological burden, factors of distress, and trauma-related symptoms of IS-traumatized female refugees from Northern Iraq. In particular, the study seeks (1) to provide an overview of the care providers' perspective of the overall psychological burden of IS-traumatized women; (2) to identify the specific factors of distress among IS-traumatized women from the care providers' perspective; (3) to analyze the

care providers' perception of trauma-related psychological and somatic symptoms of IS-traumatized women.

METHOD

Study Design and Ethical Considerations

This exploratory cross-sectional survey uses self-developed questionnaire-items. The study was conducted in the context of a network meeting of care providers working as part of a Special Quota Project in Baden-Wuerttemberg in April 2017 at the University of Tuebingen. Participants were informed by written information about the study and gave written consent to participate. The questionnaire was administered in the German language. The study was approved by the ethics board (ethic application No. 189/2017BO2) of the University of Tuebingen and fulfills the ethical principles of the Declaration of Helsinki (40).

Sample

All registered care providers of the HAP ($N = 132$) were invited to participate. $N = 96$ of them completed the questionnaire (response rate = 72.7%). Due to working conditions or illness, not all of the invited care providers were able to participate in the network meeting and the study.

The sample comprises care providers from five different professional backgrounds (social workers, interpreters, physicians, psychotherapists and administrators) working in the context of the HAP with IS-traumatized Yazidi women and children. The care providers were working with varying numbers of women and children at different local sites across Baden-Württemberg, Germany.

Survey Instruments

Sociodemographic data and context characteristics of the care providers and their work in the HAP and were assessed with self-developed questions. Moreover, we asked the care providers specifically if they had trauma or flight experiences themselves.

The care providers' perspective on psychological burden, factors of distress and trauma-related symptoms of IS-traumatized Yazidi women were investigated with a self-developed 7-point-Likert-scaled questionnaire. To the best of our knowledge, no validated questionnaire exists investigating the aim of this study because of the uniqueness of the HAP and this specific refugee group. The used questionnaire can be subdivided into four main topics. First, the care providers' perception of the refugees' current overall psychological burden as well as the mean and maximum overall psychological burden over the whole period the refugees spent in Germany was assessed. Second, the stress-level the care providers perceive in the refugees due to the specific factors of distress shown in **Table 1** was identified. Third, the frequency of occurrence of trauma-related (psycho-) somatic symptoms shown in **Table 1** was inquired. The forth part of the questionnaire, assessing the trauma-related psychological symptoms depicted in **Table 1** was only given to mental health professionals such as doctors and psychotherapists to ensure an objective, professional evaluation regarding these complex symptoms.

TABLE 1 | Quantitative questionnaire items regarding psychological burden, factors of distress and trauma-related symptoms of IS-traumatized female refugees, according to care providers' perspectives.

Questionnaire items with response options using a Likert-type scale ranging from 1 (very low) to 7 (very high)

- "Please rate the overall psychological burden in the following subunits:"
 - "Current overall psychological burden"
 - "Mean overall psychological burden over the whole period in Germany"
 - "Maximum overall psychological burden over the whole period in Germany"
- "In General, how stressful do you perceive the following factors for the women:"
 - "Ambivalence about returning to the country of origin"
 - "Illiteracy"
 - "Fear of hostility of strangers"
 - "Fear of persecution by ISIS"
 - "Restrictions of movement"
 - "limited accessibility of work opportunities"
 - "Family planning/desire to have children"
 - "Missing work/tasks"
 - "Desire to marry"
 - "Cultural differences"
 - "Insufficient privacy"
 - "Differences in religion"
 - "Language barriers"
 - "Worries about family members in Iraq"
 - "Worries that family members cannot follow from Iraq to Germany"
 - "Social conflicts with beneficiaries"
 - "Social conflicts with care providers"
 - "Uncertain future"
- Trauma related somatic symptoms: "How often do the following symptoms occur in the women in your experience:"
 - "Pain"
 - "Paresthesia of skin or body"
 - "Movement disorders"
 - "Dissociation"
 - "Functional complaints"
 - "Feelings of suffocation"
 - "Dizziness"
 - "Heart complaints"
 - "Gastrointestinal complaints"
- Trauma-related psychological symptoms: "How often do the following symptoms occur in the women in your experience (only answered by mental Health professionals)":
 - "social withdrawal"
 - "depression"
 - "anxiety/panic attacks"
 - "listlessness"
 - "agitation (restlessness)"
 - "nervousness"
 - "irritability"
 - "suicidal tendencies"
 - "self-injury"
 - "insomnia"
 - "nightmares"
 - "flashbacks"
 - "avoidance of trauma-specific stimuli"
 - "dissociative disorder"
 - "eating disorder"
 - "abuse of medication"
 - "abuse of alcohol"
 - "abuse of addictive substances"
 - "feelings of guilt"
 - "negative self-image"

The questionnaire was designed by a team of psychologists and doctors, some of whom have experience working with IS-traumatized Yazidi refugees. According to their expertise and the existing research literature in this field, the most common psychological burden, factors of distress and trauma-related symptoms were included in the survey. To determine the feasibility and appropriateness of this approach and to ensure a correct understanding of the self developed questions, the questionnaire was piloted and adapted by means of expert-interviews with psychologists, social workers and interpreters working in the HAP. The whole questionnaire is available from the authors upon request.

Data Analysis

All quantitative data were analyzed using SPSS [version 24.0.0.1, (41)]. The Psychological burden was analyzed using the mean (M) and standard deviation (SD) to identify the importance and order of the care providers' ratings of each item. For determining the mean differences, a paired sample t -test was used for interval-scaled data. A significance level of $\alpha = 0.05$ was assumed; for multiple testing, we used the Bonferroni correction of the p -value to avoid an accumulation of alpha errors. To investigate the influence of different determinants on the perceptions of care providers chi-squared tests for independence were used (42).

RESULTS

Results of the Sample Description ($N = 96$)

The majority of participants are female (86.5%) with 56.8% of the participants working as social workers. The mean age of the participants is 43.12 years ($SD = 13.01$). On average, the participants already worked in the HAP for 16.3 3 months ($SD = 6.54$). Each care provider was responsible for a mean of 20.39 refugees ($SD = 27.66$). From a mean of 17.1 ($SD = 13.97$) working hours per week in the HAP, the care providers spend 11.1 h ($SD = 10.84$) per week in direct contact with the refugees. Almost a quarter of the care providers (24.0%) reported personal experiences of trauma themselves; 7.3 % reported a personal flight history. Table 2 provides more information regarding the sample description.

Psychological Burden of IS-Traumatized Yazidi Women

The overall psychological burden of the IS-traumatized women was rated by care providers in three different dimensions: (a) the current overall psychological burden, $M = 5.29$ ($SD = 0.96$), meaning the care providers' perceptions of the refugees' psychological burden during the time this study was conducted; (b) the mean overall psychological burden, $M = 5.51$ ($SD = 0.94$), meaning the care providers' perceptions of the refugees' psychological burden over the entire period that the women resided in Germany; and (c) the maximum overall psychological burden, $M = 6.04$ ($SD = 1.02$), meaning the care providers' perceptions of the refugees' maximum psychological burden during the whole time they resided in Germany.

TABLE 2 | Sample description of the care providers in the Special Quota Project.

Sample Description		
AGE (YEARS)		
Mean	43.12	
SD	13.01	
Range	23–66	
GENDER		
Female	83	86.5%
Male	11	11.5%
PROFESSION		
Social education worker/social worker	54	56.8%
Interpreter	11	11.6%
Administrator	11	11.5%
Psychologist/Psychotherapist	6	6.3%
Creative-/Special Therapist	6	6.3%
Therapist for children and youth	3	3.2%
Medical practitioner/Psychiatrist	1	1.1%
Other profession	3	3.1%
EMPLOYMENT		
Professional	83	88.3%
Voluntary/training within the profession	2	2.1
Voluntary outside the profession	9	9.6%
ADDITIONAL TRAINING IN THE TREATMENT OF TRAUMATIZED REFUGEES		
Yes	39	42.9%
No	52	57.1%
EXPERIENCES WITH TRAUMATIZED PATIENTS (MONTHS)		
Mean	69.20	
SD	90.57	
Range	1–360	
PERSONAL EXPERIENCES OF FLIGHT		
Yes	7	7.3%
No	83	86.5%
PERSONAL EXPERIENCES OF TRAUMA		
Yes	23	24.0%
No	67	69.8%
PERIOD OF TIME IN THE PROJECT (MONTHS)		
Mean	16.33	
SD	6.54	
Range	1–27	
NUMBER OF WOMEN CARED FOR		
Mean	20.39	
SD	27.66	
Range	0–111	
WORKING TIME PER WEEK (HOURS)		
Mean	17.1	
SD	13.97	
Range	1–48	
DIRECT CONTACT WITH WOMEN (HOURS)		
Mean	11.11	
SD	10.84	
Range	0–39	

Specific Factors of Distress of IS-Traumatized Yazidi Women

The factors the care providers' rated as the most distressing for the refugees were "worries about family members in Iraq"

($M = 6.69$, $SD = 0.69$), "Worries that family members cannot follow (from Iraq to Germany)" ($M = 6.62$, $SD = 0.68$), and an "uncertain future" ($M = 5.89$, $SD = 1.02$). Other factors of distress are illustrated in **Figure 1**. By calculating paired t -tests, it was found that there was no significant difference between the care providers' ratings of "worries about family members in Iraq" and "worries that family members cannot follow (from Iraq to Germany)", $t_{(90)} = 1.15$, $p = 0.252$. However, the care providers rated "worries about family members in Iraq" significantly more stressful for the refugees than an "uncertain future", $t_{(88)} = 6.72$, $p < 0.000$. "Worries that family members cannot follow (from Iraq to Germany)" were also rated as a significantly greater burden to the refugees compared to an "uncertain future", $t_{(88)} = 6.37$, $p < 0.000$. The level of significance using the Bonferroni correction (with 3 items) was $\alpha = 0.012$.

Trauma-Related Symptoms: (Psycho-) Somatic Symptoms of IS-Traumatized Female Refugees

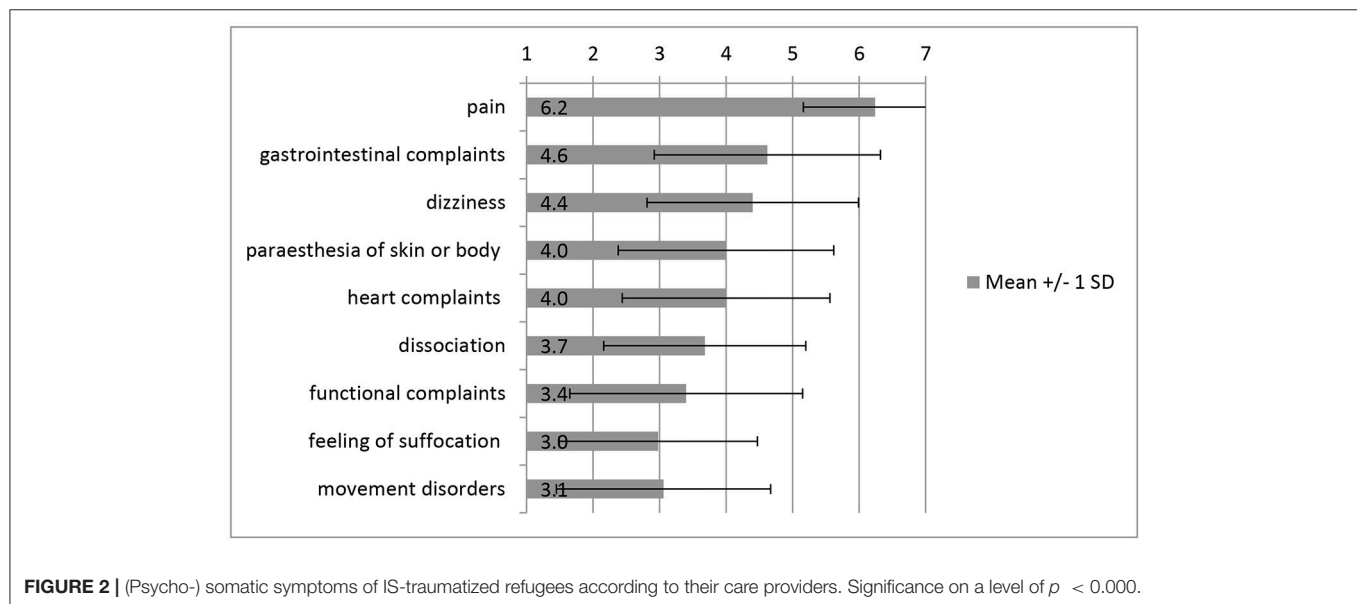
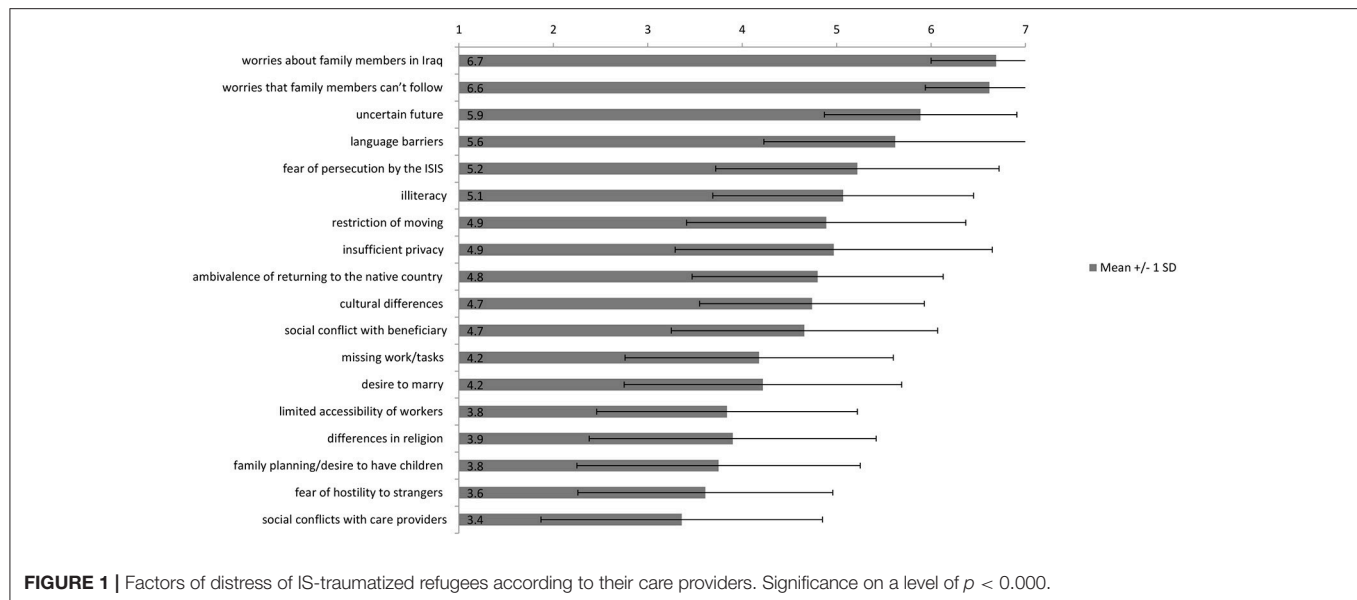
When asked about the frequency of occurrence of (psycho-)somatic symptoms on the 7-point Likert type scale, the care providers reported "pain" ($M = 6.24$, $SD = 1.08$), "gastrointestinal complaints" ($M = 4.62$, $SD = 1.70$), and "dizziness" ($M = 4.40$, $SD = 1.59$) as the three predominant symptoms. For the ratings of the other symptoms see **Figure 2**. In free-text answers care providers specified the pain symptoms as "headaches" and "back pain." Using a paired t -test, it was found that care providers reported "pain" as occurring significantly more often in the women than "gastrointestinal complaints", [$t_{(64)} = 8.23$, $p < 0.000$]. "Pain" was also rated as occurring significantly more frequent than "dizziness", [$t_{(61)} = 9.37$, $p < 0.000$]. There was no significant difference in the care providers' rating regarding the frequency of occurrence of "Gastrointestinal complaints" and "dizziness" in the refugees, [$t_{(61)} = -0.52$, $p = 0.605$]. The significance level using the Bonferroni correction (with 3 items) was $\alpha = 0.012$.

Trauma-Related Symptoms: Psychological Symptoms of IS-Traumatized Female Refugees

According to the mental health professionals' ratings on the above-described Likert-type scale from 1 ("very low") to 7 ("very high"), the following psychological symptoms are identified as particularly significant: "nightmares" ($M = 6.43$, $SD = 0.54$), "insomnia" ($M = 6.43$, $SD = 0.79$), and "depression" ($M = 5.71$, $SD = 1.11$). However, due to the small number of participating mental health professionals no further statistical analysis was performed with these results. For all ratings see **Table 3**.

Controlling for Potential Confounding Factors

Since this study assesses psychological burdens of refugees by questioning their care providers, several personal characteristics of the care providers could influence their perception and rating behavior. (43) found that an own trauma or flight history of care providers working with refugees is a significant



risk factor for secondary traumatization in care providers (43) which can influence their behavior toward trauma-victims. These personal experiences could also influence the perception of care providers on the refugees and their ratings in this survey. The relation between personal trauma and personal flight experiences and the items “worries about family members in Iraq,” “worries that family members cannot follow (from Iraq to Germany),” “uncertain future,” “pain,” “fears,” and “movement restrictions” was examined using Chi-square tests. The results indicate neither a significant association between “personal traumatic experiences” (see Table 4) and the ratings of the included items nor between the care providers’ “personal flight experience” and their rating behavior (see Table 5). For detecting the determinant of care providers’ perceptions of the “personal flight experience,” the significance

level was adapted according to the Bonferroni correction using multiple testing (5 items) and shows a significance level of $\alpha = 0.001$.

DISCUSSION

To the best of our knowledge, this is the first study to explore the psychological burden, factors of distress, and trauma-related symptoms in a large sample of IS-traumatized females from Northern Iraq from the perspectives of their care providers. The results show that care providers perceive female IS-victims who came to Germany in 2015/2016 as a highly psychologically burdened group with an especially high trauma-related symptom load.

TABLE 3 | Psychological burden of IS-traumatized women, according to psychotherapists' perspectives.

Measure		
Psychological burden according to psychotherapists' perspectives	<i>M</i>	<i>SD</i>
Nightmares	6.43	0.54
Insomnia	6.43	0.79
Depression	5.71	1.11
Nervousness	5.57	0.54
Avoidance of trauma-specific stimuli	5.57	1.27
Listlessness	5.29	1.25
Anxiety/panic attacks	5.29	1.11
Negative self-image	5.29	1.38
Social withdrawal	5.00	2.08
Irritability	5.14	0.90
Flashbacks	5.14	1.07
Feelings of guilt	5.14	1.77
Agitation (restlessness)	4.71	1.38
Dissociative disorder	3.86	1.35
Abuse of medication	3.00	1.10
Eating disorder	2.86	1.07
Suicidal tendencies	3.29	1.80
Self-injury	2.43	1.40
Abuse of addictive substances	1.67	1.03
Abuse of alcohol	1.71	0.95

TABLE 4 | Chi-squared test for "personal trauma experience" for analyzing any influences in the care providers' ratings of the factors of distress and somatic symptoms of IS-traumatized women.

Personal trauma experience	χ^2	<i>p</i>	Cramer's <i>V</i>
1. "worries about family members in Iraq"	$\chi^2 (4, n = 85) = 0.78$	0.941	0.096
2. "worries that family cannot follow"	$\chi^2 (3, n = 85) = 3.70$	0.296	0.209
3. "uncertain future"	$\chi^2 (3, n = 83) = 2.66$	0.447	0.179
4. "pain"	$\chi^2 (6, n = 61) = 6.09$	0.413	0.316
5. "fear of persecution by ISIS"	$\chi^2 (5, n = 82) = 1.63$	0.898	0.141
6. "fear of hostility by strangers"	$\chi^2 (5, n = 83) = 2.96$	0.706	0.189
7. "restriction of movement"	$\chi^2 (6, n = 83) = 7.47$	0.279	0.300

The care providers registered high mean values of psychological burden and distress levels in the refugees during the whole time the refugees resided in Germany. However, there is some variability in the refugees' overall psychological burden rated by their care providers. At the time this survey took place, which was 1–2 years after the refugees first arrived in Germany, the care provider rated the current overall psychological burden of the refugees as less stressful than their mean or maximal psychological burden during their time in Germany. This result suggests that the early post-migration phase is especially stressful for refugees.

TABLE 5 | Chi-squared test for personal flight experience for analyzing any influences in the care providers' ratings of the factors of distress and somatic symptoms of IS-traumatized women.

Personal flight experience	χ^2	<i>p</i>	Cramer's <i>V</i>
1. "worries about family members in Iraq"	$\chi^2 (4, n = 85) = 1.38$	0.848	0.127
2. "worries that family cannot follow"	$\chi^2 (3, n = 85) = 4.12$	0.249	0.220
3. "uncertain future"	$\chi^2 (3, n = 83) = 3.01$	0.391	0.190
4. "fear of persecution by ISIS"	$\chi^2 (5, n = 82) = 6.71$	0.243	0.286
5. "Fear of hostility to strangers"	$\chi^2 (5, n = 83) = 6.33$	0.276	0.276

Worries about their family members in Iraq and worries that family members will not be granted asylum in Germany are seen as the highest stressors for IS-traumatized women by their care providers. This finding is in line with the recent literature. In an investigation of Iraqi refugees resettled in the US, Gangamma et al. also described the refugees' worries about relatives and personal safety. They found this psychological burden to be omnipresent, even though the refugees themselves did currently not face any threat (44). Other studies confirmed the significant association between family separation and serious mental health problems such as subsyndromal depression, anxiety, or PTSD (45). Intrusive fears about family members are thereby related to greater mental health impairment and current living difficulties (46). This is especially relevant in the context of the refugees in this study. Many of their family members are still held in IS-captivity or live in refugee camps in Iraq (5). Furthermore, due to restrictions in German law, there are no clear prospects for families to reunite in Germany.

Another main factor of distress identified in this study is the uncertainty regarding the refugees' future. This is in line with other studies. El-Shaarawi, for example, described the effects of uncertainty on the mental health of Iraqi refugees in Egypt as well. The author presented evidence for causes of instability leading to distress and restrictions of the refugees' well-being (47).

Regarding trauma-related psychological symptoms, the mental health professionals perceive a wide range of different symptoms as frequently occurring. From the perspectives of mental health professionals, the refugees in this study suffer predominantly from sleeping disorders such as nightmares and insomnia. In addition, specific PTSD-symptoms, e.g., nervousness, avoidance of trauma-related stimuli, listlessness and flashbacks are also rated as occurring often in the refugee sample. Furthermore, the mental health professionals rated affective burdens such as depressive symptoms, anxiety and panic attacks as occurring frequently. In contrast, abuse of alcohol and addictive substances were rarely perceived. Similar symptoms have been found in other studies as well. A study examining Yazidi refugees resettled in Turkey has reported disorders such as PTSD, depression, and anxiety generally as the most often noted mental illnesses among children (48).

The most frequently reported trauma and stress-related symptoms of IS-traumatized females from the perspective of their care providers were pain, gastrointestinal complaints and dizziness. Pain symptoms showed a significantly higher occurrence-rating compared to other somatic symptoms. Pain may become a chronic disease of importance among traumatized refugees (49) with high comorbidity with depression. In the population of Iraqi refugees, pain, particularly back pain, was diagnosed most often (50). Rohlof et al. found more unexplained somatic symptoms in traumatized refugees than in the general Western population (51). Jamil et al. listed next to self-reported somatic complaints medical conditions among Iraqi refugees and found dizziness and gastrointestinal symptoms to be the main health complaints (19, 52). Given these findings, refugees should receive specialized medical support for these somatic symptoms, always with consideration of the psychological load and the traumatic experiences they have suffered. Indeed, ways of expressing psychosocial distress depend on a culture's values, norms, and stereotypes (53). In addition, the personal meaning of having a trauma disorder influences the patient's way of expressing trauma symptoms and his or her help-seeking processes (54). For the successful integration of refugees, cultural sensitivity training for care providers seems to be essential. They need to have some understanding about the refugees' cultural idioms of distress explanatory models, coping strategies, and norms for seeking help (55, 56). Therefore, refugee mental health care should be conducted by an interdisciplinary and multicultural team with knowledge of both trauma symptoms and the cultural values and norms of the Yazidi society.

LIMITATIONS

Using the care providers' perspective introduces potential underlying biases to the study's results. There could have been an overestimation of observable symptoms such as social withdrawal or an underestimation of non-observable symptoms such as nightmares, a negative self-image or feelings of guilt. Interpreting these results, the reader has to keep in mind that the care providers could only answer the questions based on the symptoms they perceived in the refugees or based on what the refugees had told them. However, since the care providers spend on average 11h per week in direct contact with the refugees, their level of being informed about the psychological burden of the women is assumed to be sufficient. Moreover, specific characteristics of the caregivers could have influenced their ratings. We were able to partly control for this bias by showing that the care providers' response behaviors were not influenced by their own traumatic or flight experiences. Another bias could have occurred due to the different working conditions of the care providers, their different contact durations with the traumatized women and the wide range of the number of refugees they work with. Due to the trauma experienced by Yazidi women, a direct investigation of their burden and symptoms

was ethically not justifiable at the time in which the study was conducted. More time was needed to ensure their medical and psychiatric treatment and integration in Germany. Nevertheless, in the future research, a survey asking IS-traumatized female refugees from Northern Iraq about their psychological burdens directly is needed to revise the results of the present study. This could be especially interesting in order to assess in which topics care providers' and refugees' rating match and to which questions they have different answers.

Moreover, because a self-developed questionnaire was used in order to accurately address the characteristics of this specific refugee population, there are no psychometric properties available. It must further be considered that the sample population comprised a special group of refugees, and to what extent the results can be generalized must be accurately determined.

CONCLUSION

This study is the first to provide survey data on the psychological burden, factors of distress and trauma-related psychological and somatic symptoms of IS-traumatized women, in their care providers' perspectives. The most important distressing factors, as seen by the care providers, are the women's worries about relatives and their lack of certainty and stability regarding their future. Pain, gastrointestinal complaints and dizziness the care providers considered to be the main somatic-symptom complaints among IS-traumatized female refugees. Care providers' personal trauma and flight experiences do not seem to influence their perceptions of psychological distress or trauma-related symptoms. These findings have important implications for the needs and treatment options of traumatized refugees as well as the necessity for culture-sensitive training programs preparing care providers to work with highly burdened refugees.

DATA AVAILABILITY STATEMENT

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

AUTHOR CONTRIBUTIONS

CR-OES, JD, PW, and FJ planned and conducted the study. CR-OES analyzed the data and wrote the manuscript with support from FJ. JD, PW, CN, DK, SB, VR, JR, VMT and SZ supported the study and the writing process with ideas and feedback.

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Prevalence of Mental Distress Among Syrian Refugees With Residence Permission in Germany: A Registry-Based Study

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Background: High rates of prevalence of mental distress among the Syrian refugee population have been repeatedly confirmed. However, little is known about the influence of length of stay, living conditions, and residence permission in the host country or about the duration of the escape journey and travel conditions on mental health in this refugee population. This study examines the mental health of Syrian refugees, taking into account the circumstances in their country of origin and host country, as well as their escape conditions.

Methods: This investigation formed part of a registry-based study. A sample of 518 adult Syrian refugees in Erlangen, Germany, who have residence permission was identified. The response rate was 38.6%; a total of 200 Syrian refugees thus participated in the study. The respondents were investigated for post-traumatic stress disorder (ETI), depression (PHQ-9), generalized anxiety (GAD-7) and post-migration variables.

Results: The prevalence of participants who had personally experienced and/or witnessed traumatic events was 75.3%. Symptoms of PTSD were found in 11.4% of the participants. Moderate to severe depression was confirmed in 14.5% and moderate to severe generalized anxiety in 13.5% of the sample. The criteria for at least one diagnosis were met by 30.5% of the participants. More severe PTSD symptoms were associated with older age, shorter validity of the residence permit, larger number of traumatic events (TEs) and higher generalized anxiety symptoms. Depression symptoms were associated with younger age, shorter duration of escape journey, larger number of TEs and higher generalized anxiety symptoms. Generalized anxiety symptoms correlated with female gender, PTSD, and depression symptoms.

Conclusions: These findings suggest that Syrian refugees in Germany are a vulnerable population, especially if they have experienced and/or witnessed multiple traumatic events. However, post-migration conditions and positive future prospects in the host country can be protective factors for this population.

Keywords: syrian refugees, PTSD, depression, generalized anxiety, post-migration variables, Germany, residence permission, mental health

INTRODUCTION

It has been reported by the Office of the United Nations High Commissioner for Refugees that by the end of 2015, 65.3 million individuals were forcibly displaced worldwide. With 4.9 million refugees, 6.6 million internally displaced persons, and nearly 250,000 asylum seekers, an estimated 11.7 million Syrians were displaced by the end of 2015 and seeking protection within Syria or abroad (1). Since 2015, approximately 1.35 million asylum applications have been documented in Germany, including 473,881 requests from Syrians (2–4). Most Syrians receive political asylum—i.e., refugee status or subsidiary protection. In 2016, approximately 98% of the Syrians had received protection in Germany (5).

Coming from war regions, these people have often experienced traumatic events (TEs). This defines them as a high-risk group for mental disorders (6). Several studies have investigated the mental health problems of Syrian refugees in recent years. Prevalence rates range from 20.5 to 35.7% for PTSD (7–12), from 20 to 43.9% for depression (7–9, 12, 13), and from 19.3 to 31.8% for anxiety (8, 12).

Some of the risk factors for mental distress have previously been reported in the literature. Alpak et al. (10) found symptoms of PTSD in 33.5% of refugees from Syria in Turkey. They reported positive correlations between PTSD, the number of traumatic events experienced, and female gender. In a previous study by our group (8) on Arabic-speaking asylum seekers (34% of whom were Syrian) who had been placed in collective accommodation centers, with a mean length of stay in Germany of about 7.9 months, the prevalence of mental stress was high. Symptoms of PTSD were found in 35.7% of the sample, moderate to severe depression in 35.7%, and moderate to severe generalized anxiety in 39.3%. In comparison with asylum seekers who had mental distress, those without mental distress had experienced fewer TEs and had longer periods of stay in Germany. There were no differences between men and women with regard to the number of TEs, the prevalence of PTSD, depressive symptoms, or generalized anxiety symptoms (8). In a study that included internally displaced Syrians as well as Syrian refugees in the Netherlands, the rates of PTSD were 31.8% for internally displaced Syrians and 23.4% for Syrian refugees. However, the rate of depression was significantly higher in the refugee sample in comparison with the internally displaced Syrians (44.1 vs. 16%). The authors argue that internally displaced Syrians were continuing to live in the war zones and were therefore still in a conflict mode. An alternative explanation for the high depression rates among refugees is their sense of loss of their homeland, community, and family (14).

These results indicate the impact of gender and post-migration conditions on the prevalence of mental disorders. Variables affecting mental health, such as length of stay, living environment, and residence permission are rarely examined in research studies. Insecure residence status and poverty are relevant stressors in the acculturation process (15) and therefore have an impact on mental health (15, 16). Uncertainty about asylum status in the country of arrival gives rise to emotional distress (17), and the duration of the asylum procedure has

been shown to be a risk factor for psychiatric problems (18). Bogic et al. (19) reported higher rates of PTSD among refugees with a temporary residence permit, while Chou (20) found that visa status is predictive for future psychological distress in older migrants. Traumatic events prior to migration, forced and unplanned migration, living alone or separated from family in the host country, and the length of migrant residence in the host country are known to increase the likelihood of mental disorders in migrants (21). In a study of refugees from Iraq, Nickerson et al. (22) found that post-migration living difficulties are a predictor for PTSD and depression. Steel et al. (23) assessed the long-term effects of trauma on mental health among Vietnamese refugees after a mean length of residence in Australia of 11.2 years. They reported that trauma-related mental illness appeared to decline steadily over time. They did not find any associations between several post-migration, social, and economic factors and mental illness. They suggest that post-migration stressors may decline after prolonged resettlement, but that the effects of high exposure to premigration trauma can persist.

When we examine the administrative process involved in obtaining asylum permission in Germany, several difficulties become apparent. Upon entry into Germany, refugees seeking asylum are required to formally request asylum. Verbally declaring “Asylum” to a local authority representative results in a change of the individual’s status from illegal immigrant to asylum seeker. From their place of arrival, the refugees are allocated to different cities and regions. The initial distribution of asylum seekers is orientated in line with the “Königstein key”¹. This key defines the percentage assigned to each federal state in matters affecting the national common financial adjustment scheme, such as the asylum system. It also determines what proportion of asylum seekers is to be received by each federal state. The distribution quota for 2016 in Bavaria was 15.5%. The asylum seekers can be accommodated in reception facilities (*Erstaufnahmeeinrichtung*) for up to 6 months, or until their application is decided on. If accommodation is provided in reception facilities, basic benefits are provided in the form of non-cash benefits (e.g., heating, clothing, personal hygiene, and benefits in case of sickness, pregnancy, and birth) and they are regulated by the Asylum Seekers’ Benefits Act (*Asylbewerberleistungsgesetz*). Asylum applicants who are no longer obliged to live in a reception facility are distributed to follow-up facilities (for instance, collective accommodation or local accommodation, such as apartments or accommodation groups). The local Agency for Foreign Nationals mandates asylum applicants who have good prospects for remaining to attend language courses (*Integrationskurse*) whilst their applications are being processed. Asylum applicants from Eritrea, Iraq, Iran, Syria, and Somalia have been granted this early access because of the high likelihood that they will be granted asylum. At this stage, the applicants receive advice on the potential for limited access to the labor market. They can apply for counseling at the local employment agency and can look for work. Once they have received a job offer, they still need permission from

¹ Bundesamt für Migration und Flüchtlinge. Available online at: <http://www.bamf.de/EN/Fluechtlingschutz/Ankunftszentren/ankunftszentren-node.html> (2017).

the Agency for Foreign Nationals to start working. People who are granted asylum receive a temporary residence permit if the conditions for this are satisfied (§26 AsylG;²). In 2015, 105,620 decisions were made in Germany on asylum applications by Syrians (24). The vast majority of the applicants were granted refugee status in accordance with §3 Abs 1 AsylG², following the Geneva Convention, which includes a 3-year resident permit.

Only 61 people were granted subsidiary protection status. This status implies a 1-year residence permit and may be extended for another 2 years. A major difference is the restricted subsequent immigration of dependants. People who were permitted to stay in Germany after March 16, 2016 on that legal basis are not permitted to bring members of their family to the country. This restriction is at present applicable until at least July 2018. The ratio for Syrians changed in the following years: of the 295,040 decisions made in 2016, 121,562 involved the granting of this subsidiary protection status within the meaning of Section 4 of the Asylum Act (*Asylgesetz*;²). In 2017, a majority consisting of 55,697 of the 99,527 decisions followed that legal basis. People with temporary residence permits and with subsidiary protection are allowed to work in Germany³. Necessary benefits are then no longer paid under the Asylum Seekers' Benefits Act, but unemployment benefits for jobseekers can be received under Book II of the Social Code (*Sozialgesetzbuch II*) if applied for. A single person is eligible to receive €416 per month in addition to the cost of housing. Attendance at an integration course is required in order to ensure good preparation for the labor market [§ 3 Abs 2a Satz 1 SGB II; (25)].

To the best of our knowledge, this is the first study on Syrian refugees in Germany who have residence permission. The aim was to examine mental distress among Syrian refugees who have been staying in Germany since 2014 and who have received a positive decision regarding their asylum procedure—i.e., a residence permit.

MATERIALS AND METHODS

This investigation formed part of a registry-based study in Erlangen, Germany, and was conducted in collaboration with Erlangen City Council and the Job Center in Erlangen. Participants in the present study were Syrian refugees who arrived in Germany after 2014 and were resident in the city of Erlangen, receiving unemployment benefits and in possession of a residence permit. The registry of the Erlangen Job Center was used to obtain the data. At the time of the investigation, a total of 518 Syrian refugees were registered. All 518 Syrian refugees were informed about this study in written form. The purpose of the study and conditions for participation were explained to them. They were invited to participate and to attend prearranged meetings in a room at the city hall. Those who attended the

meetings were again given information about the study orally. After consenting to participate, they were asked to complete questionnaires in Arabic. In the room, up to 15 refugees at one time completed the questionnaires during the meetings. The participants were asked not to speak to each other while filling in the questionnaires. The team members involved in the study (the first and second authors) and one translator remained in the room and offered further explanations if needed in German or Arabic.

The inclusion criteria for the study were: age of consent (minimum 18 years), agreement to participate in the study, Syria as the country of origin, and a good command of Arabic (at least spoken). Nineteen of the 200 participants (9.5%) were not literate, and the second author (AZ, Arabic-speaking, physician, doctoral candidate) read the questions for them and helped them to complete the questionnaires.

The data were obtained between July and December 2017. Participation in the study was completely voluntary, and written informed consent was obtained from all the participants. All of the study participants received a reimbursement of €15. The study was approved by the Ethics Committee of the University of Erlangen–Nuremberg (project identification code: 74_17 B).

Assessment Instruments

The survey instruments included sociodemographic and migration-related variables, as well as symptoms of post-traumatic stress, depressive symptoms, and symptoms of generalized anxiety disorder. The questions on sociodemographic and migration-related variables were translated from German into Arabic, back-translated, and commented upon by the first and last author. The comprehensibility and cultural validity of the Arabic versions of the questionnaires have been examined in a previous study (8).

Essen Trauma Inventory (ETI)

The Essen Trauma Inventory (26) is a self-rating questionnaire that was developed for assessing potential traumatic events and post-traumatic stress disorder. The translated version of the Essen Trauma Inventory was obtained from the author, Dr. Sefik Tagay. To begin with, the participants marked “yes” or “no” in the questionnaire if they had personally experienced or witnessed a series of potential TEs (e.g., torture, military conflict, explosions). For the worst TE that they had experienced, they rated whether it triggered an objective threat to life (A1 criterion) as well as a subjective feeling of threat (A2 criterion). Additionally, they rated the 17 items on the PTSD symptom list. The PTSD symptom list was rated on a 4-point Likert scale that ranged from “does not match at all” (0 points) to “completely matches” (3 points). Clinically apparent PTSD is indicated if the participant has experienced a TE, meets both criteria (A1 and A2), and the total score for the PTSD symptom list reaches a cut-off value of 27. Cronbach's α in the present study sample was $\alpha = 0.95$.

Patient Health Questionnaire—Depression Module (PHQ-9)

Depression was assessed using the nine-item PHQ-9 (27, 28), which includes each of the nine DSM-IV (29) criteria for

²Bundesministerium der Justiz und für Verbraucherschutz. Asylgesetz (AsylG). Available online at: http://www.gesetze-im-internet.de/asylvg_1992/AsylG.pdf (1992).

³Die Bundesregierung. Available online at: <https://www.bundesregierung.de/Content/DE/Lexikon/FAQ-Fluechtlings-Asylpolitik/2-was-bekommen-fluechtlinge/03b-Leistungen-Anerkannte.html> (2018).

depression. The Arabic version of the PHQ-9 questionnaire is available online (30). The PHQ is a screening instrument for psychiatric case definition in primary care. The items refer to problems within the previous 2 weeks. The score for the severity of depression varied from 0 (not present at all) to 3 (present nearly every day), yielding a total score between 0 and 27. The scores for PHQ-9 were used to determine the presence of depression and its severity depending on the following score ranges: 10–14 moderate, 15–19 moderate to severe, and 20–27 severe. Cronbach's α in the present study sample was $\alpha = 0.70$.

Generalized Anxiety Disorder (GAD-7)

An Arabic version (8) of the 7-item Generalized Anxiety Scale (31, 32) was administered in order to assess the symptomatic severity of generalized anxiety disorder among the participants. Each of the seven items was rated on a 4-point Likert scale. Response options were “not at all” = 0, “several days” = 1, “more than half the days” = 2, and “nearly every day” = 3. GAD-7 scores thus range from 0 to 21, with scores of ≥ 5 , ≥ 10 , and ≥ 15 representing mild, moderate, and severe symptom levels of generalized anxiety disorder. In this study's sample, the internal consistency was $\alpha = 0.92$.

Statistical Analysis

Statistical analyses were conducted using the IBM SPSS statistical package, version 21.0 (IBM Corporation, Armonk, New York). Prevalence rates were calculated on the basis of available cut-off scores for each questionnaire. A missing value analysis was performed. In case of missing items, the value was replaced with the rounded mean of the remaining items in the corresponding questionnaire when maximally one item (ETI, GAD-7) and three items (PHQ-9) in the questionnaires were missing. In addition to descriptive methods, categorical variables including prevalence rates were compared using chi-square tests. Fisher's exact test was used if the expected count in one of the cells was less than 5. To calculate differences between groups, we used *t*-tests for continuous variables and chi-square tests for ordinal or dichotomous variables. If variables did not meet the assumption of normal distribution, the comparison between groups was repeated using nonparametric tests. After testing for multicollinearity, multiple linear regression analysis with the enter method was used to explore the influence of sociodemographic and migration-related variables on the severity of mental stress. The significance level for all tests was set at $p = 0.050$.

RESULTS

Response Rate and Missing Values

The response rate was 38.6%; a total sample of 200 participants came to the meetings and were included in the study. Analysis showed that the nonrespondents ($n = 318$) were significantly younger than those who participated in the study (29.6 years, $SD = 9.9$ vs. 33.3 years, $SD = 10.6$; $p < 0.001$) and were less frequently married (34.9% married among nonparticipants vs. 59.5% married among participants; $p < 0.001$), with no significant gender differences (25.2% women

among nonparticipants vs. 30.5% women among participants, $p = 0.183$).

In the ETI questionnaire, eight participants (4%) had one missing item; in the PHQ-9 questionnaire, two participants (1%) had one missing item and 10 participants (5%) had three missing items; and in the GAD-7 questionnaire, eight participants (4%) had one missing item.

Sociodemographic Variables

The sample consisted of 61 women (30.5%) and 139 men (69.5%). The mean age of the participants was 33.3 years ($SD = 10.6$, range: 18–63). There were no significant age differences between women and men ($M = 34.93$, $SD = 9.5$ vs. $M = 32.5$, $SD = 10.9$, $p = 0.071$). Demographic data are presented in **Table 1**. A total of 114 participants (59.1%) were parents, and they had a mean of 3.4 children (range: 1–10).

Psychiatric/Psychotherapeutic Treatment and Migration-Related Variables

Twelve participants (6.0%) had received psychiatric/psychotherapeutic treatment at some time during their lives. Among them, five participants (41.7%) had treatment only in their country of origin, two participants (16.7%) had treatment in the country of origin and were receiving ongoing therapy in Germany and four participants (33.3%) were only receiving ongoing therapy in Germany. Migration-related variables are presented in **Table 2**.

The mean duration of their escape journeys was 8.7 weeks ($SD = 21.8$, range: 0.20–182). The majority (81.4%, $n = 162$) had traveled across land and by boats and rubber dinghies across the sea; 17 participants (8.5%) had traveled only across land; and 20 participants (10.1%) reported having reached Germany by another method (e.g., by plane). On a visual scale from 0 (not at all difficult) to 10 (very difficult), the difficulty of the escape was indicated as on average 7.1 ($SD = 3.0$, range: 0–10). Their mean duration of stay in Germany was 23.3 months ($SD = 6.5$, range: 2–52). Asylum procedures had lasted a mean of 9.2 months ($SD = 5.5$, range: 0–27). Their protection/residence permissions were valid for a mean of 16.0 months more ($SD = 8.61$, range: –9 to 33, with negative values for current extension requests). Residence permission had been issued for a mean of 31.7 months ($SD = 11.3$, range: 4–75).

TES and Post-traumatic Stress Disorder

A total of 149 participants (75.3%) had personally experienced and/or witnessed TEs; the distribution is shown in **Table 3**. Men had more often experienced and/or witnessed the following TEs: serious accident, fire, or explosion ($\chi^2 = 8.31$, $df = 3$, two-tailed Fisher's exact test $p = 0.032$) and physical violence from strangers ($\chi^2 = 8.95$, $df = 3$, two-tailed Fisher's exact test $p = 0.023$). Forty-nine participants (24.5%) reported only one TE, 76 participants (38.0%) reported two to five TEs, and 24 participants (12.0%) reported more than five TEs. Forty-six women (75.4%) and 103 men (75.2%) had experienced at least one TE ($\chi^2 = 0.001$, $df = 1$, two-tailed Fisher's exact test $p = 1.000$). On average, the participants reported having experienced and/or witnessed $M = 2.27$ TEs ($SD = 2.39$, range: 0–10). The most distressing

TABLE 1 | Sociodemographic variables.

Characteristics	Women (<i>n</i> =61)		Men (<i>n</i> =139)		Comparison		Total (<i>N</i> = 200)	
	<i>n</i>	% ^a	<i>n</i>	% ^a		<i>p</i>	<i>n</i>	% ^a
MARITAL STATUS								
Single	8	13.1	66	47.5	$\chi^2 = 24.50$	0.000	74	37.0
Married	48	78.7	71	51.1			119	59.5
Divorced/widowed	5	8.2	2	1.4			7	3.5
AGE								
18-24	11	18.0	40	28.8	$\chi^2 = 8.41$	0.089	51	25.5
25-34	19	31.1	42	30.2			61	30.5
35-44	19	31.1	39	28.1			58	29.0
45-54	11	18.0	10	7.2			21	10.5
>55	1	1.6	8	5.8			9	4.5
ACCOMMODATION								
Collective accommodation center	9	14.8	20	14.5	$\chi^2 = 11.86$	0.001	29	14.5
Own apartment (alone or with family)	49	80.3	83	60.1			132	66.0
Apartment together with other people	3	4.9	35	25.4			38	19.0
	M (SD)	Range	M (SD)	Range		<i>p</i>	M (SD)	Range
EDUCATION IN YEARS ^b								
(<i>n</i> = 186)	9.9 (4.9)	0 – 20	10.4 (4.3)	0 – 20	$t_{(184)} = -0.617$	0.538	10.2 (4.5)	0 – 20

^aValid values.^bIncluding university attendance.

TEs were military conflict (34.5%, *n* = 40), death of a loved one (17.4%, *n* = 20), and serious accident/explosion (13.0%, *n* = 15).

Twenty-two participants (11.4%) met the criteria for a diagnosis of PTSD. There were no significant differences between women and men with regard to the prevalence of PTSD (16.4 vs. 8.6%, $\chi^2 = 2.61$, *df* = 1, *p* = 0.140) or the occurrence of PTSD symptoms [*M* = 37.2, *SD* = 4.4 vs. *M* = 34.5, *SD* = 5.8, $t_{(20)} = 1.20$, *p* = 0.243].

Prevalence and Severity of Depression Symptoms and Symptoms of Generalized Anxiety Disorder

The total score for depression in this sample was *M* = 7.1 (*SD* = 6.6, range: 0–27). There were no significant differences between women and men [*M* = 7.5, *SD* = 6.0 vs. *M* = 6.9, *SD* = 6.8, $t_{(198)} = 0.63$, *p* = 0.530]. The total score for generalized anxiety was *M* = 4.6 (*SD* = 4.9, range: 0–21). Women reported more generalized anxiety than men [*M* = 6.5, *SD* = 5.9 vs. *M* = 3.8, *SD* = 4.1, $t_{(198)} = 3.3$, *p* = 0.001]. The data for severity of depression and generalized anxiety in women and men are shown in **Table 4**.

Number of Mental Disorders

Sixty-one participants (30.5%) were screened as positive for at least one diagnosis. Thirty-three participants (16.5%) met the criteria in one diagnostic category, 14 participants (7.0%) screened as positive for two diagnostic categories, and 14

participants (7.0%) screened as positive for all three diagnostic categories. There were significant gender differences in the distribution of the number of diagnoses ($\chi^2 = 8.5$, *df* = 3, *p* = 0.043). Among the total sample, 139 participants (69.5%) did not have any mental distress. The distribution of the number of diagnoses of mental distress is shown in **Table 5**.

Predictors of PTSD, Depression, and Generalized Anxiety Symptoms

Multiple linear regression analyses were performed to examine the influence of sociodemographic and migration-related variables on symptoms of PTSD, depression, and generalized anxiety (**Table 6**). Stronger symptoms of PTSD were significantly associated with older age ($\beta = 0.24$, *p* = 0.001), shorter future validity of residence permit ($\beta = -0.20$, *p* = 0.041), larger number of TEs ($\beta = 0.35$, *p* = 0.000), and greater symptoms of generalized anxiety ($\beta = 0.46$, *p* = 0.000).

More severe symptoms of depression were significantly associated with younger age ($\beta = -0.16$, *p* = 0.012), shorter escape journey duration ($\beta = -0.12$, *p* = 0.012), larger number of TEs ($\beta = 0.25$, *p* = 0.000), and greater symptoms of generalized anxiety ($\beta = 0.61$, *p* = 0.000).

Increased symptoms of generalized anxiety were significantly associated with female gender ($\beta = -0.20$, *p* = 0.000), more severe PTSD symptoms ($\beta = 0.35$, *p* = 0.000), and stronger depression symptoms ($\beta = 0.55$, *p* = 0.000).

TABLE 2 | Migration-related variables.

Migration-related variables	Women (<i>n</i> = 61)		Men (<i>n</i> = 139)		Comparison		Total (<i>N</i> = 200)	
	<i>n</i>	% ^a	<i>n</i>	% ^a		<i>p</i>	<i>n</i>	% ^a
ESCAPE JOURNEY								
Across land and by boats/dinghies	43	71.7	119	85.6	$\chi^2 = 12.9$	0.002	162	81.4
Only across land	4	6.7	13	9.4			17	8.5
By another method (e.g., plane)	13	21.7	7	5.0			20	10.1
	M (SD)	Range	M (SD)	Range		<i>p</i>	M (SD)	Range
Escape duration ^b (<i>n</i> = 161)	12.1 (30.2)	1–182	7.4 (17.6)	0.2–144	$U = -0.004^f$	0.998	8.7 (21.8)	0.2–182
Escape difficulty ^c (<i>n</i> = 193)	7.2 (3.3)	0–10	7.1 (2.9)	0–10	$U = -0.660^g$	0.511	7.1 (3.0)	0–10
Duration of stay in Germany ^d (<i>n</i> = 198)	21.1 (8.3)	2–50	24.3 (5.2)	10–52	$U = -1.828^h$	0.068	23.3 (65)	2–52
Duration of residence permit ^d (<i>n</i> = 178)	28.8 (13.3)	5–75	32.9 (10.3)	4–74	$U = -2.357^i$	0.018	31.7 (11.3)	4–75
Future validity of permit ^d (<i>n</i> = 180)	14.5 (8.8)	–9–32 ^e	16.6 (8.5)	0–33	$U = -1.394^j$	0.164	16.0 (8.6)	–9–33 ^e
Duration of asylum procedure ^d (<i>n</i> = 188)	8.8 (5.2)	1–20	9.3 (5.6)	0–27	$U = -0.281^k$	0.780	9.2 (5.5)	0–27

^aValid values. ^bIn weeks. ^cvisual scale from 0 (not at all difficult) to 10 (very difficult). ^dIn months. ^enegative values for current extension requests; mean ranks of women and men. ^f81.02 and 80.99 respectively. ^g101.04 and 95.31 respectively. ^h88.28 and 104.38 respectively. ⁱ75.57 and 94.94 respectively. ^j81.90 and 93.90 respectively. ^k92.75 and 95.21 respectively.

TABLE 3 | Lifetime prevalence of traumatic events (*n* = 200).

Traumatic event	Personally experienced		Witnessed		Personally experienced and witnessed		Personally experienced and/or witnessed	
	<i>n</i>	% ^a	<i>n</i>	% ^a	<i>n</i>	% ^a	<i>n</i>	% ^a
Military conflict	62	31.2	20	10.1	3	1.5	85	42.7
Prisoner/hostage	21	10.7	22	11.2	1	0.5	44	22.3
Torture	12	6.0	4	2.0	2	1.0	18	9.0
Physical violence (stranger)	24	12.1	13	6.5	3	1.5	40	20.1
Physical violence (acquaintance)	6	3.0	5	2.5	2	1.0	13	6.6
Death of loved one (e.g., homicide)	37	18.5	18	9.0	4	2.0	59	29.5
Serious accident/explosion	38	19.4	26	13.3	5	2.6	69	35.2
Serious illness	10	5.1	29	14.8	0	0.0	39	19.9
Sexual harassment (stranger)	1	0.5	0	0.0	0	0.0	1	0.5
Sexual harassment (acquaintance)	3	1.5	0	0.0	0	0.0	3	0.5
Neglect	21	10.6	1	0.5	0	0.0	22	11.1
Childhood sexual abuse (stranger)	3	1.5	1	0.5	0	0.0	4	2.0
Childhood sexual abuse (acquaintance)	3	1.5	0	0.0	1	0.5	4	2.0
Natural catastrophe	7	3.5	6	3.0	0	0.0	13	6.5
Other trauma	32	16.4	8	4.1	0	0.0	40	20.5
At least one traumatic event	120	60.0	79	39.5	12	6.0	149	75.3

^aValid values.

DISCUSSION

The present study examined the prevalence of TEs and the occurrence of symptoms of PTSD, depression, and generalized anxiety in Syrian refugees who have been living in Germany since 2014 and have residence permits. The main finding of the present study is that lower levels of PTSD, depression, and generalized anxiety were observed in comparison with other studies on Syrian refugees. We would

attribute this result to the optimized living conditions in the sample, emphasizing the importance of post-migration variables.

Approximately 11.4% of the participants in the study met the criteria for PTSD, while 14.5% met the criteria for at least moderate depression and 13.5% met the criteria for moderate generalized anxiety. Approximately one-third of the participants met the criteria for at least one diagnosis. These results are in contrast to the findings of previous studies from different

TABLE 4 | Severity of depressive symptoms and symptoms of generalized anxiety disorder.

Measures	Women (<i>n</i> = 61)		Men (<i>n</i> = 139)		Comparison		Total (<i>N</i> = 200)	
	<i>n</i>	%	<i>n</i>	%	χ^2	<i>p</i>	<i>n</i>	%
DEPRESSION (PHQ-9)								
Total score 0–9	40	65.6	106	76.3	11.3	0.012	146	73.0
Total score 10–14	14	23.0	11	7.9			25	12.5
Total score 15–19	6	9.8	11	7.9			17	8.5
Total score >20	1	1.6	11	7.9			12	6.0
GENERALIZED ANXIETY (GAD-7)								
Total score 0–4	27	44.3	94	67.6	12.8	0.005	121	60.5
Total score 5–9	19	31.1	33	23.7			52	26.0
Total score 10–14	7	11.5	6	4.3			13	6.5
Total score >15	8	13.1	6	4.3			14	7.0

PHQ-9, Patient Health Questionnaire—Depression Module; GAD-7, Generalized Anxiety Disorder.

TABLE 5 | Distribution of the number of diagnoses of mental disorders.

Number of diagnoses	Women (<i>n</i> = 61)		Men (<i>n</i> = 139)		Comparison		Total (<i>N</i> = 200)	
	<i>n</i>	%	<i>n</i>	%	χ^2	<i>p</i>	<i>n</i>	%
Without diagnosis	38	62.3	101	72.7	2.1	0.182	139	69.5
SINGLE DIAGNOSTIC CATEGORY								
Only PTSD	1	1.6	4	2.9	0.4	1.000	5	2.5
Only depression	7	11.5	20	14.4			27	13.5
Only GAD	0	0.0	1	0.7			1	0.5
TWO DIAGNOSTIC CATEGORIES								
PTSD and depression	0	0.0	2	1.4	3.1	0.462	2	1.0
PTSD and GAD	1	1.6	0	0.0			1	0.5
Depression and GAD	6	9.8	5	3.6			11	5.5
THREE DIAGNOSTIC CATEGORIES								
PTSD, depression and GAD	8	13.1	6	4.3	5.0	0.035	14	7.0

PTSD, post-traumatic stress disorder; depression, Patient Health Questionnaire-Depression Module total score ≥ 10 ; GAD, Generalized Anxiety Disorder total score ≥ 10 .

countries that have shown high prevalence rates of mental distress among Syrian refugees (7–13).

However, post-migration conditions and visa status have not been taken into account in the majority of studies on refugees. Richter et al. (9) examined mental distress among refugees in reception facilities. The participants were still going through the asylum procedure at that time, with a short length of stay in Germany. Other studies have also focused on asylum seekers (2, 10, 13). Kazour et al. (11) included Syrian refugees living in camps in Lebanon, with a mean duration of displacement of 10 months. In a previous study by our group on Arabic-speaking asylum seekers who had been placed in collective accommodation centers (8), the participants did not have residence permission and their mean length of stay in Germany was relatively short (7.9 months). However, a negative correlation was found between the severity of mental distress symptoms and the length of stay in Germany.

Longer duration of the asylum procedure has been shown to be an important risk factor for psychiatric problems (18). In the context of the acculturation process, an unclear residence permission status and poor economic conditions (and living conditions) are stress factors for immigrants (15). Silove et al. (17) reported that delays in processing refugee applications can increase the refugees' stress in the country of arrival. In refugees from the former Yugoslavia, Bogic et al. (19) found that temporary residence permission status was associated with higher rates of mood and anxiety disorders. Studies on refugees from Iraq (22), from Syria (12), as well as Arab immigrant women (33) also confirm the importance of post-migration conditions on mental health. By contrast, Steel et al. (23) did not find any association between several post-migration, social, and economic factors and mental illness among Vietnamese refugees.

Different visa status among the participants in the present study in comparison with other studies on Syrian refugees might explain the wide divergence noted in the prevalence

TABLE 6 | Linear regression analysis predicting symptoms of PTSD, depression and generalized anxiety ($n = 200$).

Variable	R^2	ΔR^2	B	SE B	β	95% CI	p
PTSD symptoms	0.56	0.56					
Sex ^a			-1.08	1.53	-0.04	-4.10 to 1.91	0.481
Age			0.27	0.08	0.24	0.12 to 0.42	0.001
Years of education			0.09	0.17	0.03	-0.24 to 0.42	0.595
Being illiterate ^b			1.29	2.52	0.03	-3.68 to 6.26	0.610
Marital status ^c			-3.21	1.68	-0.13	-6.53 to -0.10	0.058
Accommodation ^d			0.24	1.34	0.01	-2.40 to 2.89	0.856
Escape journey ^e			-1.20	2.35	-0.03	-5.84 to 3.44	0.610
Escape duration			0.02	0.03	0.03	-0.04 to 0.08	0.527
Duration of stay in Germany			-0.16	0.14	-0.09	-0.43 to 0.11	0.244
Duration of residence permit			0.21	0.13	0.19	-0.04 to 0.46	0.093
Future validity of permit			-0.30	0.14	-0.20	-0.58 to -0.01	0.041
Number of TEs			1.77	0.32	0.35	1.13 to 2.40	0.000
PHQ-9 total score			0.08	0.15	0.05	-0.21 to 0.37	0.574
GAD total score			1.14	0.19	0.46	0.76 to 1.52	0.000
Ongoing psychiatric/psycho-therapeutic treatment			-0.01	0.01	-0.03	-0.02 to 0.01	0.563
Depression symptoms	0.63	0.63					
Sex ^a			1.46	0.76	0.10	-0.04 to 2.96	0.056
Age			-0.10	0.04	-0.16	-0.18 to -0.02	0.012
Years of education			-0.11	0.08	-0.07	-0.27 to 0.06	0.213
Being illiterate ^b			-1.72	1.26	-0.08	-4.20 to 0.76	0.173
Marital status ^c			1.09	0.85	0.08	-0.58 to 2.77	0.198
Accommodation ^d			0.37	0.67	0.03	-0.95 to 1.70	0.579
Escape journey ^e			-0.59	1.18	-0.03	-2.92 to 1.74	0.617
Escape duration			-0.04	0.02	-0.12	-0.07 to -0.01	0.012
Duration of stay in Germany			-0.03	0.07	-0.03	-0.16 to 0.11	0.716
Duration of residence permit			-0.09	0.06	-0.15	-0.22 to 0.03	0.140
Future validity of permit			0.10	0.07	0.12	-0.04 to 0.24	0.176
Number of TEs			0.67	0.17	0.25	0.35 to 1.00	0.000
GAD total score			0.82	0.09	0.61	-0.65 to 0.10	0.000
ETI symptom score			0.02	0.04	0.04	-0.05 to -0.09	0.574
Ongoing psychiatric/psycho-therapeutic treatment			-0.01	0.01	-0.06	-0.01 to 0.00	0.221
GAD symptoms	0.66	0.66					
Sex ^a			-2.06	0.52	-0.20	-3.08 to -1.03	0.000
Age			0.00	0.03	0.01	-0.05 to 0.06	0.931
Years of education			-0.04	0.06	-0.04	-0.16 to 0.08	0.467
Being illiterate ^b			-0.73	0.89	-0.04	-2.49 to 1.02	0.409
Marital status ^c			0.14	0.60	0.01	-1.05 to 1.32	0.824
Accommodation ^d			-0.10	0.47	-0.01	-1.04 to 0.82	0.814
Escape journey ^e			-0.04	0.83	-0.00	-1.68 to 1.60	0.963
Escape duration			0.01	0.01	0.06	-0.01 to 0.04	0.223
Duration of stay in Germany			0.06	0.05	0.08	-0.04 to 0.15	0.225
Duration of residence permit			-0.04	0.05	-0.08	-0.13 to 0.05	0.401
Future validity of permit			0.03	0.05	0.05	-0.07 to 0.13	0.561
Number of TEs			-0.07	0.12	-0.04	-0.31 to 0.17	0.543
ETI symptom score			0.14	0.02	0.35	0.10 to 0.19	0.000
PHQ-9 total score			0.41	0.04	0.55	0.32 to 0.49	0.000
Ongoing psychiatric/psycho-therapeutic treatment			0.00	0.00	0.02	-0.01 to 0.01	0.602

^a0 = female, 1 = male; ^b0 = no, 1 = yes; ^c0 = unmarried, 1 = married; ^d0 = collective accommodation center/ with others, 1 = own apartment or with family; ^e0 = mainland incl. sea, 1 = other.

ETI, Essen Trauma Inventory; GAD, Generalized Anxiety Disorder; PHQ-9, Patient Health Questionnaire—Depression Module; PTSD, post-traumatic stress disorder; TE, traumatic event.

rates of mental distress. In addition to residence permission, general living conditions in the host country are also important factors for mental health. Even in EU member states in which asylum policies are similar, once the refugees have obtained residence permission their living conditions vary from country to country, due to differences in the national welfare systems (34). In Germany financial support for every child is approximately €194–225 per month. In Greece, for example, there are no benefits for families, and some support is available only for those with many children and a low income. In the case of illness or inability to work, Germany provides financial support relative to the last income before the illness. In Greece, there is no such benefit (35). Additionally, the unemployment rates in these countries differ [approximately 5.7% in Germany vs. 22.3% in Greece in 2017; (36, 37)]. Psychotherapeutic care for refugees also differs very widely between EU member states. Although countries may legally be obliged to provide equal treatment to asylum seekers and citizens, refugees may still not be entitled to outpatient psychotherapy treatment if their health insurance does not cover it⁴. In summary, it can be seen that social welfare systems and conditions for refugees differ in the EU member states and that the benefits in some countries are much higher than in others. Prospects for obtaining residence permission as a refugee also differ between countries. For Greece, data from 2016 show that 70.9% of applications from asylum seekers from all countries are rejected, whereas in Germany only 28.6% of applications are rejected⁵. For refugees, it is crucial to know that after all of their difficulties and problems (e.g., escaping from their home country and experiencing multiple traumatic events, sometimes even during the escape), they will be able to stay and receive protection in a country that also provides good prospects for their future and for a new start in life. These could be factors that can help this vulnerable group on their way to mental stability.

However, in a large study of mental health among Syrian refugees resettled in a European country (Sweden) in which the national welfare system is comparable to that in Germany, the prevalence rate of mental disorders is reported to be in the range of 30–40%, and approximately 55% of the refugees had at least one mental disorder (12). Despite the comparability of Germany and Sweden with regard to residence status, length of stay in the host country, and general living conditions, the present study found lower prevalence rates of PTSD, depression, and anxiety in Germany. However, this discrepancy might be attributed to significantly larger numbers of traumatic events experienced by the individuals in the Swedish sample. In the study by Tinghög et al. (12), the refugees had experienced a mean of 4.2 traumatic events, while in the present study the participants reported having experienced and/or witnessed 2.3 traumatic events. In addition, the types of traumatic event experienced differ between the sample in Sweden (e.g., military conflict 86.9%,

torture 30.6%, physical violence or assault 30.5%, witnessing physical violence or assault 63.3%, sexual violence 6.9%) and the sample in Germany (e.g., military conflict 42.7%, torture 9.0%, personally experienced and/or witnessed physical violence from a stranger 20.1%, sexual violence from a stranger 0.5%). Another possible explanation for differences in the samples might be different recruiting methods (postal questionnaire versus personal appointment). It might be presumed that individuals who participate through a personal appointment are those with greater emotional stability, as they have to organize attendance. These differences emphasize the fact that refugees are generally a heterogeneous population with different premigration and post-migration conditions that depend on the country in which they arrive. The symptom manifestations measured may also depend on methodological aspects such as broader inclusion criteria.

Studies on refugees also need to take into account comparisons with the population in the countries of origin. Interestingly, the present results show prevalence rates of mental illness similar to those in the Arabic population in general. The review by Tanios et al. (38) reported different rates of anxiety disorders in Arab populations, at 28.2% in Jordan, 16% in Saudi Arabia, 16.7% in Lebanon, and 10% in the United Arab Emirates. In Lebanon, Karam et al. (39) noted a 3.4% lifetime prevalence rate of PTSD, a 16.7% prevalence rate of anxiety, and a 12.6% prevalence rate of mood disorders. The lifetime prevalence of any disorder was 25.8%. However, in a study in four post-conflict areas, the lifetime prevalence for PTSD in the Gaza Strip was 17.8% (40).

In studies with participants from the Middle East, an association is seen between mental disorders and various socioeconomic variables (10, 41–48) and also traumatic events (10, 41, 42, 44, 47). In the present study women had a significantly higher severity of depression and generalized anxiety than men and female gender was a significant predictor for GAD symptoms. In addition to socioeconomic variables and the number of TEs, the present study found an association between reported PTSD and a shorter future validity of residence permits. The shorter future validity may be interpreted by the participants as representing uncertainty about their further stay in the host country and may give rise to fear about returning to their homeland. The present study found associations between higher depression symptom scores and a shorter escape duration. A possible explanation for this could be that people with shorter escape durations had had less time to mourn and to adapt to the fact of leaving their homeland.

The strengths of the present study include its registry-based methodology, the sample size representing the largest refugee population reported in Germany since 2014, the inclusion of information about living conditions, and the good comparability of the demographic characteristics of the sample with the basic Syrian refugee population in Germany. In the period from 2014 to 2017, 64.8% of requests for asylum from Syrian refugees were made by men and 35.2% by women (2–4, 49). In the present sample, 30.5% of the participants were women and 69.5% were men. Among applicants in Germany between 2014 and 2017, 22.6% were aged 18–24 and 34.7% were aged 25–44 (2–4, 49).

⁴Bundespsychotherapeutenkammer. *Psychotherapeutic Care for Refugees in Europe*. Available online at: http://www.npce.eu/mediapool/113/1137650/data/20171006/psychotherapeutic_care_for_refugees_in_europe.pdf

⁵Asylum Information Database. Available online at: <http://www.asylumineurope.org/>

In the present survey, 25.5% of participants were 18–24 years old and 29% were 25–44 years old. The mean duration of the asylum procedure in 2016 was 8.7 months (3). In the present sample, the asylum procedure had lasted a mean of 9.2 months.

Despite these strengths, the study also has some limitations. First of all, the response rate represented 38.6% of the registry-based total sample. A possible reason for the low response rate could be the recruiting method (personal prearranged appointments that may have collided with other appointments such as language courses, medical appointments). However, it was noted that responders were older and were more often married than nonresponders, and this might also represent a selection bias, with nonresponders having higher mental distress, based on the results showing that age is a predictor for PTSD and depression. An additional shortcoming of the investigation is the lack of information on psychiatric comorbidities other than PTSD, depression, and generalized anxiety; the self-reported questionnaires could also be a source of bias. In addition, the cross-sectional design of the study does not make it possible to draw any causal conclusions concerning the influence of the variables measured.

CONCLUSION

These findings suggest that Syrian refugees in Germany are a vulnerable population, particularly if they have experienced and/or witnessed multiple traumatic events. The survey cohort was not in distress to the same extent as previous studies with this population in Germany have shown. Post-migration conditions and good prospects in the host country appear to be a protective factor after refugees have escaped. It can also be presumed that refugees first focus on integrating into the country of arrival and that mental distress increases over time.

RECOMMENDATIONS FOR FUTURE RESEARCH

Further research and prospective studies with representative samples of refugee populations are needed in order to confirm and refine these results. The present survey has shown the difficulty of comparing results, since asylum policies and living conditions in the resettlement destinations are different. Future studies should therefore assess not only premigration factors (e.g., traumatic events) but also different post-migration

conditions (e.g., residence status, living conditions, acculturation, escape conditions) that can become sources of stress. It is also important to identify protective factors (e.g., social support). Since traumatic events of this intensity and severity can be transmitted intergenerationally, future studies with this population should also include their children. Germany and Europe have been witnessing the largest migration recorded in their history in recent years, and the provision of care for refugees has become a challenge for the mental health systems in the host countries. Establishing an EU database that gathers together academic research studies from the different member states on the topic of refugees and mental health might be helpful in efforts to understand and plan the corresponding requirements in the health services.

DATA AVAILABILITY

The raw data supporting the conclusions of this study will be made available by the authors upon request.

AUTHOR CONTRIBUTIONS

EG conceived, designed, conducted, analyzed and wrote this manuscript. AZ and GS contributed to manuscript writing. YE provided feedback and mentorship at each stage of the research design and implementation, including a full review and provision of feedback on the final manuscript.

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Being Through Doing: The Self-Immolation of an Asylum Seeker in Switzerland

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In April 2016, Armin,¹ an asylum seeker in a village of Switzerland, set himself alight in the public square of the town, one of a few cases reported across Europe. He performed the act following a denied request for asylum and was saved by bystanders. We present the results of two qualitative interviews conducted with Armin, his translator and his roommate following the incident. The act is theorized through the lens of a dialogical analysis focusing on the concept of social recognition. The notion of trauma is considered as a key mediating mechanism, theorized as creating ruptures in time, memory, language, and social connections to an Other. We conclude this communicative act to represent both “being-toward-death” and a relational striving toward life; a “destruction as the cause of coming into being.”

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INTRODUCTION

The number of refugees seeking asylum across the world is unprecedented. According to the UNHCR,² 65.6 million people around the world have been forced from home. Among them are nearly 22.5 million refugees—people fleeing conflict or persecution who are defined and protected in international law, and must not be expelled or returned to situations where their life and freedom are at risk. Switzerland has 40,900 legally recognized refugees³ and has received over 18,000 more requests for asylum in 2017 alone.⁴ Not least among the difficulties are public health challenges of the multiple traumas faced by this population which constitute severe threats to human, social, cultural, and community development (1–3). Several scholars have demonstrated the ways in which refugees and asylum seekers have attained visibility in protests as well as through other acts of political activism through the practices of hunger strikes, self-mutilation, and lip sewing (4–7). For such vulnerable populations, these acts of self-harm have been theorized as a resilient attempt to overcome invisibility. When there are no words, when oppressed and dispossessed minorities find themselves on the outskirts of public visibility, one recourse is to use the body as a communicative tool. One extreme example of this is self-immolation, used as a tool by various oppressed groups, notably including asylum seekers and refugees, around the world (8–11). A large body of literature further highlights the mediating effect of trauma and dissociation on acts of self-harm [for a comprehensive review, see Ref. (12)]. The high prevalence of self-harm among asylum seekers may therefore come as no surprise. As noted by Finklestein and Solomon (13) and others, there has been an increasing awareness of the traumatogenic nature of the refugee experience. This includes a focus on the “systemic trauma” (14) related to

¹ Name changed in line with standard ethical protocols and the recommendations of the Ethics Review Committee.

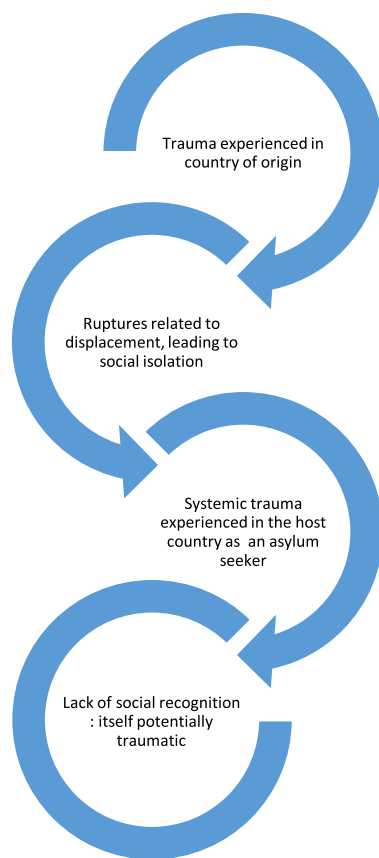
² <http://www.unhcr.org/figures-at-a-glance.html> (Accessed: March 23, 2018).

³ <https://data.worldbank.org/indicator/SM.POP.REFG> (Accessed: March 23, 2018).

⁴ <http://www.asylumineurope.org/reports/country/switzerland/statistics> (Accessed: March 23, 2018).

the “experiences of systematic oppression, loss, displacement, and exposure to violence” (15) faced by displaced populations. There is therefore a “double” rupture—one related to traumatic events experienced in the country of origin, the second related to issues of displacement and social isolation experienced by displaced populations.

This “double rupture” invokes a vicious cycle of trauma and isolation, a series of disruptions to the relational processes in which meaning is dialogically created—the bedrock of which is social recognition. Exposure to trauma, itself connected to a breakdown in social connection, risks the individual being caught up in a vicious cycle where no addressee may be found, no language exists to form a coherent narrative whereby the event may itself be collectively made sense of. Viewed through a dialogical systems lens, the traumatic world’s slipping away from the categories of meaning can be seen as a severe disruption of those relational processes in which meaning is formed (16). Thus, as illustrated in the model below, trauma begets trauma.



For those whose landscapes have been disrupted by trauma, “their problem is not the limits of memory but of language—the inadequacy of ordinary words to express all they have witnessed” (17). When words fail, when “the temporality of linguistic convention, considered as ritual, exceeds the instances of its utterance, and that excess is not fully capturable or identifiable” (18), it naturally falls upon the body to become the site of (reconstructive) action. Butler, for example, has marked the body as the stage on which traumatic disconnection unfolds:

Loss and vulnerability seem to follow from our being socially constituted bodies, attached to others, at risk of losing those attachments, exposed to others, at risk of violence by virtue of that exposure ... the body implies mortality, vulnerability (19).

When the image or content of a traumatic memory is unavailable, it is the bodily aspects of memory which persist. In the absence of language, the body holds what the mind cannot.

BACKGROUND

In this article, we explore the self-immolation of Armin, an asylum seeker from North Africa who set himself alight in a public square in a town in Switzerland. We will argue that his experience of being a failed asylum seeker, characterized by a social and political marginalization, as well as the fact of being torn from his communal and social fabric in Africa, could be conceptualized as a traumatic experience. Here, to understand what may or may not be defined as trauma, we draw upon psychoanalytic conceptualizations of the term: trauma is defined as a frightful experience which overwhelms the psyche to such an extent that images, words, or other memories related to the event are unable to be integrated into the system of representations which structure the experience of the individual. Within this paradigm, one commonality of trauma experience is the feeling of a chaos of seemingly unutterable experiences collapsing into that “wordless nothing” (20). The act of self-immolation in particular is understood to reflect this disintegration. It will be explored through the lens of the theoretical construct of “social recognition”—and thus considered as a dialogical utterance used in an attempt to restore intersubjectivity and heal from trauma.

SOCIAL RECOGNITION IN DIALOGISM

Dialogically speaking, an utterance can never stand on its own: it is always directed at the Other. It requires and anticipates a response from the Other (21).

According to Bakhtin (22), “addressivity” is essential to language, it is a lived social reality, continually and creatively co-constructed in micro-interactions and inevitably socially, politically, and historically contextualized. It is intersubjective. Bakhtin’s notion of utterance recognizes that the speaker is already taking cognizance in some way of their addressee, their imagined audience, and thus, the utterance is “dialogic.” Social recognition may therefore be understood as a key component of restoring intersubjectivity:

There is a certain kind of speech that is necessary for [the] actualization of the person to take place; that addresses him directly ... language binds them both together, and she is part of a human plurality with him (20).

Marková (21) examines the inherently social nature of dialogism, drawing on the concept of social recognition (*anerkennung*) first introduced by the philosopher Fichte. Within this paradigm,

the integrity of the Self is seen to arise in and through the Self's ethical obligations with respect to the Other: "in dialogical interaction there is no possibility of the Self's escape from responding to the Other. Even no response is a response" (p. 110). Within this dialogic framework, the Self requires the social recognition of the Other to be fully constituted as a free being. Without a "bridge back to the quotidian," through social recognition, the symbolic capacities for articulating and validating within a shared dialogical space between Self and Other diminishes and "the publically interpreted world collapses ... into non-relationality (unsharability)" (23). In such a "non-dialogic space" (16), the lack of social recognition to connect the individual to a stable external reality may result in experiences of extreme self-loss and, potentially, "the disintegration of the world" (24). As stated by Kirmayer (17):

The mode of remembering and telling one's story changes greatly when one does not have the poet's task of evoking in the listener anything approximating the horror that one has experienced There is a need to have the rupture with ordinary experience acknowledged by others (p. 25).

Could the act of self-immolation, then, be a consequence of such a disintegration? An attempt to restore intersubjectivity in the face of a loss of social recognition? Both a manifestation of trauma and an attempt to heal from it? To explore this, we turn to the case study of self-immolation by the asylum-seeker Armin, which took place in Switzerland in 2016. Our findings are based on two personal interviews with him following the incident, interviews with his roommate and his translator as well as his personal folder including documentation of his consultation with doctors and lawyers which he himself put together and shared with us. Written informed consent was obtained from the participant for the publication of this case report. This investigation did not fall within the auspices of a particular research project but reflects our interests as academics and, above all, human beings who found ourselves particularly struck by the incident. The theoretical framework guiding our analysis is that of dialogism (21, 25), with a particular focus on self-recognition. We conducted a dialogical analysis of the transcripts of interviews we conducted with Armin as they unfolded, where the focus was on exploring the use of elements drawn from the cultural-symbolic field to confer meaning to past traumatic experiences, his act of self-immolation, the current situation, and to redefine-reposition himself toward the future.

THE SELF-IMMOLATION OF ARMIN

Armin is an asylum seeker from North Africa who arrived in Switzerland in September 2014. He had been imprisoned in his country of origin in 2008 after having physically attacked a judge in an attempt to gage out his eyes. This incident occurred during a court case involving a land dispute wherein the judge ruled against his favor. In prison, he began engaging in hunger strikes to protest against the conditions. After serving 6 years out of a 20-year sentence, he managed to escape and make his way to Europe.

Upon his arrival in Switzerland, he was transferred to multiple reception centers where he would go on hunger strike for 8 days at a time to protest against the reception conditions. He describes, "sleeping on the sofa with eight people living and breathing in the same room." The situation becomes unbearable for him to such an extent that he began sleeping in the bathroom. He was subsequently transferred to a private apartment which he shared with an Eritrean refugee. He began using marijuana and cocaine "because it helped me to forget my problems," and was arrested by the police for shoplifting while intoxicated. He also started grinding up paracetamol and selling it as cocaine—using the money to send back to his mother. In November 2015, he heard news of his 11-year-old daughter drowning to death in his country of origin.

After having waited for 23 months for the results of his second asylum application, he attempted to leave Switzerland by asking to annul his asylum application. He boarded a train heading for Germany. However, due to the fact that his fingerprints were already registered, he was prevented from leaving the country. In November 2015, he heard news of his sole remaining child, his 12-year-old son, being killed. It was during the same time that he heard of the fact that his application for asylum had been refused, a decision which he decided to appeal. According to his personal file, he attempted suicide in February 2016 following an argument with his doctor and was sent to a psychiatric hospital. Upon returning to his apartment, he received the second negative response to his request for asylum, with a deadline to leave Switzerland by the 7th of July.

On April 20th, the morning of the self-immolation, his roommate reports that the police came to his apartment at 5 o'clock in the morning looking for drugs. According to his roommate, he was detained at the police station until 11:00 a.m., whereupon he was released and returned home for lunch. His roommate describes his mood as being "calm and quiet" during the meal. Thereafter, he headed to the town's biggest public square with a can of petrol in his bag. In his words, "I was very very angry and very ... I poured the petrol onto myself and the people stopped me ... I found that there was no other solution but death and that's why I took the petrol and a lighter and set myself alight." According to newspaper reports, passers-by heard him screaming incoherently in Arabic and rushed to pour water over him to extinguish the flames.

The incident was poorly reported in the media and few if any public statements were made on behalf of any of the institutions working with asylum seekers. The little that was reported focused mainly on applauding the quick-thinking actions of the citizens and local fire brigade in putting out the fire. One newspaper report concluded that the act did not seem to have been of a political nature. Little was said by the community of asylum seekers and refugees themselves living in the town. The following day, roughly 70 people congregated in a demonstration in solidarity. There was no report of this demonstration in the local media. It was as though a veil of silence shrouded the incident. Armin ended up in intensive care for a month with severe burn injuries, and 7 weeks later was subsequently transferred to a psychiatric hospital.

ANALYSIS

The first interview we conducted with him was at this psychiatric hospital, with the assistance of a translator. Upon meeting him, the first words he said were, “We find ourselves in a country where we are considered terrorists ... we need to unite.” He stated that he planned to go to Geneva the following day to visit the head office of Al Jazeera, the international news network. He wanted to be interviewed to tell people that “the prison of my people in Africa is better than the prison here ... I want to explain to my people what Switzerland actually is.” From the first interview, what Armin immediately highlights is wanting to “show” and “explain” to people the dire reality of his situation, for his suffering to be seen. It is the need for social recognition.

He went on to describe a life without meaning: an endless and empty repetition, a wordless nothing:

There’s nothing to do in the apartment. You eat, you drink, you sleep, you eat, you drink, you sleep, you eat, you drink, you sleep. There is nothing.

There appears to be a striking absence of connection to Others mentioned in his speech. The endlessness is repetitive; past and future are circular, not linear. He continues the conversation by reflecting on his initial arrival to Switzerland, where he was housed in a reception center for asylum seekers staying:

For 8 months sleeping on the sofa and not on my bed where 8 people lived and breathed in the same room.

Armin found the physical proximity to the other living, breathing people unbearable, resulting in him leaving the communal room and isolating himself. He continued the interview by explaining this:

Armin: I slept in the toilets. I slept in the toilets! 15 nights I slept in the toilets!

Translator: Why?

Armin: I took my mattress and went to sleep in the toilets!

Translator: Why?

[Silence]

His silence is striking. There are no words to describe this disconnection, this descent into nothingness. He explained that the center for him had been

An open prison. It’s the place where you return to no matter in which direction you go. So long as there are no offers of work, no internship for mutual benefit, there is no future here.

Once again, time is represented in a circular fashion, not a linear one. No matter the direction, there is a return to this same place of nothingness. Any hope for a future is linked to “mutual benefits”—in other words, a dialogue with an Other who could serve to recognize him, to assist him in creating future plans. In

the absence of this Other, Armin remains disconnected not only from society but from his own future; “there are inexplicable events, life is unendurable, and ... justice is a mirage” [(p. 108) as cited in Ref. (26)].

He continued

I set myself on fire because I didn’t have any will to live. I found myself in a situation without future, without anything and therefore a worthless person, like this cup ... without future, without anything, like this cup. I am like this cup. No future for me, no work, no marriage, no learning.

In this discussion, Armin asserts that there is no future here for him, which he relates to the lack of work or professional training. This seems to be for him both an “entry ticket” to normal life, and a way to overcome suffering. It is not only the economic security of a job which he has lost, but the social security of connection to Others and the recognition of himself as a valued member of society—without which he is “worthless,” something less than human.

He believes there to be no possible life for himself in Europe, there is “no work,” “no school,” “no marriage,” and “no future.” He states the reason for having committed suicide as being “I need to have work, to do something.” Elsewhere, it has been argued that the process of forced migration risks creating an “a-temporal space,” a transitional and disconnected period wherein experiences, skills, connections acquired and built in the past are rendered inaccessible (27), as are any clear perspectives on the future. A consequence of such overwhelming episodes is that the experience seems dissociated—isolated in one’s consciousness (28).

Poignantly, he concludes this interview by saying:

Yes, I went to death.⁵

The second interview, similarly conducted in the presence of a translator, occurred once Armin had been released from the psychiatric hospital. He began by saying:

I came to Switzerland, but Switzerland wasn’t my destination. In my mind, there were other destinations like France, Italy, England, but I was stopped.

His words imply a sense of being stuck, of thwarted dreams and ambitions for the future. He is overwhelmed by the reality of the situation, in rude contrast to what he imagined for his life:

Armin’s words (spoken by his interpreter): After 9 days, I went back home but I encountered the same problems of solitude, there is nothing to do, there is no solution but death. I thought there was no solution but death, and for this reason, I brought petrol and a lighter and I set myself fire.

⁵In the translation from French into English, the words may be translated either as “I surrendered to death” or “I went to death.”

Interpreter: Why did you choose that way?

Armin: So that people know. I did it so that people could be made aware, to stop despising people like me, to know that all people are equal.

And so far, nothing happens. I stay home, I ... I eat, I drink, I sleep. There is nothing. There is no future in Switzerland. No future. I got married, my wife died, my two children died. There is nothing (Translation and exchange in Arabic).

Interpreter: I told him that we were here with him. He told me there is nothing. The dog here is better treated than me.

Armin: In this case, is it not better to die?

Further on in the interview, he continued:

I'm not happy with my life, I do this and that, I do some terrible things, I sell drugs, I take cannabis, things like that and I'm unable to find a solution—not for me nor for my family ... I want to live like other people. I don't consider what I have to be a life. I am not living. (...) I am a shirt and walking trousers, not a human being.

An underlying sentiment of shame pervades his speech: he is ashamed of being someone who sells drugs, ashamed of not being able to support his family and make them proud. The mystifying dualism of this shame is that it is at once an isolating, intimately intra-psychic phenomenon seeking concealment, yet remains deeply embedded in a visual and public interpersonal space where the self is violently and unexpectedly exposed to the critical gaze of the Other (29). The source of shame can therefore never be completely in the self or in the Other, but is a rupture of what Kaufman (30) calls the “interpersonal bridge” (p. 22) binding the two. It is a disconnection and consequent lack of social recognition which underlies this shame.

Armin comments on the act of self-immolation in relation to his negative evaluation of his own life and thwarted expectations of living a normal life, a “human” life. The feelings expressed seem to be the same: injustice, solitude, sadness, emptiness, uselessness, all worsened by a perceived lack of hope in a better future. Here, time is a circular, wordless nothing. His act is defined explicitly as communicative, a direct call for social recognition:

I did it so that people could be made aware, to stop despising people like me, to know that all people are equal.

Continuing the interview, he paused and stated, “I don't know. Maybe I'm mad.” It is impossible to grasp the full meaning behind these words. At face value, Armin seems to be considering whether or not he is indeed suffering from a psychiatric disorder, as stated by the many professionals with whom he has been in contact in Switzerland. However, throughout the two interviews we conducted with him, we are left with the impression that, for the most part, he appears to be contesting this very idea. Indeed, his words seem to reflect a resistance to the fact that he is a psychiatric patient in the face of others telling him that he is “mad.”

Although he finds himself cast out of the networks of humanity—having lost his family, his friends, his cultural homeland, his work, he justifies his act as a will to communicate his situation and humanity to other human beings. For Stolorow (23), being plunged into such singularity and solitude may paradoxically bring about an enhancement of “resoluteness” (p. 45). In such a state, the individual returns from the publicness of “they” to a more authentic and steadfast sense of self and purpose, which may lead to authentic “Being-toward-death.” In his own words, “Yes, I went to death.” However, on analyzing his motives for committing the act, it is evident that it goes beyond a simple desire to commit suicide. The self-stated reasons for him having committed the act highlight both the sociopolitical conditions in which he finds himself, as well as an internal psychological state of despair. This echoes the work of Biggs (31), who highlights the paradox that, in many cases, the act serves as both an escape and a protest.

Based on this hypothesis, considering the act “as escape” would arguably be indicative of suicidal ideation possibly linked to psychological factors of depression including a sense of helplessness and despair—in his own words “having no will to live.” Armin continues this reflection on his “situation without future” in which he finds himself. Not only does he perceive a life without future, he perceives a life where “dogs are treated better than me” and he is no better than “a cup.” He sees himself without a future and, most significantly, he connects this state to the lack of relationship with a social Other—in other words, his relationship to the network of human society which places him in the position of less than human, outside of social recognition.

DISCUSSION

Torn from the communal fabric of being-in-time, trauma remains insulated from human dialogue (23) (p. 56).

Disruptions created by trauma are embedded within an inter-subjective context wherein severe emotional pain cannot find a relational home in which to be held and integrated (23, 24). Trauma disrupts the intersection of the individual and their social context and related to safety, trust, independence, power, esteem, intimacy as well as spiritual and existential beliefs. These disruptions been theorized as representing a threat not only to one's core sense of self, but furthermore a violation of self-understanding and worldviews to the extent that it disrupts attachment and interpersonal dialogue necessary for meaning making in the social world (14, 32, 33). Particularly in cases where trauma has been prolonged, “the survivor may be left with large chunks of endured experience with no meaning, creating disquieting gaps and discontinuities in the experience of one's life history” (16). This was the case of Armin who sees “no future” for himself as a “worthless person.”

For the transformation of traumatic memories into semiotic forms which connects it through language to its rightful place in time, the elaboration needs to be socially situated and “inter-subjectively acknowledged” (34). This is because social resources provide a time orientation, and, consequently, a self-continuity between past and future (35) necessary for the construction of

a coherent narrative, and, ultimately, the reconstruction of the Self. From a dialogical perspective, the psychological processing of trauma cannot merely be internally homogenous but involve multiple voices, texts, interests and traditions embodied in each individuals own varied histories and in the artifacts and norms of the system—a source of trouble and of innovation (25). This can only take place in the context of “interlocution” or “addressivity”—a dialogue between the person’s inner world and the sociocultural context in which traumatic events are processed (14, 36). The critical issue here is that of the notion of reciprocity (37) inherent to social recognition (21). Thus, it is within this dialectal sphere between the internal and external, Self and Other, the personal and political where coherent narratives of the event may be formed as part of the process of healing. As such, the self-immolation of Armin may be seen as a communicative act.

CONCLUDING REMARKS

The interplay between language, trauma, and the sociocultural context is a complex and mutually reinforcing one: traumatic events may overwhelm and even rupture the semiotic systems in language which connects the individual to the communicative and social resources necessary to its very regulation and healing, thus perpetuating a vicious cycle of isolation and disconnection. The process of migration may be in itself a traumatic experience wherein the Self risks being annihilated and negated through the systemic trauma associated with legal and social practices of exclusion (14). In this space, social bonds and connections are disrupted which themselves are, paradoxically, necessary for finding the language to make sense of traumatic experiences in the form of a coherent narrative. Considering this cycle of trauma and disruption, it is noteworthy that Armin’s history of violence began before he claimed asylum, as evidenced by his attempt to gorge out the eye of a judge in his country of origin. This serves as an important reminder of the complex context of trauma—which extends beyond an isolated event. Furthermore, it highlights the compounded, interdependent relationship between the individual (who in this case arrived in Europe with a prior history of violence) and the social, cultural, and political context.

In the apparent absence of social recognition, Armin found himself “a worthless human.” Cast outside of the containment of human plurality as a result of a myriad of political and social mechanisms of exclusions, we hypothesize that his act of self-immolation serves as both an escape and a protest, both a “relational striving” for “being-in-the-world,”—profoundly embedded in an inter-subjectively constitutive context, and a “being-toward-death” (23). Is the act both a significant indicator of deep psychological distress and despair, as well as an attempt to restore a connection to the world of the living? We argue that the utterance is at once disruptive and engaging, destructive and constructive, a conflict and a collaboration, a death instinct toward destruction but a

“destruction as the cause of coming into being” (38). To quote Armin himself, it is at once a “yes, I went to death” as well as an “I want to live like other people.”

When he placed himself in the most public space of a Swiss town and set himself alight “to show that all men are equal,” it was an attempt to overcome trauma, social isolation, and lack of social recognition, a co-constructed inquiry to begin to try and put symbolic expression to experience (39). A “social interaction in its own right” (40), it represents an attempt to restore interaction. As such, it is a way of metaphorically construing and narrating experience; a compelling narrative enjoining others to take action (41). This is an utterance, a communicative act with the consequent potential to promote agency and civic engagement (42) which demands a response from the addressee, the Other. It demands and forces social recognition.

The brutality of such acts leave the public with little choice but to be disrupted and engaged as an “addressee”—whether voluntarily or not. In such moments, “the public sphere can no longer turn a blind eye to its privileged bodies” [Habermas, as cited in Ref. (43)], “the audience is not allowed to simply demonstrate ‘distant compassion’ but rather they are encouraged to engage and self-reflect about local injustices and activism within their own vicinities” (4) (p. 100). This self-immolation was a powerful communicative act that utilized self-inflicted violence as a means of forcing social recognition, both a personal and political action.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of the Ethics Committee of the University of Neuchatel with written informed consent from all subjects in accordance with the Declaration of Helsinki. The protocol was approved by the Ethics Committee of Neuchatel.

AUTHOR CONTRIBUTIONS

The authors conducted fieldwork, conceptualized and wrote the paper together. GW is the first author, and LK is the second author and corresponding author.

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Secondary Traumatization in Caregivers Working With Women and Children Who Suffered Extreme Violence by the “Islamic State”

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Introduction: Refugees fleeing persecution, torture, or sexual violence are at high risk of developing both acute and chronic psychological disorders. Systematic violence, as committed against the Yazidi minority in Northern Iraq by the terror organization known as the Islamic State (IS), can be seen as a particularly traumatic burden to the victims, but also to caregivers providing treatments and assistance to them. The intense exposure to traumatic content may cause secondary traumatization in respective caregivers. This study aims (1) to identify the prevalence of secondary traumatization in caregivers working with traumatized women and children from Northern Iraq; (2) to determine the specific distressing factors and resources of the caregivers; as well as (3) to analyze whether caregivers' personal history of trauma or flight, attachment styles, working arrangements as well as support offers qualify as risk or resilience factors for secondary traumatization.

Materials and Methods: In this cross-sectional study, $N = 84$ caregivers (social workers, psychotherapists/physicians, and interpreters) in the context of a Humanitarian Admission Program (HAP) for women and children traumatized by the so called IS were investigated about their work-related burdens and resources. Secondary traumatization was assessed with the Questionnaire for Secondary Traumatization (FST). To identify relevant determinants for secondary traumatization multiple linear regression analyses were performed.

Results: Secondary traumatization was present in 22.9% of the participating caregivers, with 8.6% showing a severe symptom load. A personal history of traumatic experiences, a personal history of flight, a higher number of hours per week working in direct contact with refugees as well as a preoccupied attachment style were detected as risk factors for

secondary traumatization. A secure attachment style could be identified as a resilience factor for secondary traumatization.

Discussion: Caregivers working with traumatized refugees are at high risk of developing secondary traumatization. Based on the findings of this study and theoretical considerations, a framework of classification for different types of trauma-associated psychological burdens of caregivers working with traumatized refugees is proposed. Implications for the training and supervision of professionals in refugee- and trauma-care are discussed.

Keywords: secondary traumatization, refugees, caregiver, trauma, resilience, attachment style, genocide, Yazidi

INTRODUCTION

In 2017, the UN Refugee Agency (UNHCR) registered an unprecedented number of 65.6 million forcibly displaced people worldwide. Among them, 22.5 million people are classified as refugees, defined as people who have been forced to flee their home country because of persecution, war, or violence (1). Germany received 222,683 applications for asylum in 2017, out of which 198,317 were first-time applications (2). In 2016, Germany registered the highest number of asylum applications in the last decade: 722,370 first-time applications for asylum in Germany. In both years, around half of refugees trace their origin to one of three countries: Syria, Afghanistan, or Iraq (2).

Although the prevalence rates of mental disorders in refugees worldwide varies widely among different studies, a large meta-analytic review recently identified prevalence rates of 30.6% for post-traumatic stress disorder (PTSD) and rates of 30.8% for depressive disorder among refugees (3, 4). In this context and in general, man-made traumas such as torture and especially sexual violence are a strong predictor for developing PTSD (5, 6) and comorbid depression (7).

Religious minorities from Northern Iraq, such as the Yazidis, are heavily burdened victims of man-made traumas due to the extreme violence and terror of the so-called Islamic State (IS). The jihadist terror organization is also known as the Islamic State in Iraq and Syria (ISIS), the Islamic State in Iraq and the Levant (ISIL), or as Daesh, the acronym of the group's previous Arabic name. In August 2014, IS attacked and subjugated the Yazidis and other religious minorities in the area of Mount Sinjar in Nineveh governorate, Iraq. In a retrospective household survey, it was estimated that 2.5% of the Yazidi population was either killed or kidnapped during these attacks (8). Men, women, and children were exposed to extremely brutal violence including forced religious conversion, enslavement, extreme torture, and execution. Furthermore, women and girls were exposed to systematic sexual violence by IS-fighters whereas boys were trained to become child soldiers (8, 9). Approximately half of the victims who were able to flee from IS show full syndrome of PTSD [42.9%, (10)]. Furthermore, 39.5% of these victims suffer from major depression (10). In the population of IS-victims, women are more likely than men to suffer from PTSD and major depression (10). The United Nations declared the crimes against the Yazidis as an ongoing genocide (11).

The efficacy of trauma-specific treatments for refugees in Germany is documented and its importance is well-grounded (12, 13). Nevertheless, caregivers working with traumatized refugees are confronted with multiple challenges and burdens in their everyday work. Due to their close contact with their clients, caregivers are frequently exposed to details of extremely traumatic events (14). The repeated exposure to their clients' traumatic memories can lead to the transference of typical trauma symptoms such as hyperarousal, avoidance, and intrusions to the caregivers even if they were never exposed to the traumatic events themselves (15). This phenomenon is called secondary traumatization and can be identified in various helping professions including social workers and trauma therapists (16–18). In addition, Kindermann et al. recently reported that 21% of interpreters working with refugees suffered from secondary traumatization (19). The general prevalence rates of secondary traumatization in caregivers illustrate the need for research on risk and resilience factors of secondary traumatization especially in professionals working with highly traumatized patients. With regards to specific predictors of secondary traumatization, one factor that has been controversially discussed in the previous literature is a personal trauma history of the caregiver (20–22). In the context of refugee-care, especially an own history of flight could be particularly relevant. Another factor commonly found to be associated with secondary traumatization is the degree of exposure (23). Furthermore, there is some evidence that supervision can be protective to harmful changes in professionals' views of themselves, others, and the world, as a result of exposure to traumatic details of their client's history (24). Moreover, peer-to-peer consultation (intervision) is often recommended when working with trauma-patients to prevent work related stress (25).

Previous studies found an association between attachment styles and vulnerability for mental disorders, inter alia PTSD (26). Attachment theorists propose that early childhood experiences lead adults to exhibit distinct attachment patterns which can be characterized as secure or insecure attachment styles. Insecure attachment can be divided into preoccupied, fearful, or dismissing attachment styles (27). Several studies indicate that a secure attachment style may have a protective effect on the development of PTSD whereas insecure attachment styles are associated with higher levels of PTSD symptoms (26, 28).

So far, there has been preliminary evidence that attachment styles may also have an impact on secondary traumatization (19, 29). In a survey with interpreters, Kindermann et al. found that a dismissing attachment style serves as a risk factor and a secure as well as a preoccupied attachment style qualify as resilience factors for secondary traumatization (19).

However, there is little research about the burden of secondary traumatization and the relevance of different risk and resilience factors in caregivers so far. To our knowledge, data on secondary traumatization in professionals working specifically with IS-victims who have suffered extreme mental and physical torture and the most brutal forms of sexual violence are also missing. Such extreme trauma contents may pose an increased risk for secondary traumatization in caregivers.

This is the first study to investigate the prevalence and determinants of secondary traumatization in caregivers as well as distressing factors, resources, and needs in their everyday work with IS-traumatized refugees. The aims of this study are to (1) identify the prevalence of secondary traumatization in caregivers working with IS-traumatized refugees, (2) to analyze the caregivers' specific distressing factors and resources and (3) to determine risk and resilience factors of secondary traumatization in caregivers by testing the hypothesis that supervision, intervention, secure, and preoccupied attachment styles serve as resilience factors of secondary traumatization whereas an own trauma history, own experiences of flight, more hours per week of direct contact with refugees as well as fearful and dismissing attachment styles serve as risk factors for secondary traumatization.

METHODS

Study Design and Ethical Considerations

This cross-sectional study used validated quantitative psychometric survey instruments as well as self-developed quantitative questionnaire-items. The study was approved by the ethics board of the Medical University of Tübingen (ethics application No. 189/2017BO2).

Baden-Württemberg Humanitarian Admission Program

To ensure a safe environment and adequate medical and psychological treatment to the survivors of the Yazidi genocide from 2014, the Ministry of State of Baden-Württemberg, Germany, implemented a Special Quota Project known as the Baden-Württemberg Humanitarian Admission Program (HAP). In 2015/2016, the HAP offered 1,100 especially vulnerable women and children who survived IS-violence the opportunity to migrate to Germany and receive medical and psychological treatment as well as housing and education with the aim of enabling long-term integration into the German society (30–32). The women and children of the HAP are now living in 22 districts in Germany, where an interprofessional team of caregivers including social workers, psychotherapists, doctors, and interpreters is involved in the provision of specialized and target-group adjusted services (31). Currently, Germany has

the largest Yazidi diaspora worldwide with a strong sense of community identification (33).

Sample

Initially all registered caregivers of the HAP were invited to a HAP-networking meeting. With the invitation, the caregivers received the study information and were invited to participate. At the networking meeting on April, 27, 2017, all interested caregivers answered the below described questionnaires before the program of the networking meeting started (to avoid contamination and cross-influence of participants). Participation was voluntary, pseudonymized, and conducted in German language.

Out of 132 registered caregivers of the HAP, $N = 96$ participants took part in the study (response rate = 72.7%). Since secondary traumatization is only relevant for caregivers working in direct contact with traumatized patients, we excluded 12 participants who were exclusively working administratively in the project. In the end, a final sample of 84 caregivers was included in the analysis. Sociodemographic characteristics of the sample are depicted in **Table 1**.

Survey Instruments

Sociodemographic data and context characteristics regarding the work in the HAP were assessed via self-developed questionnaire

TABLE 1 | Sample description of participating caregivers of the Baden-Württemberg Humanitarian Admission Program ($N = 84$).

	<i>M (SD, range)</i>
Age (years)	44.0 (13.0, 23–66)
Work experience (months)	
in the HAP	16.3 (6.7, 1–26)
with traumatized patients	72.1 (93.7, 1–360)
N (%)	
Gender	
Female	78 (94.0)
Male	5 (6.0)
Profession	
Social workers	50 (59.5)
Interpreters	11 (13.1)
Health care professionals (psychologists, psychotherapists, physicians)	10 (11.9)
Creative therapists	6 (7.1)
Administrators with direct contact to beneficiaries	4 (4.8)
Others	3 (3.6)
Further qualifications for working with refugees	36 (45.0)
Trauma relevant qualification	16 (19.0)
Voluntary/professional basis	
Professional	73 (88.0)
Voluntary (within own profession)	2 (2.4)
Voluntary (outside of own profession)	8 (9.6)
Organization of help offers	
Working with children	11 (13.4)
Working with adults	6 (7.3)
Working with adults and children	65 (79.3)

items. In addition, we asked the caregivers if they have experienced traumatic situations (e.g., violence, accidents) themselves and if they had a personal flight history due to war or conflicts. Furthermore, two standardized scales were adapted to assess secondary traumatization and attachment styles and two self-developed item sets were used to capture distressing factors and resources of the caregivers.

The professional lifetime version of the Questionnaire of Secondary Traumatization [FST; (17, 34)] was used to assess the severity of secondary traumatization. We chose the professional lifetime version of the FST over the acute version to capture secondary traumatization during the most stressful time period in the HAP. Expert-interviews we conducted with HAP-professionals for preparing the study revealed that the time period after the women arrived were especially stressful for the caregivers. The FST consists of five subscales: “Intrusion,” “avoidance,” “hyperarousal,” “parapsychotic sense of threat,” and “PTSD-comorbidities.” Participants are prompted to rate how often these symptoms occurred during the first week of the time period with the highest level of distress in the professional context in question (here: refugee care). The FST sum scores can yield sum scores from 31 to 155. Participants scoring under 65 show no signs of secondary traumatization, sum scores above 65 indicate clinical relevant symptoms of secondary traumatization. Between 65 and 82, sum scores classify moderate secondary traumatization, while scores above 82 refer to severe secondary traumatization (17). The FST shows a high internal consistency with Cronbach’s $\alpha = 0.94$ (34).

The Relationship Questionnaire (27) was used in the German Version to assess adult attachment styles. On a 7-point Likert scale, four attachment patterns (secure, dismissing, preoccupied, and fearful), defined by using a combination of a person’s self-image and image of others (positive or negative), can be rated. A secure attachment style indicates positive internal models of the self and others. High scores on the dismissing attachment style represent a positive evaluation of the self and a negative disposition toward other people. A preoccupied attachment style corresponds to a negative model of the self and a positive model of others. Scoring high on the fearful subscale refers to negative models of the self and others. An international, large-scaled study could identify the following mean values (35): Secure: $M = 4.3$ ($SD = 1.7$), dismissing: $M = 3.7$ ($SD = 1.8$), preoccupied: $M = 3.4$ ($SD = 1.9$), and fearful: $M = 3.5$ ($SD = 2.0$).

Since the distressing factors and resources of the HAP-caregivers are highly context specific, two self-constructed 7-point Likert scaled item sets were applied. We asked the participants to rate from 1 (very low) to 7 (very high) how burdened/supported they feel due to the distressing/helpful factors depicted in **Tables 2, 3**. The item set measuring distressing factors consisted of 16 items with a high internal consistency of Cronbach’s $\alpha = 0.86$. The nine items of the item set assessing different resources are more heterogeneous with a sufficient internal consistency of Cronbach’s $\alpha = 0.61$. The questionnaire-items were developed by the research team consisting of psychotherapists, psychologists, and physicians and

TABLE 2 | Self-constructed questionnaire items assessing distressing factors of caregivers working with IS-traumatized refugees.

Questionnaire-Items: Distressing factors

- “Autonomy/dependency conflicts between beneficiaries and caregivers i.e., beneficiaries either show themselves as overly dependent or overly autonomous in the relationship with the caregiver”
- “Beneficiaries’ contacting of offenders in Iraq”
- “Beneficiaries’ decision to return to Northern Iraq”
- “Excessive expectations of beneficiaries regarding the caregivers’ profession/role”
- “Pain symptoms of beneficiaries”
- “Reports on beneficiaries’ traumatic experiences”
- “Subjective lack of appreciation from beneficiaries”
- “Witnessing the suffering of beneficiaries”
- “Cultural differences in general between beneficiaries and caregivers”
- “Different attitudes toward (physical) closeness and distance between beneficiaries and caregivers”
- “Differences in child-rearing between beneficiaries and caregivers”
- “Differences regarding gender roles between beneficiaries and caregivers”
- “Differences regarding marriages between beneficiaries and caregivers”
- “Religious differences between beneficiaries and caregivers”
- “Intermixture of private and professional aspects of the caregiver”
- “Humanitarian developments in Northern Iraq e.g., exhumations of Yazidi mass graves by the United Nations to enable certainty about the loss of dead family members or prosecution of responsible fighters”

TABLE 3 | Self-constructed questionnaire items assessing supportive factors of caregivers working with IS-traumatized refugees.

Questionnaire-Items: Supportive factors

- “Appreciation from beneficiaries”
- “Appreciation of work from society”
- “Communication with colleagues from other care centers”
- “Communication with colleagues from own care centers”
- “Supervision”
- “Support from security services”
- “Support from superiors”
- “Already acquired knowledge and competence”
- “Awareness of doing something meaningful”

piloted as well as adapted by means of expert-interviews using the think aloud method (36) with professionals (psychotherapists, social workers, and interpreters) working in the HAP context.

Statistical Analysis

For sample description, means, percentages, and distributions are reported. For the analysis of differences in means, Mann-Whitney-U tests for independent samples were applied since the data was not normally distributed. To test correlations of determinants with the respective outcome (FST-scores), Spearman rho test was applied as a non-parametric measure. Multiple linear regression analyses were performed to assess whether determinants were associated with FST-scores. Due to the small sample size, we conducted two multiple linear regression analyses and separated the potential determinants with regards to content in terms of our hypothesis to a regression model with potential risk factors and one model with potential

resilience factors for secondary traumatization. The level of significance for all analyses was set at $\alpha = 0.05$. All statistical analyses were performed using IBM SPSS Statistics version 24 (37).

RESULTS

Prevalence of Secondary Traumatization

Applying the FST-diagnostic criteria, secondary traumatization was present in 22.9% of the participating caregivers at least once throughout their work as a refugee-caregiver, with 14.3% indicating a moderate secondary traumatization and 8.6% showing severe secondary traumatization (Figure 1). The mean FST-score was $M = 52.94$ ($SD = 16.92$). Conspicuously, 62.5% of interpreters show secondary traumatization. FST-scores for the whole sample and for the main professions individually are presented in Table 4.

Workload

Caregivers in the HAP work on average $M = 17.78$ ($SD = 14.12$) hours per week while they spend $M = 11.84$ ($SD = 10.88$) hours in direct contact with the beneficiaries. Furthermore, HAP-caregivers care for $M = 19.49$ women ($SD = 27.58$) and $M = 23.19$ ($SD = 24.16$) children.

Personal Trauma and Flight History of Caregivers

A personal trauma-history was reported by 24.1% of caregivers. Examining each profession individually, 40.0% of all participating creative therapists, 27.3% of interpreters, 23.4% of social workers, and 22.2% of health care professionals (psychologists, psychotherapists, and physicians) had experienced at least one traumatic event in their life.

A personal history of flight was reported by 7.6% of caregivers. More precisely, almost half of the interpreters (45.5%) and 10.0% of health care professionals reported a personal history of flight.

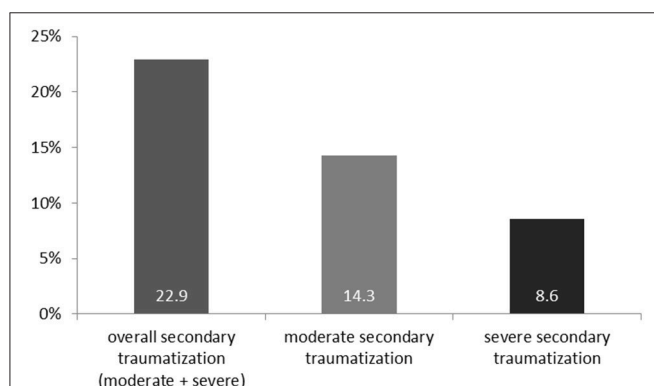


FIGURE 1 | Percentages of caregivers with secondary traumatization measured by the Questionnaire of Secondary Traumatization (FST).

Attachment Styles (RQ)

With a mean of $M = 5.77$ ($SD = 1.03$) a secure attachment style is predominant in HAP-caregivers. The ratings to each attachment style are presented in Table 5.

Burdens of Caregivers

Based on the list of the self-developed questionnaire-items regarding distressing factors in the HAP, the caregivers rated “witnessing the suffering of beneficiaries” ($M = 4.67$, $SD = 1.44$), “differences in child-rearing” ($M = 4.53$, $SD = 1.73$), and “humanitarian developments in Northern Iraq” ($M = 4.44$, $SD = 1.78$) as the most distressing factors in their work (Figure 2).

Resources of Caregivers

The caregivers considered “communication with colleagues from own care center” ($M = 5.67$, $SD = 1.71$), “awareness of doing something meaningful” ($M = 5.64$, $SD = 1.25$), and the “already

TABLE 4 | Secondary traumatization of caregivers working with IS-traumatized refugees in categories for the whole sample and the three main professions individually.

FST-categories	N (%)
WHOLE SAMPLE (N = 70)	
No ST	54 (77.1)
Moderate ST	10 (14.3)
Severe ST	6 (8.6)
SOCIAL WORKERS (N = 42)	
No ST	34 (81.0)
Moderate ST	6 (14.3)
Severe ST	2 (4.8)
HEALTH CARE PROFESSIONALS (N = 9)	
No ST	8 (88.9)
Moderate ST	1 (11.1)
Severe ST	0 (0)
INTERPRETERS (N = 8)	
No ST	3 (37.5)
Moderate ST	1 (12.5)
Severe ST	4 (50.0)

ST, secondary traumatization; FST, Questionnaire for Secondary Traumatization.

TABLE 5 | Attachment styles of the caregivers of the Baden-Württemberg Humanitarian Admission Program.

Attachment styles	M	SD	Min	Max
Secure attachment style	5.77	1.03	3	7
Dismissing attachment style	3.81	1.73	1	7
Preoccupied attachment style	2.05	1.29	1	7
Fearful attachment style	1.94	1.17	1	6

Relationship Questionnaire Ratings are defined from 1 (“doesn’t describe me”) to 7 (“very accurately describes me”).

acquired knowledge and competence" ($M = 5.59$, $SD = 1.24$) as the most helpful work-related resources (Figure 3).

Perceived Need for Supervision

While 64.1% of the caregivers stated that they had the opportunity for supervision and 61.5% for intervention, 71.6% of the participating caregivers rated their need for supervision as "rather high" to "very high" ($M = 5.04$, $SD = 1.68$) on a scale from 1 = "very low" to 7 = "very high." The wish for case-related supervision was "rather high" to "very high" in 82.6% of caregivers ($M = 5.51$, $SD = 1.45$), whereas 57.6% wished for supervision related to their personal burdens in a "rather high" to "very high" way ($M = 4.7$, $SD = 1.87$). Specifically, 40.1%

of caregivers rated their wish to have individual supervision as "rather high" to "very high" ($M = 4.04$, $SD = 1.89$) and 67.5% rated their wish for group supervision as "rather high" to "very high" ($M = 4.90$, $SD = 1.89$).

Associations With Secondary Traumatization

Caregivers with own traumatic experiences (Median = 56.0) showed significantly stronger symptoms of secondary traumatization than caregivers without own experiences of trauma (Median = 50.0), $U = 240.5$, $p = 0.008$. However, no significant differences in severity of secondary traumatization emerged between caregivers with and without intervention,

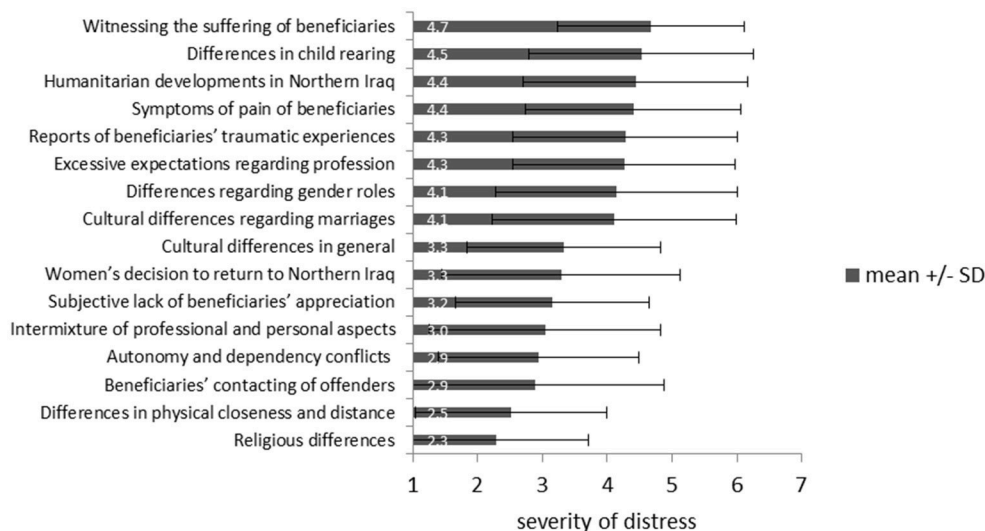


FIGURE 2 | Ranking of distressing factors of caregivers working with IS-victims from 1 ("very low distressing") to 7 ("very high distressing").

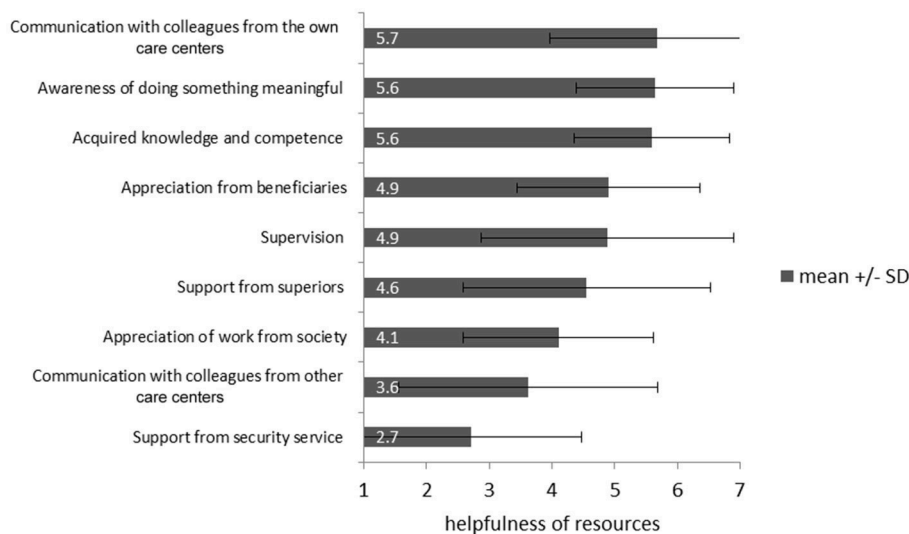


FIGURE 3 | Ranking of resources of caregivers working with IS-victims from 1 ("not helpful") to 7 ("very helpful").

supervision, relevant specific trainings, or whether a caregiver worked on a volunteer or a professional basis. Associations between individual and environmental characteristics and FST-scores are presented in **Table 6**.

Potential Risk Factors for Secondary Traumatization

Multiple linear regression analysis was performed to assess to what extent potential risk factors explain the variance of FST-scores in caregivers. To identify risk factors for secondary traumatization, we included variables in the regression model

TABLE 6 | Associations between secondary traumatization symptom load (FST-scores) and sociodemographic factors, context characteristic, workload, attachment styles, distressing factors, and resources of caregivers working with IS-traumatized refugees.

	FST-scores	
	<i>r_s</i>	<i>p</i>
SOCIODEMOGRAPHIC FACTORS		
Age	−0.09	0.487
Work-experience with traumatized patients	0.02	0.887
Work experience in the HAP	0.18	0.134
WORKLOAD		
Working hours per week in the HAP	0.34	0.006**
Working hours per week in direct contact with beneficiaries	0.33	0.006**
Number of women caring for	0.17	0.173
Number of children caring for	0.27	0.030*
ATTACHMENT STYLES		
Secure attachment style	−0.26	0.034*
Dismissing attachment style	0.20	0.106
Preoccupied attachment style	0.29	0.015*
Fearful attachment style	0.15	0.221
DISTRESSING FACTORS		
"Autonomy/dependency conflicts between beneficiaries and caregivers"	0.31	0.009**
"Reports on beneficiaries' traumatic experiences"	0.39	0.001**
"Witnessing the suffering of beneficiaries"	0.43	<0.001***
"Beneficiaries contacting of offenders in Northern Iraq"	0.36	0.004**
"differences regarding gender roles between beneficiaries and caregivers"	0.26	0.034*
"intimixture of private and professional aspects of the caregiver"	0.49	<0.001***
"excessive expectations of beneficiaries regarding the caregiver's profession/role"	0.32	0.007**
RESOURCES		
"Communication with colleagues from own care center"	−0.28	0.019*
"Communication with colleagues from other care centers"	−0.38	0.002**

Only significant associations between distressing factors and resources and FST-scores are depicted in this table. HAP, Baden-Württemberg Humanitarian Admission Program, FST, Questionnaire of Secondary Traumatization, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

which could be identified as risk factors for secondary traumatization for other samples before (e.g., interpreters) or have been discussed in recent literature to put an individual at risk for secondary traumatization such as personal trauma history, specific attachment styles as well as degree (duration) of exposure (15, 19, 23).

The data met all the assumptions for multiple regression analysis (Durbin-Watson-Statistic = 1.96). A significant regression equation was found [$F_{(5, 57)} = 4.541$, $p = 0.001$], with $R^2 = 0.285$. The result of the regression indicates that the identified risk factors explain 28.5% of the variance of secondary traumatic symptom load. Comparing the individual contributions of variances for single factors, standardized beta values are highest for personal history of flight, hours per week working in direct contact with HAP beneficiaries and personal history of traumatic experiences (**Table 7**).

Potential Resilience Factors for Secondary Traumatization

A second multiple linear regression analysis was calculated to assess to what extent potential resilience factors for caregivers working with traumatized refugees can explain variance of severity of secondary traumatization. We used secure and preoccupied attachment styles as independent variables, because Kindermann et al. showed that those two attachment styles serve as resilience factors for secondary traumatization in interpreters working in refugee-care (19). In addition, we added supervision and intervention as independent variables to the model, since their positive effect on caregivers has been mentioned in previous literature (38, 39).

The data met all the assumptions for multiple regression analysis (Durbin-Watson-Statistic = 1.99). A significant regression equation was found [$F_{(4, 60)} = 2.995$, $p = 0.025$], with $R^2 = 0.166$. The results of the regression indicate that the regression model explains 16.6% of the variance of secondary traumatization symptom load. Comparing the individual contributions of variances for single factors, standardized beta values were highest for secure attachment style and preoccupied attachment style. However, whereas secure attachment style is associated negatively with FST-scores, a preoccupied attachment style is associated with FST-scores in a positive way. Supervision and intervention do not contribute significantly to explaining the variance in the FST-scores (**Table 8**).

Requirements for Caregivers

As highly significant for the work in the HAP the participating caregivers rated "Communicative competence" ($M = 6.20$, $SD = 0.89$), "cultural sensitivity" ($M = 6.05$, $SD = 1.07$), and "psychological self-care" ($M = 6.05$, $SD = 1.17$) were rated as highly significant for the work in the HAP (**Figure 4**).

DISCUSSION

This is the first study that investigated the prevalence of secondary traumatization and its determinants in caregivers working with IS-traumatized women and children. The study showed that working with patients who suffered from torture

TABLE 7 | Linear regression model for potential risk factors for secondary traumatization in caregivers.

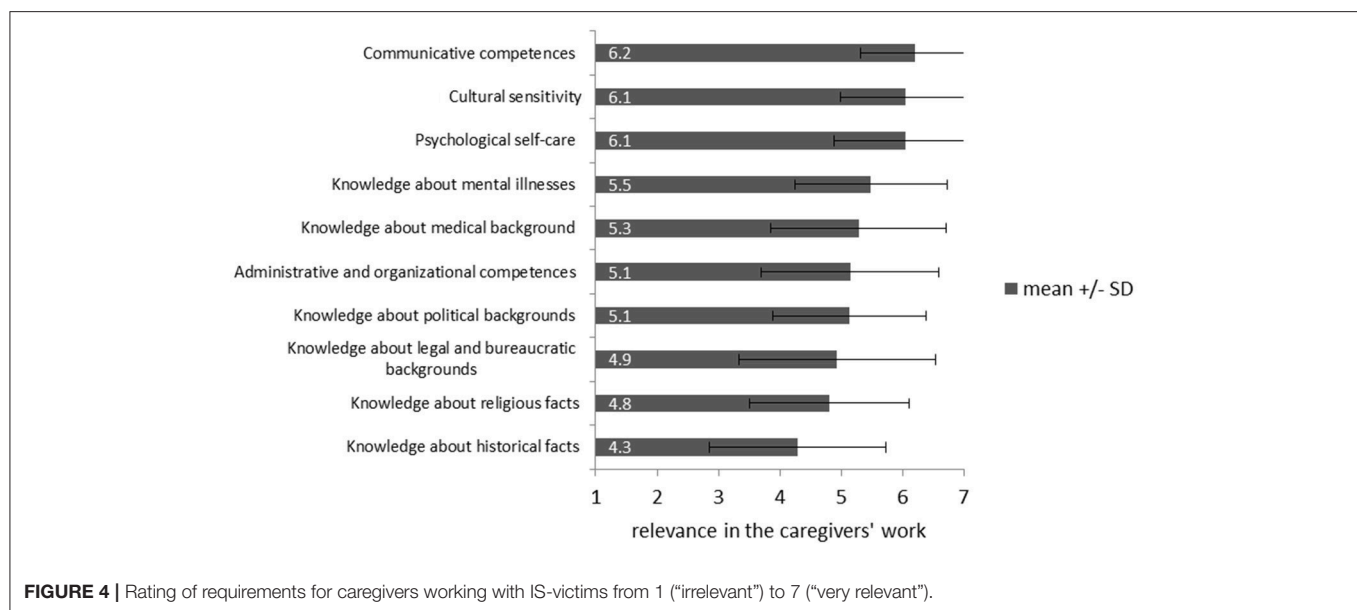
Variables	N	b (95% CI)	SE b	β	p	Tolerance
Constant		36.38 (25.93, 46.83)	5.22		0.000***	
Personal history of traumatic experiences	63	11.44 (2.64, 20.24)	4.40	0.305	0.012*	0.916
Personal history of flight	63	21.71 (6.57, 36.86)	7.56	0.331	0.006**	0.944
Hours per week working in direct contact with beneficiaries	63	0.45 (0.11, 0.79)	0.17	0.311	0.012*	0.882
Dismissing attachment style	63	0.35 (−1.86, 2.56)	1.10	0.038	0.754	0.861
Fearful attachment style	63	2.71 (−0.36, 5.78)	1.53	0.208	0.083	0.905

$R^2 = 0.285$, Adjusted $R^2 = 0.222$, β = standardized beta, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE 8 | Linear regression model for potential resilience factors for secondary traumatization in caregivers.

	N	b (95% CI)	SE b	β	P	Tolerance
Constant		70.28 (46.55, 94.01)	11.87		0.000***	
Secure attachment style	65	−4.33 (−8.10, −0.56)	1.89	−0.274	0.025*	0.975
Preoccupied attachment style	65	3.22 (0.35, 6.09)	1.44	0.273	0.028*	0.936
Supervision	65	0.54 (−7.52, 8.60)	4.03	0.016	0.893	0.937
Intervision	65	0.33 (−7.59, 8.25)	3.96	0.010	0.933	0.942

$R^2 = 0.166$, Adjusted $R^2 = 0.111$, β = standardized beta, * $p < 0.05$, *** $p < 0.001$.



(physical, mental, and sexual violence) while in the captivity of a radical terror organization can lead to trauma-specific symptoms at caregivers' side. In 22.9% of the caregivers secondary traumatization as defined by the Questionnaire of Secondary Traumatization was present at least once throughout their work in refugee-care, with 8.6% of participants indicating severe secondary traumatization. Since these professional lifetime prevalence rates occurred during a short time period of an average of 16.3 months, they demonstrate a substantial mental health risk to caregivers working with traumatized refugees. This is an important finding since secondary traumatization not only affects the well-being of the caregiver but may also impact the

care they are providing. Disrupted alliances between caregivers and clients, violations of professional boundaries, or inadequate reactions to the client's trauma could be the consequence (40).

FST-scores found in this study are comparable to those of interpreters working in common refugee-care (19) and even almost as high as the professional lifetime-prevalence of secondary traumatization in trauma-therapists (17, 18). Clinicians with higher levels of exposure to victims of sexual violence are statistically more likely to exhibit trauma symptoms themselves (41). Since the beneficiaries of the HAP were especially selected for the program due to their extremely traumatic experiences in IS-captivity, where sexual violence was

used as a weapon of war (30), HAP-caregivers are working in a context which puts them at high risk for developing secondary traumatization. This corresponds with the presented data.

Distressing Factors of Caregivers

As the most important distressing factors for caregivers this study detected witnessing the suffering of the refugees by the caregivers, cultural differences in child-rearing between the refugees and the caregivers and the current humanitarian developments in Northern Iraq. These main distressing factors show how diverse the requirements for refugee-caregivers are. In their everyday work, they are not only confronted with highly traumatized clients but also with cultural differences and ongoing humanitarian catastrophes in the home countries.

Associated with secondary traumatization in caregivers is their psychological stress resulting from witnessing the refugees suffer, from the reports of the traumatic experiences of the beneficiaries and from witnessing beneficiaries contacting their offenders in Northern Iraq. Furthermore, stress resulting from the intermixture of private and professional aspects, from excessive expectations of beneficiaries regarding the caregivers' profession or role and from autonomy/dependency conflicts between caregivers and beneficiaries correlates with secondary traumatization. Regarding cultural differences, only stress due to differences in gender roles is associated with secondary traumatization. Concrete implications of these results are summarized in **Figure 6**.

As a main finding of this study, a personal history of traumatic experiences could be identified as a risk factor for secondary traumatization. In former studies, it has been shown that previous experience of significant stressors increases current levels of distress, beyond that which is accounted for by present stressors (42). This study not only supports this finding but widens it by applying it to symptoms of secondary traumatization, suggesting that a personal trauma history makes caregivers more vulnerable to the trauma stories of others. These results are consistent with other studies finding an association between personal history of trauma and secondary traumatization (19, 20, 43, 44). However, it has been suggested that being exposed to details of a patient's trauma might trigger one's own similar traumatic experiences. If this is the case, then the occurring symptoms could be due to the primary traumatization rather than symptoms of secondary traumatization (23, 45, 46). It has also been critically discussed whether the association between own trauma experience and secondary traumatization is due to a lack of construct validity of instruments which can lead to a lack of distinction between actual PTSD, reactivation of PTSD-symptoms, and secondary traumatization (45, 46). However, unlike many former studies that used common PTSD-questionnaires to assess secondary traumatization, this study avoided this critique by using a reliable and valid secondary traumatization questionnaire with good internal consistencies. The FST was specifically designed and evaluated for measuring trauma symptoms that are uniquely associated with the client's and not the caregivers personal traumatic experience (17, 34). Therefore, the present study aimed to measure distinct secondary traumatization load

differentiated from actual PTSD-symptoms in caregivers or a reactivation of former PTSD-symptoms. Furthermore, this study found that caregivers with own trauma histories show more secondary traumatization than caregivers without own trauma histories. These findings argue for another differentiation between common secondary traumatization and secondary traumatization aggravated by own trauma experiences. Based on theoretical considerations and the findings of this study, four categories of trauma-associated psychological burdens and their practical implications can be hypothesized (**Figure 5**). In further studies, the kinds of trauma caregivers have already experienced themselves should be assessed further to test if the exact type of trauma influences the vulnerability for secondary traumatization.

In the study sample, one-third of the caregivers (24.1%) already experienced at least one traumatic event in their lives themselves. This lifetime-prevalence rate is comparable to the rate of 23.8% for traumatic experiences found in the general population in Germany (47). Nevertheless, there are also references that people working in refugee-care are even more likely to have experienced a traumatic event themselves than the general population (48). Therefore, an own trauma history is a highly relevant risk factor for secondary traumatization in refugee-caregivers.

More specifically, this study identified an own history of flight as a relevant risk factor for secondary traumatization in refugee-caregivers. In this case, the caregiver's personal experiences show similarities to the refugees' life stories. In qualitative interviews, trauma therapists already noticed that similarities to their own life could be the reason for a lack of necessary professional distance which could lead to secondary traumatization (17). The findings of this study seem to support this assumption. Since interpreters often come from migrant or refugee families, this might be one explanation for the high percentage of interpreters suffering from secondary traumatization.

The results of this study also show that a high frequency and duration of direct contact with refugees is another risk factor for secondary traumatization. This finding is in line with other studies where caregivers with more exposure to traumatized patients reported higher levels of post-traumatic stress symptoms (15, 41, 49, 50). In addition, the number of children the caregivers worked with correlated significantly and positively with FST-scores whereas the number of women cared for was not significantly associated with secondary traumatization. This finding indicates a difference between the work with IS-traumatized children and the work with IS-traumatized women regarding secondary traumatization. Hence, future studies comparing secondary traumatization in caregivers exclusively working with children compared to adult settings could be beneficial.

A preoccupied attachment style, characterized by an over-involvement in close relationships in combination with a low self-esteem, can also increase the risk for secondary traumatization. Since Kindermann et al. identified a preoccupied attachment style as a resilience factor for secondary traumatization in interpreters working in refugee-care (19), we hypothesized the same for this study sample. However, as the results show, a preoccupied attachment style does not only fail to prevent

Secondary Traumatization	<p>Proposed Definition: Post traumatic stress symptoms in caregivers due to the exposition to a patient's trauma content with the absence of an own trauma history of the caregiver.</p> <p>Relevance: Caregivers working with traumatized refugees are at risk for developing secondary traumatization.</p> <p>Potential Consequences: Focus on patient's trauma content and its effect on the caregiver; may be addressed in individual supervision and in group supervision within the professional context to create a supportive cooperative network in the caregiver-team. In case of prolonged or severe symptom load additional individual trauma-therapy can be recommended.</p>
Complex Secondary Traumatization	<p>Proposed Definition: Post traumatic stress symptoms due to the exposition to the patient's trauma content; complicated/aggravated by trauma experiences or mental health comorbidities of caregivers. With regards to intrusions/flashbacks a caregiver predominantly experiences trauma content of patients.</p> <p>Relevance: The present study identifies an own history of trauma or flight as risk factors for secondary traumatization.</p> <p>Potential Consequences: Focus on the patient's and on the caregiver's trauma history. Supervision within the professional context may be supportive but not sufficient: Individual trauma-therapy should be recommended.</p>
Reactivation of primary PTSD	<p>Proposed Definition: Former primary PTSD is reactivated after a symptom free interval triggered by the patient's trauma content. With regards to intrusions and flashbacks a caregiver predominantly experiences own trauma content.</p> <p>Relevance: Relevant for caregivers with previous (similar) trauma qualifying experiences.</p> <p>Potential Consequences: Focus on the caregiver's trauma experiences and on similarities in the caregiver's and the patient's trauma; best addressed in an individual trauma therapy. Supervisors should be attentive for caregivers with own trauma history. Caregivers should seek individual trauma-therapy outside the professional context.</p>
Primary PTSD	<p>Proposed Definition: Post traumatic stress symptoms are due to own trauma experiences defined by ICD-10/DSM-5 and are independent of the patient's trauma content. Current PTSD of caregivers may adversely be affected by exposition to trauma content of refugees.</p> <p>Relevance: One third of refugee-caregivers in the present study had a trauma history themselves.</p> <p>Potential Consequences: Caregivers should be screened for acute PTSD before working with traumatized patients. It can not be recommended to work as a trauma-caregiver with acute PTSD. An individual trauma therapy with a focus on the caregiver's trauma should take place first.</p>

FIGURE 5 | Proposed classification of trauma-associated psychological burdens of caregivers working with traumatized refugees.

secondary traumatization in refugee-caregivers, but qualifies as a potential risk factor for secondary traumatization. In contrast, fearful and dismissing attachment styles, both characterized by a negative perception of others, did not significantly explain variance of the symptom load. These results suggest that only attachment styles based on a positive perception of others (preoccupied and secure) can serve as potential determinants of secondary traumatization.

Resources of Caregivers

The main resources of caregivers are talking to colleagues from their care centers, the awareness of doing something meaningful, and the already acquired knowledge and competence. Considering the communication with colleagues as helpful is associated with lower secondary traumatization scores. This applies to the communication with colleagues from the same care center and from other care centers. Since there is no significant difference in secondary traumatization symptom load between caregivers with and without intervention, it is possible that the communication with colleagues supports caregivers especially in an informal, unstructured way.

As another main finding, a secure attachment style could be identified as a potential resilience factor for secondary traumatization. This finding goes in line with previous research (19) and with the detected resources in the present study such as communication with colleagues. Since caregivers with secure attachment styles, defined as being comfortable with

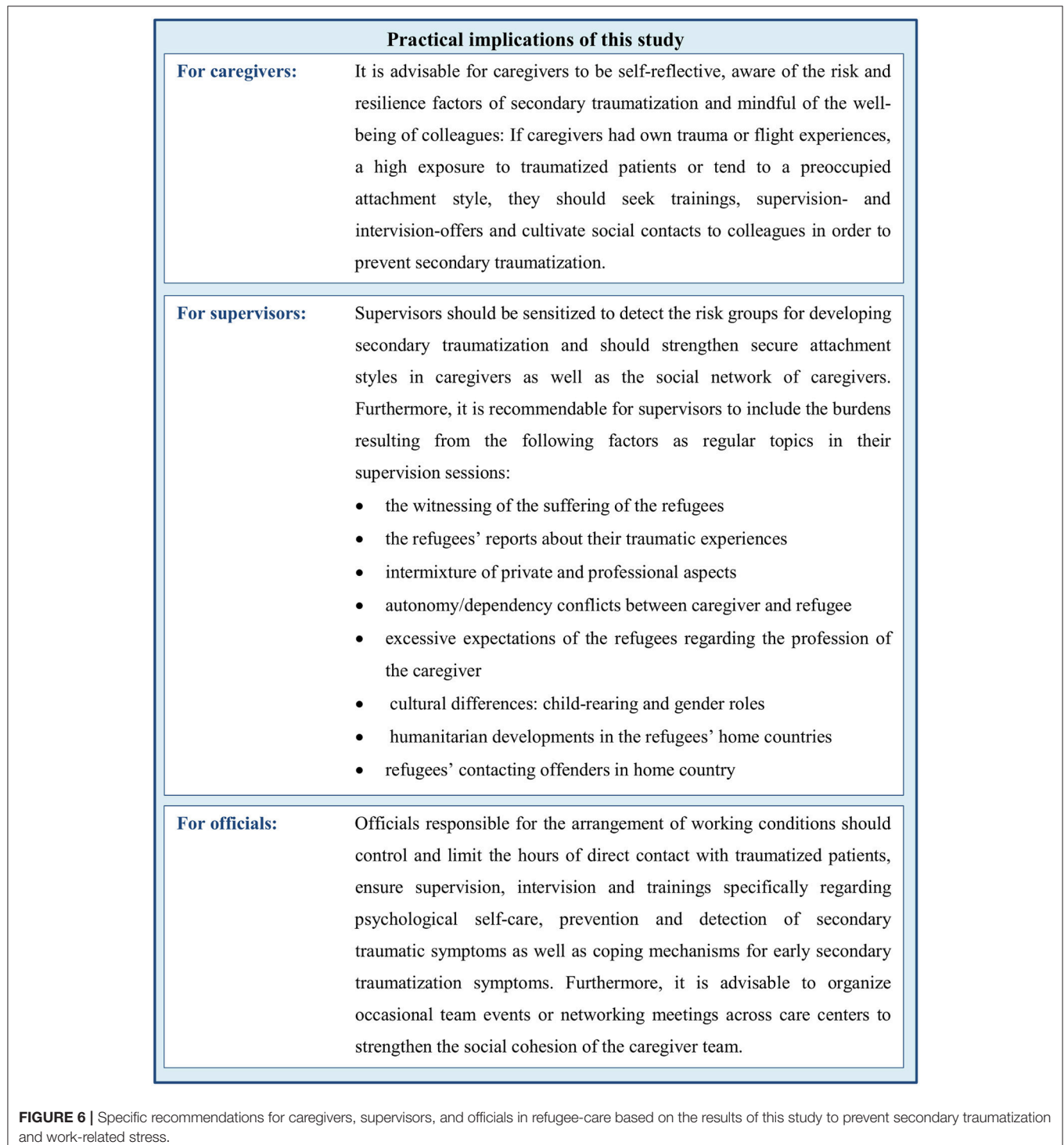
intimacy and autonomy (27), are more likely to have functioning relationships (51), the results of this study point out the importance of a reliable social network in preventing secondary traumatization, especially but not exclusively with coworkers.

Although supervision is strongly recommended in the recent literature in order to prevent secondary traumatization (52), it could not be identified as a significant resilience factor for secondary traumatization in the present study. However, 71.6% of caregivers rated their need for supervision as "rather high" to "very high" and supervision was rated as "rather helpful" on average. This finding suggests that even if the supervision received in the HAP does not significantly prevent secondary traumatization, caregivers wish for, and benefit from it to reduce the burden of work related stress. Furthermore, the primary goal of supervision is not only to prevent secondary traumatization but improve other aspects of professional well-being and indeed the quality of care delivered. Moreover, the specific effects of supervision may only be sufficiently investigated in controlled prospective fashion when quantity and quality of supervision are also considered.

Since the already acquired knowledge and competence are considered a main resource of caregivers, seminars before, during and after working in refugee-care could prevent work-related psychological strain. Although the importance of trainings for caregivers is acknowledged in recent literature (53), no significant differences in the severity of secondary traumatization emerged between caregivers with and without further relevant trainings.

The results of this study suggest a more project-orientated offer of seminars where communicative competences, cultural sensitivity, and psychological self-care are trained as important competences in the work with refugees. Such professional trainings should be developed, standardized and evaluated in

future research projects to guarantee a benefit for caregivers, especially for potentially vulnerable groups as identified in this study. For specific recommendation regarding prevention of secondary traumatization based on the results of this study see **Figure 6**.



LIMITATIONS

This study shows several limitations: First, the small sample needs to be noted as a restriction of the present study. Moreover, since the networking meeting was a voluntarily event a selection bias due to taking part by more involved or dedicated caregivers may be present. However, it is hardly realistic to recruit larger samples of caregivers that work exclusively with IS-victims. Given the small number of HAP-caregivers in total and the high response rate in this study, the generalization of the study results for caregivers in the context of the HAP can be assumed. Second, the heterogeneity regarding different professions in the study sample with social workers as the predominant subgroup could be seen as a restricting factor for generalizing the findings for one or the other of the individual professions. For a closer look at the different professions in refugee-care and interprofessional differences regarding secondary traumatization beyond descriptive data, future research should consult larger subgroups of the relevant professions. Third, since secondary traumatization symptoms were captured retrospectively, the reported data underlies the validity-limitations of retrospective data collection. Forth, the cross-sectional study design limits the generalizability of the results and hinders inference of causal relationships. The role of the detected potential risk and resilience factors should therefore be considered as hypothetical and needs to be confirmed by longitudinal data.

CONCLUSION

This is the first study to explore secondary traumatic symptoms, burdens and resources in caregivers working with women and children who suffered from extreme IS-violence in the form of torture, slavery, and sexual violence by using inter alia an instrument specifically designed and evaluated to detect secondary traumatization. The findings show that caregivers working in this context of refugee-care are a vulnerable group for developing secondary traumatization. The results of the present study also indicate that secondary traumatization varies by both individual characteristics such as attachment styles and personal

experiences, as well as by environmental characteristics such as the dose of exposure to traumatized patients. The results of this study have implications for the selection, training, and continuing education and organizational support of caregivers working with traumatized refugees especially when extreme forms of traumatic content such as IS-violence against women are present in the respective clients.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of the ICH-GCP-guidelines, Declaration of Helsinki. The protocol was approved by the ethics committee of the medical faculty of the University of Tübingen and the University Hospital Tübingen named Ethik-Kommission an der Medizinischen Fakultät der Eberhard-Karls-Universität und am Universitätsklinikum Tübingen. All subjects gave written informed consent in accordance with the Declaration of Helsinki.

DATA AVAILABILITY STATEMENT

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

JD, CR-O, PW, and FJ planned and conducted the study with the support of MB and HS. JD analyzed the data and wrote the manuscript with support from FJ. CN, SZ, JH, JK, NA, PP, and NG supported the study and the writing process with ideas and feedback.

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Psychotherapeutic Group Intervention for Traumatized Male Refugees Using Imaginative Stabilization Techniques—A Pilot Study in a German Reception Center

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Background: Due to persecution, human rights violations and armed conflicts, the prevalence of post-traumatic stress disorder (PTSD) is high in refugee populations. Previous studies indicate that trauma-focused treatments are highly effective in treating PTSD in refugees. However, these approaches rely on the stability of the therapeutic setting, treatment continuity, and safe housing. Although early treatment of PTSD is recommended, these requirements are not met in reception centers. Therefore, we conducted a pilot study to examine the effect of imaginative stabilization techniques derived from psychodynamic psychotraumatology therapy for the early stabilization of traumatized refugees in a reception center.

Methods: From May 2017 to April 2018, 86 imaginative stabilization group therapy sessions have taken place. A sample of 43 out of 46 traumatized refugees completed self-report questionnaires assessing PTSD, depression, and anxiety symptoms prior to attending open imaginative stabilization group therapy sessions. Furthermore, participants filled in self-report questionnaires on distress and emotional state (valence/arousal/dominance) before and after each session. After having participated in four consecutive sessions, a sub-group of 17 participants completed a follow-up assessment of PTSD, depression, and anxiety symptoms. Follow-up interviews were conducted with 25 participants 2 weeks after their last session attendance to explore self-practice habits post intervention.

Results: The pre-post-intervention comparison of scores indicated a significant reduction of distress ($z = -3.35, p < 0.001, r = -0.51$) and an improvement of affective reports for valence ($z = -4.79, p < 0.001, r = -0.82$) and dominance ($z = -3.89, p < 0.001, r = -0.59$), whereas arousal scores were not affected. We found a significant reduction of anxiety symptoms ($z = -2.04, p < 0.05, r = -0.49$), whereas PTSD and depression scores remained unchanged. Follow-up interviews revealed that 80% of the participants continued to practice the imaginative stabilization techniques after redistribution to other accommodation.

Conclusion: The results indicate that imaginative stabilization techniques are a promising and feasible approach to treat refugees in unstable reception center settings. In regular imaginative stabilization group therapy sessions, we were able to reduce the participants' distress and anxiety symptoms while strengthening their internal resources and increasing their emotional stability.

Keywords: imaginative stabilization techniques, refugees, post-traumatic stress disorder, group therapy session, reception center

INTRODUCTION

As a result of persecution, armed conflicts, deficient health care, and human rights violations, more than 65.5 million people worldwide were forcibly displaced from their homes by the end of 2016. Approximately one third of these refugees sought safety in Europe, risking their lives during a perilous journey (1). Between 2016 and 2017, around 920,000 first-time asylum applicants were registered in Germany (2). Due to pre-, peri-, and post-migratory distress factors, fleeing people show a high risk to develop mental health problems. In recent literature, up to 40% of refugees are reported to be affected by post-traumatic stress disorders (PTSD), depression, and anxiety disorders (3–8). Observed prevalence rates of mental health problems in refugees are inconsistent due to the heterogeneity of the groups and to the diversity of applied diagnostic instruments (9, 10). Regardless of the exact numbers, current findings underline the urgent need for culturally sensitive interventions shortly after the refugees' arrival in the respective host countries to enable sufficient treatment of mental health problems and prevent further exacerbation and chronification.

Even though PTSD prevalence rates in refugees are high, research on the effectiveness and efficacy of different therapeutic approaches for refugees is still lacking (11–14). To date, narrative exposure therapy (NET) is the most closely investigated approach for the treatment of PTSD with well-documented evidence, including meta-analytical reviews, indicating the effective reduction of PTSD symptoms (15–23). Further, studies investigating trauma-focused behavioral therapy (24–27) and eye movement desensitization and reprocessing [EMDR; (28, 29)] also show results that point to a significant decrease of PTSD symptoms.

All the interventions described above directly target traumatic experiences in order to achieve symptom control and psychological stabilization. This requires a safe, stable, and continuous psychotherapeutic setting. However, upon arrival in their countries of destination, refugees are often initially sheltered in reception centers where psychosocial and psychiatric evaluation and mental health care provision is sparse, although urgently needed (5, 7, 14, 30, 31). The implementation of interventions for traumatized refugees is further limited through the redistribution to collective or municipal accommodations. Especially the setting provided by accommodation in reception centers is not stable enough for trauma confrontation treatment. This in turn underpins the need for specific therapeutic approaches that might prove to be adaptive for this specific setting.

Imaginative stabilization techniques derived from psychodynamic trauma therapy (32) might represent one possible strategy to support traumatized refugees. This approach aims to develop, activate, and strengthen individual skills, resources, and coping strategies, as well as to improve self-care and -calming skills by the means of imagining self-assuring and -activating inner pictures (14, 32). As cornerstones of psychodynamic imaginative trauma therapy [PITT; (33)], imaginative stabilization techniques have been shown to significantly reduce trauma symptoms in psychiatric inpatients (34, 35). Studies with refugee samples apply imaginative stabilization techniques either as one core element within a multimodal stabilization approach (36), or as a part of different symptom management techniques before trauma confrontation (37). These studies point out that imaginative stabilization techniques are applicable for refugee populations. However, so far, the specific effect of imaginative stabilization techniques on PTSD symptom reduction has not been addressed. Further research on stabilization interventions among traumatized refugees has revealed inconsistent results without specifying what exactly is meant by the term “stabilization” (29).

Therefore, this pilot study aims to investigate the feasibility and effectiveness of imaginative stabilization techniques (32) for traumatized, English-speaking, male refugees sheltered in a German reception center in a group therapy setting using a quantitative pre-post design. As primary outcome measures we hypothesized that the imaginative stabilization techniques would (1) positively impact the refugees' affective state and (2) decrease their perceived distress. Our secondary outcome measure was the assumption that the intervention would lead to symptom reduction, reflected in (3) a decrease in PTSD symptoms as well as (4) an improvement of psychiatric comorbidities in terms of depression and anxiety symptoms. Finally, (5) we assumed that the refugees would practice the imaginative stabilization techniques on their own after their last imaginative stabilization group therapy session attendance.

MATERIALS AND METHODS

Participants

Over a period of one year (from the end of May 2017 to the end of April 2018), refugees that consulted the psychosocial outpatient clinic (30, 31) in the reception center “Patrick Henry Village” (PHV) in Heidelberg Kirchheim, Germany, and met the inclusion criteria were referred to our imaginative stabilization group therapy sessions. All participating refugees had either

applied for asylum in Germany before the intervention or were in the middle of the application process during the intervention. Study inclusion criteria were: diagnosed PTSD by experienced psychotherapists and psychiatrists working in the psychosocial outpatient clinic, male gender, and the ability to speak and understand the English language. Exclusion criteria were addiction, current psychosis, traumatic brain injury, and age below 18 years.

Study Design and Ethical Approval

We investigated the feasibility and effectiveness of imaginative stabilization techniques (32) in refugees suffering from PTSD and sheltered in a reception center using a prospective, longitudinal design. As the participants' imminent redistribution to other accommodations caused a high degree of fluctuation, we chose an open group setting. We decided against a mixed-gender concept to ensure a comfortable, safe, and trusting environment with minimal triggering potential. Due to the fact that a higher portion of male patients sought help at the reception center's psychosocial outpatient clinic (30) and the center's existing psychosocial offers (e.g., shelters for women and children offered by charitable organizations) catered to the needs of burdened women, we decided on a group therapy setting exclusively for male refugees. The following assessment points were defined:

- *Baseline measurement of the severity of symptoms related to mental distress:* Prior to the individuals' first imaginative stabilization group therapy session, we used a questionnaire to assess symptoms of PTSD, depression, and anxiety disorders.
- *Pre-post imaginative stabilization group therapy session assessment:* Additionally, pre-post effects of imaginative stabilization techniques on the refugees' affective state and their perceived distress were examined.
- *Follow-up symptom severity measure of mental distress for subgroup:* Furthermore, we used the same questionnaire as we had used for the baseline measurement to assess symptom reduction in PTSD, depression, and anxiety disorders in a subgroup of participants after they had attended the imaginative stabilization group therapy sessions for the fourth time.
- *Follow-up interviews:* Finally, follow-up interviews were carried out with participants via phone 2 weeks after their last imaginative stabilization group therapy session attendance, in order to assess why they had stopped coming to the group and whether they had continued to practice the techniques individually.

The study was approved by the ethics committee of the University of Heidelberg (S-640/2016) and all participants gave their written informed consent in accordance with the Declaration of Helsinki.

Imaginative Stabilization Group Therapy Sessions

The imaginative stabilization group therapy sessions took place twice a week and were carried out by two psychotherapists: a post-doctoral scientist and licensed psychodynamic psychotherapist highly experienced in trauma therapy, and

a Heidelberg University Ph.D. candidate undergoing post-graduate training in behavioral therapy. Before the participants' first session, the therapists individually met new group members to inform them about the structure and the content of the group setting. Participants who had already attended the imaginative stabilization group therapy sessions at least once, filled out the questionnaire at the beginning of the session. We started the imaginative stabilization group therapy sessions by asking the participants how they were feeling and giving them the possibility to talk about their individual difficulties or ask questions. Next, we began with the three imaginative stabilization techniques. The first technique consisted of mindful breathing to enable the participants to relax, focus on the present moment, and enter a state of self-engagement. The second technique, the Body Scan which was originally developed by Kabat-Zinn (38) and described by Reddemann (32), aims to teach the participants self-perception and enable them to experience their bodies by mindfully focusing on different parts of their body. For the third technique we used one of two guided imagery techniques: either the "inner safe place" or the "tree exercise" (32). The technique "inner safe place" encourages individuals to imagine themselves at a real or made-up place where they feel comfortable and safe. During the "tree exercise," individuals imagine a tree as a symbol of strength and nutrition with the goal to evoke a feeling of inner stability, comfort, and energy. Both exercises focus on different sensory perceptions aimed at deepening the imagination and strengthening feelings of safety and comfort. After having completed all three techniques, participants had the possibility to share their experiences in a short discussion round. At the end of each imaginative stabilization group therapy session the participants filled out questionnaires.

Measures

Baseline Measurement of the Severity of Symptoms Related to Mental Distress

Prior to the first imaginative stabilization group therapy session, a baseline measurement (T1) including the Primary Care PTSD Screen for DSM-5 [PC-PTSD-5; (39)], the two-item Patient Health Questionnaire [PHQ-2; (40)], and the short version of the General Anxiety Disorder questionnaire [GAD-2; (41)] were used to assess mental distress of all participants.

We assessed the individuals' PTSD symptoms via the PC-PTSD-5 (39). Derived from DSM-5 criteria, the questionnaire begins with a list of trauma events which we adapted to include the trauma most frequently experienced by refugees (14). Items are assessed by a dichotomous (yes/no) response format instead of a Likert scale to facilitate administration and scoring. Individuals who do not report trauma exposure do not answer subsequent questions on PTSD symptoms. If participants confirmed at least one trauma event, they were asked five binary questions to assess their perception of these experiences: (1) Were they re-experiencing the trauma? (2) Were they avoiding situations related to the trauma? (3) Were they experiencing recurrent thoughts about the trauma? (4) Were they suffering emotional numbness? (5) Were they feeling guilty of the experiences? (39). The PC-PTSD-5 has possible scores between 0 and 5 and a cut off score at 3. It shows good sensitivity

(0.93) and acceptable specificity (0.85) and was well tolerated by patients (42). The average Kuder-Richardson formula 20 reliability coefficient was 0.52.

In the PHQ-2 (40) participants are asked two questions on anhedonia and depressed mood. The possible answers are set on a scale between 0 (not at all) and 3 (nearly every day). The overall score of the PHQ-2 ranges between 0 and 6 and has a good construct validity (r from 0.67 to 0.87) and a good internal consistency [$\alpha = 0.83$; (43)]. The cut-off score set at ≥ 3 shows a sensitivity of 0.61–0.87 and a specificity of 0.86–0.92 for major depression in primary care and medical outpatients (40, 43, 44), and a sensitivity of 0.79 and a specificity of 0.86 for any other depressive disorder (43).

The GAD-2 (41) is recommended by the National Institute for Health and Care Excellence Guidelines (45) for the detection of anxiety disorders. It consists of two items: (1) “Feeling nervous, anxious or on edge” and (2) “Not being able to stop or control worrying” with response possibilities from 0 (not at all) to 3 (nearly every day). The overall score ranges between 0 and 6. With the cut-off score set at ≥ 3 the GAD-2 shows a sensitivity of 0.89 for generalized anxiety disorder and a specificity of 0.83 for generalized anxiety disorder (41, 46). Internal consistency reliability is acceptable [$\alpha = 0.83$; (47)].

Pre-post Imaginative Stabilization Group Therapy Session Assessment

As primary outcome measure we administered the Self-Assessment Manikin scale [SAM; (48)] and the distress thermometer of the Refugee Health Screener-15 [RHS-15 distress thermometer; (49)] before (pre) and after (post) each imaginative stabilization group therapy session.

The SAM (48) is a nonverbal, cross cultural (50) rating scale. Patients are asked to select one out of five manikin pictures to describe their present affective state concerning the three major affective dimensions of valence (sad—happy), arousal (excited—calm), and dominance (weak—strong). The dimension of valence ranging from 1 (sad) to 5 (happy) illustrates the participants’ positive or negative feelings; the dimension of arousal ranging from 1 (excited) to 5 (calm) describes their perceived vigilance and excitement; the dimension of dominance ranging from 1 (weak) to 5 (strong) represents their feeling of being in control of the current situation (51). The SAM scales are widely used in different situations and for diverse groups of patients, i.e. for traumatized patients as well as for refugees (51–54).

The RHS-15 (49) was developed especially for refugees and asylum seekers. It contains 14 symptom items and a distress thermometer which rates distress on a visual analogous scale ranging from 0 (“Things are good”) to 10 (“I feel as bad as I ever had”). With a cut-off score set at ≥ 5 , sensitivity (0.81–0.95) and specificity (0.86–0.89) of the RHS-15 are good (49).

Follow-Up Symptom Severity Measure of Mental Distress for Subgroup

When individuals had participated in four imaginative stabilization group therapy sessions, they were asked to fill out the PC-PTSD-5 (39), PHQ-2 (40), and GAD-2 (41) again, in order to compare the rate of their mental distress after four

sessions (T2) to their answers prior to the first session (T1) as secondary outcome measures.

Follow-Up Interviews

We contacted all participants via phone two weeks after their last imaginative stabilization group therapy session attendance. The phone calls were digitally recorded in order to ensure a reliable analysis. The three key questions of these interviews were developed according to the guidelines of the COREQ-Checklist (55) and designed as semi-structured interviews according to the methodological aspects of Helfferich (56). With our first question, we aimed to discover the reasons why the participants had stopped coming to the imaginative stabilization group therapy sessions. Secondly, we asked the participants whether they were practicing the imaginative stabilization techniques on their own. The third question concerned frequency, time and preferred place of self-practice.

Data Analysis

All statistical analyses were carried out by using the Statistical Package for the Social Sciences (SPSS) program version 24 (57). Demographic variables and baseline characteristics were analyzed using descriptive statistics (frequencies, means, and standard deviations). Because the data distributions tended to be slightly skewed, we used Wilcoxon signed-rank tests. We compared the scores of the SAM and the RHS-15 distress thermometer before an individual’s first (pre) and after an individual’s last (post) imaginative stabilization group therapy session attendance (primary outcome measures). The baseline scores for PTSD, depression, and anxiety disorders (T1) were compared with the scores after the fourth imaginative stabilization group therapy session (T2) for the sub-sample (secondary outcome measure). Effect sizes were calculated using Pearson’s correlation coefficient r . The internal consistency reliability of PC-PTSD-5 was determined using Kuder-Richardson formula (KR20). The recorded follow-up interviews were transcribed and analyzed descriptively by using frequency analyses in MAXQDA (58) according to the qualitative content analyses of Mayring (59).

RESULTS

Characteristics

During the study period a total of 86 imaginative stabilization group therapy sessions took place and $N = 46$ participants visited the sessions at least once. On average, the participants attended 5.43 sessions ($SD = 7.34$, range 1–40). Eight participants (17.4%) attended 10 or more sessions, whereas 26 participants (56.5%) took part in the imaginative stabilization group therapy sessions less than four times. Regarding the attendance of each session, we calculated that on average three participants ($M = 2.92$, $SD = 1.67$, range 0–10) took part in a group session. For the statistical analysis that is described below, two participants had to be excluded due to their high level of mental distress and danger of further exacerbation when confronted with the questionnaires. A further participant was excluded from the statistical analysis because he reported psychotic symptoms during the time of

TABLE 1 | Sociodemographic characteristics at baseline for all participants ($N = 46$) and the sub-sample ($n = 17$).

	At baseline ^a			Sub-Sample ^b		
	<i>n</i>	%		<i>n</i>	%	
REGION OF ORIGIN						
Sub-Saharan Africa	33	71.7		14	82.4	
Middle East	5	10.9		2	11.8	
South Asia	6	13.0		1	5.9	
North-Africa	2	4.3				
RELIGION						
Christian	27	58.7		12	70.6	
Muslim	15	32.6		4	23.5	
Hindu	2	4.3		1	5.9	
Atheist	2	4.3				
MEDICATION ^c						
None	12	26.1		7	36.8	
Antidepressants	32	69.6		9	52.9	
Neuroleptics	6	13.0		1	5.9	
No information	1	2.2				
	<i>M</i>	<i>SD</i>	<i>Range</i>	<i>M</i>	<i>SD</i>	<i>Range</i>
Age	27.50	7.47	18–45	25.24	4.87	18–32
Stay in PHV (weeks)	9.46	8.31	1–32	7.35	5.00	2–16
Session attendance	5.43	7.34	1–40	10.88	9.70	4–40

^a $N = 46$; ^b $n = 17$ participants who attended four or more imaginative stabilization group therapy sessions; PHV, reception center for refugees “Patrick-Henry Village” in Heidelberg Kirchheim, Germany; Session attendance, participation in imaginative stabilization group therapy sessions; ^cMultiple answers were possible.

his imaginative stabilization group therapy session attendance. All in all, there was a sub-sample of $n = 17$ participants who filled out the questionnaires regarding PTSD, depression, and anxiety disorders after the fourth session, thus enabling us to assess their follow-up symptom severity. **Table 1** depicts sample characteristics for all participants as well as for the sub-sample of participants ($n = 17$) who joined at least four imaginative stabilization group therapy sessions.

Baseline Measurement of the Severity of Symptoms Related to Mental Distress

The baseline scores for PTSD, depression, and anxiety disorders are presented in **Table 2**. On average, the participants reported four trauma experiences ($N = 43$, $M = 4.12$, $SD = 1.65$, range = 1–8). The most frequent traumatic events were seeing someone being killed or seriously injured ($n = 33$, 76.7%), experiencing torture ($n = 29$, 67.4%), being physically or sexually assaulted or abused ($n = 27$, 62.8%), experiencing a war ($n = 19$, 44.2%), being imprisoned ($n = 25$, 58.1%), and losing a loved one through homicide or suicide ($n = 17$, 39.5%). Beyond that, 34 participants (79.1%) fulfilled the criteria of a major

depression and 38 participants (88.4%) displayed symptoms of anxiety disorders.

Pre-post Imaginative Stabilization Group Therapy Session Assessment

Table 3 displays the mean scores for the pre- to post comparison in current affective state (SAM) and perceived distress (RHS-15 distress thermometer). Comparing scores of the SAM item “valence” prior to the participants’ first ($M = 4.30$, $SD = 1.26$) and after their last imaginative stabilization group therapy session ($M = 2.88$, $SD = 1.14$), the pre-post difference turned out to be significant ($z = -4.79$, $p < 0.001$, $r = -0.82$). There was no effect on the SAM item “arousal” scores ($z = 0.21$, $p = 0.83$, $r = -0.03$). The third SAM item “dominance” showed a significant difference ($z = -3.89$, $p < 0.001$, $r = -0.59$). Scores of the RHS-15 distress thermometer showed a significant decrease of perceived distress ($z = -3.35$, $p < 0.001$, $r = -0.51$).

Follow-Up Symptom Severity Measure of Mental Distress for Sub-group

Table 2 depicts the mean values for the T1-T2 comparisons of PTSD, depression, and anxiety disorders, as well as calculated changes in symptom severity. The Wilcoxon signed-rank test did not show a statistically significant change in PTSD scores between the first and after the fourth imaginative stabilization group therapy session ($z = -1.93$, $p = 0.06$, $r = -0.47$). The calculated comparison between T1 and T2 depression scores did not reveal a significant difference of depression scores ($z = -1.34$, $p = 0.18$, $r = -0.32$), but showed a significant reduction for anxiety scores ($z = -2.04$, $p < 0.05$, $r = -0.49$).

Follow-Up Interviews

In total, we made three attempts to reach each participant by telephone. $n = 10$ (24%) of the participants did not have a cellphone. We were able to conduct follow-up interviews with 25 (58%) out of 43 participants. Most participants ($n = 23$, 92%) informed us that they had not been able to attend the imaginative stabilization group therapy sessions anymore because of having been transferred to collective or municipal accommodations. $n = 20$ (80%) of the participants reported having continued to practice the imaginative stabilization techniques on their own, $n = 4$ (20%) participants had not practiced at all and $n = 1$ participant did not respond to any of the interview questions. **Table 4** lists the answers of all participants we interviewed. The majority of the participants practiced the mindful breathing exercise (95%). The Body Scan (55%) and the guided imagery techniques (45%) were practiced approximately equally often. Participants preferred practicing the imaginative stabilization techniques either before sleeping (45%) or regardless of the time of day whenever symptoms of distress occurred (30%). Most of the participants chose to do the techniques in their rooms (45%) or outside (10%).

DISCUSSION

In this pilot study, we aimed to examine the effectiveness of imaginative stabilization techniques among refugees sheltered

TABLE 2 | Baseline measurement of all participants and T1-T2 comparison of sub-sample for PTSD, depression, and anxiety disorders.

	All participants ^a		Sub-Sample ^b				<i>z</i>	<i>p</i> ^c	Pearson's <i>r</i>
	<i>M</i>	<i>SD</i>	T1		T2				
			<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
PC-PTSD-5	3.78	1.20	3.65	1.22	3.10	0.97	−1.93	0.06	−0.47
PHQ-2	3.79	1.55	4.06	1.82	3.35	1.54	−1.34	0.20	−0.32
GAD-2	4.28	1.52	4.47	1.59	3.82	1.59	−2.04	<0.05	−0.49

^a*N* = 43; ^b*n* = 17 participants who attended four or more imaginative stabilization group therapy sessions; ^c*p*, exact significance (two-tailed); PC-PTSD-5, Primary Care Posttraumatic Stress Disorder Screen for Diagnostic and Statistical Manual of Mental Disorders 5; PHQ-2, two-item Patient Health Questionnaire; GAD-2, short version of the General Anxiety Disorder-7; T1, rating prior to the first imaginative stabilization group therapy session attendance; T2, rating after the fourth imaginative stabilization group therapy session attendance.

TABLE 3 | Pre-post imaginative stabilization group therapy session assessment of perceived distress and current emotional state.

	Pre		Post		<i>z</i>	<i>p</i> ^a	Pearson's <i>r</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
SAM							
Valence	4.30	1.26	2.88	1.14	−4.79	<0.001	−0.82
Arousal	3.00	1.59	3.02	1.12	−0.21	0.85	−0.03
Dominance	2.12	1.28	3.12	1.12	−3.89	<0.001	−0.59
RHS-15 distress thermometer	6.57	2.80	5.14	2.67	−3.35	<0.001	−0.51

N = 43; ^a*p*, exact significance (two-tailed); SAM, Self-Assessment Manikin; RHS-15, Refugee Mental Health Screener-15; Pre, rating prior to the first imaginative stabilization group therapy session attendance; Post, rating after the participants' last imaginative stabilization group therapy session attendance.

in a reception center using a pre-post design. Regarding primary outcome measures, our results showed that imaginative stabilization techniques were effective in increasing the perception of positive feelings and being in control, as well as reducing distress. The intervention did not affect arousal. In addition, results of secondary outcome measures showed that anxiety symptoms were reduced significantly by the techniques, whereas PTSD symptoms and depression scores remained unchanged. The follow-up interviews indicated that a majority of the participants continued to practice imaginative stabilization techniques even when they were no longer able to attend the imaginative stabilization group therapy sessions anymore. The results demonstrate that group therapy which is focused on practicing imaginative stabilization techniques with refugees sheltered in a reception center is a feasible intervention which can improve the refugees' mental health despite unstable conditions.

Results of the Self-Assessment Manikin scale depicted that participation in the imaginative stabilization group therapy sessions increased positive feelings and the feeling of being in control while not having any impact on the state of arousal. Positive feelings are a source of resilience, facilitating positive reappraisal, broadening cognitive flexibility, and positive responsiveness to stressors, whereas negative feelings narrow an individual's perception and thinking (60, 61). The link between imaginative stabilization techniques and positive feelings is congruent with the aim of imaginative stabilization techniques to increase self-efficacy and to strengthen individual resources. Some studies argue that the improvement of emotional states

may prevent a relapse of PTSD (62). In addition, higher levels of positive emotions are negatively correlated with depressive symptoms (63). The lack of change in depression scores in our study might be ascribed to the low intervention dose.

After having participated in our imaginative stabilization group therapy sessions, we found participants' ego functions to have increased, which was reflected in an improved sense of self-efficacy. Loss of control and overwhelming emotions are common and well documented characteristics of traumatic experience. Furthermore, post-migratory stressors, such as uncertain future perspectives, resident status, and an altered, more negative world view maintain feelings of loss of control. It has been shown that these factors mediate and maintain PTSD and depression in refugees (64). Thus, it is especially noteworthy that the imaginative stabilization techniques could reinstall or at least improve the participants' perceived self-efficacy. It has also been shown that the perception of being in control can serve as a resilience factor in response to traumatic situations (61, 62, 65).

We were able to demonstrate that imaginative stabilization group therapy sessions reduced the refugees' distress level which is in line with findings of Kruse et al. (36). As Laban et al. (60) pointed out, techniques focusing on the connection between body and mind, the awareness of the present moment, and a non-judgmental perception of inner experiences increase participants' ability to cope with stress. Furthermore, self-efficacy is a protective factor because it enables management of stressful situations (61). Also, the psychosocial support the participants received by the therapists may have facilitated dealing with stress and daily hassles. Considering that many studies report

TABLE 4 | Report of the follow-up interviews for all participants who were contacted via phone ($N = 25$) and further details about self-practice among participants practicing the techniques ($n = 20$).

	All participants ^a	
	<i>n</i>	%
Amount of practice		
Several times a day	4	16
Once a day	3	12
Two or three times a week	5	20
Sometimes	8	32
Never	4	16
No information	1	4
	Participants practicing the techniques ^b	
Type of technique ^c		
Breathing	19	95
Body scan	11	55
Guided imagery technique	9	45
Daytime ^c		
Morning	4	20
Afternoon	1	5
Evening	3	15
Night	9	45
If symptoms get worse	6	30
No information	3	15
Location		
Room	9	45
Outside	2	10
No information	9	45

^a $N = 25$; ^b $n = 20$; ^cMultiple answers were possible.

refugees suffering from distress due to post-migratory factors and prolonged insecurity (66), the imaginative stabilization techniques can be an effective approach supporting newly arrived refugees in uncertain conditions by strengthening internal psychological resources.

Due to the high impact of imaginative stabilization techniques on affective state and perceived distress one might speculate that they should have had a similar effect on the PTSD symptom severity as well. However, we were not able to detect significant changes in PTSD symptomatology. Through imaginative stabilization techniques, participants learn how to self soothe, be aware of themselves in the present moment and how to deal with overwhelming emotions. As regular practice increases the beneficial impact of these techniques, our findings of persisting trauma symptoms may be explained through the dose of our intervention which was dependent on external circumstances in this study. Therefore, it is not surprising that current arousal levels assessed in the study did not differ significantly after the fourth imaginative stabilization group therapy session. In addition, the period of time until refugees are granted asylum is a phase of de-stabilization and re-traumatization because of the prolonged condition of insecurity, sense of powerlessness and preoccupation with past

traumatic events, i.e., in the personal interviews which are part of the asylum procedure (67). Studies examining the effect of post-migratory distress factors on refugees' mental health conditions have previously outlined the importance of refugee support offers in the early stages of their asylum procedure (67). It is also important to note that the refugees who participated in our study had only recently arrived in Germany and were still waiting for an answer concerning their request for asylum. Hereby, efforts toward the reduction of traumatic symptoms may be understood as decreasing their chance of being granted asylum in Germany (36, 68, 69).

With regard to depression, imaginative stabilization techniques did not have a significant effect. These techniques have been developed specifically for the treatment of PTSD. However, some studies have shown that imaginative stabilization techniques may also have effects on depression in the context of psychodynamic imaginative trauma therapy (35). As traumatic stress can lead to symptoms of depression, it is not surprising that psychodynamic imaginative trauma therapy may also reduce the levels of depression (6). One could argue that the imaginative stabilization techniques help individuals to reduce depressive symptoms by encouraging them and increasing their self-efficacy. Nevertheless, negative self-perception due to loss of status and social networks, negative thoughts about life due to separation from family, loss or death of relatives and friends, as well as an uncertain future may provoke or aggravate depression (17, 67, 70, 71). Furthermore, current research emphasizes that traumatic loss and grief are core elements for the development of comorbid depression in traumatized refugees (72, 73).

Practicing imaginative stabilization techniques led to a significant reduction of anxiety symptoms. Our results suggest that increased self-efficacy and activation of resources may in turn decrease anxiety symptoms, even though PTSD symptoms and arousal remain unchanged. Further studies indicate that interventions which focus on mindfulness decrease anxiety symptoms by bringing the participants' awareness to the current moment and connecting to the here and now (62).

In the follow-up interviews we learnt that the imaginative stabilization techniques were well received by the participants. Most of them continued practicing the techniques when they were not able to participate in the imaginative stabilization group therapy sessions anymore. It is interesting to note that the majority of participants either used the techniques as a routine in their daily lives or as an intervention to control certain symptoms. The fact that the participants' preferences for specific techniques differed in this sample reflects the diversity of the refugee population. To cater for this diverse group of traumatized human beings, individuals should be encouraged to practice the technique(s) perceived as most helpful by them.

Limitations

This study has several limitations. First, using a longitudinal approach with a small sample size means that results cannot be generalized without further research. Working with refugees in reception centers poses ethical barriers as well as difficulties related to the fact that most refugees are redistributed to other accommodation after a short period of time and without

forewarning. Therefore, we planned our project as a pilot study to create a basis for further research in which the effectiveness of our intervention can be assessed using a randomized, controlled trial. All participants referred to the imaginative stabilization group therapy sessions participated in the study and most of them (92%) stopped attending the group sessions because they were transferred to another accommodation. The low intervention dose due to redistribution could account for the non-significant changes in PTSD and depression. It has been shown that psychological stability needs time to develop [74]. Hence participating four times in the imaginative stabilization group sessions may not be enough to evoke statistically relevant changes in symptoms. Further, culture, religion, and ethnic background might have had an influence on the results. The heterogeneity of our sample makes it difficult to make generalized assumptions concerning these factors and would need further research with a bigger sample size. Nevertheless, this longitudinal pre-post study represents an indispensable prerequisite for subsequent controlled trials.

The second limitation is that the symptom changes described in this study may also have been caused by unspecific treatment factors or a spontaneous stabilization. Both the group setting with its constant structure and the fact that the therapists remained the same throughout the study may have provided feelings of safety and support (68). The presence of other group members may either have been an inhibiting or a stabilizing factor. The study did not address factors that occurred between the imaginative stabilization group therapy sessions as well as the participants' possible improvement due to the accompanying psychopharmacological treatment. Most of the participants took mirtazapine or amitriptyline, the main aim being to improve sleep regulation.

Third, the study consisted only of male participants and the imaginative stabilization group therapy sessions were held in English. Neither the participants nor the therapists spoke English as their first language. This means that our results might not be generalizable to other groups of refugees and in addition the results might be limited due to linguistic difficulties on both sides.

Last, the results gained through the questionnaires may have been biased by social desirability, errors of central tendency, or

by the participants having a different perception of emotions or bodily symptoms.

Conclusion

This study has highlighted the application of imaginative stabilization techniques as a promising approach to treat traumatized refugees sheltered in reception centers. The imaginative stabilization techniques proved to be a feasible and effective strategy for emotional stabilization, i.e., strengthening individual resources, empowering the self, and reducing symptoms associated with distress and anxiety disorders. The results of this pilot study support the use of imaginative stabilization techniques by participants from different cultures or ethnical backgrounds, an aspect which could be investigated in more detail in future research projects. In light of the methodological limitations described above, this study should be followed up by a randomized, controlled study to confirm our results. Furthermore, it would be beneficial if imaginative stabilization techniques in other languages were included.

AUTHOR CONTRIBUTIONS

CZ, CK, and CN conceived the study. CZ, CK, IT, DK, FJ, SZ, SH, WH, and CN participated in the design of the study. CZ, CK, and IT carried out the study. CN supervised the project. CZ and CN carried out the quantitative and qualitative analysis and finally drafted the manuscript. All authors read and approved the final manuscript.

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User-Centered App Adaptation of a Low-Intensity E-Mental Health Intervention for Syrian Refugees

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Introduction: The aim of this study is to describe the initial stages of the iterative and user-centered mobile mental health adaptation process of Step-by-Step (SbS), a modularized and originally web-based e-mental health intervention developed by the World Health Organization (WHO). Given the great need for improving the responsiveness and accessibility of health systems in host countries, the EU-funded STRENGTHS consortium studies the adaptation, implementation and scaling-up of SbS for Syrian refugees in Germany, Sweden and Egypt. Using early prototyping, usability testing and identification of barriers to implementation, the study demonstrates a user-centered process of contextual adaptation to the needs and expectations of Syrian refugees.

Materials and Methods: $N = 128$ adult Syrian refugees residing in Germany, Sweden and Egypt took part in qualitative assessments. Access, usage, and potential barriers regarding information and communication technologies (ICTs) were assessed in free list interviews. Interactive prototypes of the app were presented in key informant interviews and evaluated on usability, user experience and dissemination strategies. Focus groups were conducted to verify the results. The interview protocols were analyzed using inductive and deductive thematic analysis.

Results: The use of digital technologies was found to be widespread among Syrian refugees. Technical literacy and problems with accessing the internet were common barriers. The majority of the respondents reacted positively to the presented app prototypes, stressing the potential health impact of the intervention ($n = 28$; 78%), its flexibility and customizability ($n = 19$; 53%) as well as the easy learnability of the app ($n = 12$; 33%). Aesthetic components ($n = 12$; 33%) and the overall length and pace of the intervention sessions ($n = 9$; 25%) were criticized in regard to their negative impact on user motivation. Acceptability, credibility, and technical requirements were identified as main barriers to implementation.

Discussion: The study provided valuable guidance for adapting the app version of SbS and for mobile mental health adaptation in general. The findings underline the value of contextual adaptation with a focus on usability, user experience, and context specific dissemination strategies. Related factors such as access, acceptability and adherence have major implications for scaling-up digital interventions.

Keywords: e-mental health, mobile mental health, refugees, Syrian, global mental health, user centered design, psychosocial support

INTRODUCTION

Seven years after the start of the armed conflict in Syria, Syrians are still the largest refugee population worldwide. With more than six million internally displaced in Syria and more than 5 million who have fled Syria, the humanitarian impact of the war is profound and far-reaching at the individual as well as at the global level (1). As a consequence of the ongoing crisis, Syrian refugees are confronted with numerous sources of psychological distress caused by loss, grief and trauma as well as by post-migration stressors such as perceived discrimination, concerns about the safety of family members in Syria or the host country and social as well as economic strain (2, 3). The risk of adverse mental health consequences in refugee populations affected by severe distress is well documented (2, 4, 5). Post-migration factors are increasingly being recognized as crucial in determining the actual long-term risk of developing psychological symptoms in refugees (3, 6, 7). This includes limited access to local health systems, which is often more difficult for refugees due to a variety of barriers at the individual level (e.g., mental health literacy or fear of stigmatization) (8) and the structural level (e.g., a lack of trained staff, the language barrier or legal restrictions) (9, 10). Low use of mental health care services is a major reason for the chronic nature of PTSD and other mental health issues in refugees (11, 12). Improving the responsiveness and accessibility of local mental health systems through the identification, implementation and scaling-up of contextually appropriate preventive measures as well as low-threshold interventions for refugees therefore is a major challenge in the public health field (2, 9).

The STRENGTHS Project

The EU Horizon2020 STRENGTHS (Syrian REfuGees MeNTal HealTH Care Systems) program is a joint effort by academic and research institutions from Europe, international organizations and humanitarian organizations to improve the responsiveness of mental health systems for Syrian refugees in Europe and key countries in the Middle East and Northern Africa (13). STRENGTHS builds upon the growing evidence-base for task-shifting, trans-diagnostic treatment approaches and culturally adapted interventions for common mental disorders in populations affected by adversity. One part of STRENGTHS is to investigate the potential of an e-mental health intervention (Step-by-Step) as a strategy for increasing access to treatment in two high-income European countries (Germany and Sweden) as well as one lower-middle-income country in Northern Africa (Egypt).

This paper describes the adaptation of Step-by-Step for Syrian refugees.

E-Mental Health for Refugees

E-mental health is defined as “the use of information and communication technology (ICT)—in particular the many technologies related to the internet—when these technologies are used to support and improve mental health conditions and mental health care, including care for people with substance use and comorbid disorders.” (p. 1) (14). Depending on delivery method or problem being addressed, e-mental health interventions may be as effective as respective face-to-face versions (15), while reducing the impact of common internal barriers and external barriers to accessing care (16, 17). With the global spread of smartphones and the corresponding replacement of computers as the main access point to internet-based services, e-mental health tools are increasingly being developed for mobile computing and communication technologies which has led to the diversion of mobile health (mHealth) and mobile mental health as sub forms of e-mental health (18). The evidence-base for mobile mental health apps is still very limited which is mainly due to a lack of randomized-controlled trials (RCTs) (19, 20), but findings for acceptability of such approaches are strong. Smartphones are of immense importance for current refugees (21) and there are promising initial findings on the acceptability of mHealth for those affected by war and disaster (22).

Syrian refugees in particular are being described as “the most tech-savvy population of migrants in history” (p. 22) (23). Consequently, the potential of making basic mental health information and skills available at a large scale through smartphones requires further exploration. However, studies on the use of information and communications technologies (ICTs) shed light on a number of barriers that need to be taken into account when developing mobile solutions for Syrian refugees. Among these are the limited access to smartphones in parts of the population (e.g., elderly people or women) (24), technical limitations (e.g., limited or unstable access to mobile internet), financial limitations (e.g., the cost of smartphones and SIM cards) but also important literacy limitations (including technology literacy). All of these aspects shape the ways refugees use their smartphones, which is why it is recommended to exercise caution in assuming that Syrians have the same needs and concerns in regard to apps that would apply for Western populations (23, 25). Consequently, the development of app-based interventions requires a contextually sensitive approach.

Contextual Adaptation

Cultural adaptation (26) has been recognized as a factor that potentially increases the effectiveness of behavioral health interventions (27, 28). Recent guidelines on the implementation of culturally sensitive interventions for refugees describe cultural adaptation in terms of a broad approach to contextual adaptation, taking into account not only “culture,” but also broader access- and acceptability-related factors such as structural barriers that hinder intervention adherence (29). Consequently, contextual adaptation does not only apply to the content of an intervention (e.g., language and key topics), but also to the needs and expectations of potential users in regard to the digital medium itself, through which the intervention is offered. These needs and expectations are, in turn, shaped not only by the refugees (e.g., demographics, flight experiences) themselves, but also by their surroundings or context (e.g., living situation, host community attitudes toward refugees, levels of support provided by the host community). In the case of mobile health interventions, a key concept in this context is usability (30). Usability dimensions can have a significant effect on the acceptance and adoption of e-mental health programs (31) and are therefore highly relevant for mobile mental health programs that often suffer from low user engagement (i.e., how actively people are using the program) and low user retention rates (i.e., the percentage of users remaining after a given period of time) (32–34). Self-guided digital interventions in particular heavily rely on user engagement as they cannot build compliance and adherence on the basis of a client-practitioner relationship. High dropout rates and irregular patterns of use endanger the statistical power and the validity of the results in e-mental health trials as well as the final utility of the intervention at population level post testing in RCTs. Currently, only a few examples of systematic usability testing as an approach to optimizing the design, user engagement and relevance of mobile mental health programs exist (35–37). Following recommendations by the WHO mHealth Technical Evidence and Review Group (38), STRENGTHS aims to add to this body of research by documenting iterative user engagement at the formative research phase of the project.

The Integrate, Design, Assess, and Share (IDEAS) framework by Mummah et al. (39) is currently the most comprehensive set of published guidelines for an iterative eHealth (including e-mental health) development and evaluation process, emphasizing the importance of evidence based implementation strategies, elements of design thinking, user-centered design and early prototyping. The framework encourages user-centered solutions that are based on an assessment of the actual needs and living conditions of the target population and is therefore well-suited for the contextual adaptation of behavioral interventions for refugee populations. The IDEAS framework suggests 10 phases of intervention development: (1) empathize with target users, (2) specify target behavior, (3) ground in behavioral theory, (4) ideate creative implementation strategies, (5) prototype potential products, (6) gather user feedback, (7) build a minimum viable product (MVP, i.e., the first fully-functioning version of the program that includes all core features), (8) pilot test, (9) evaluate efficacy, and (10) share widely. The phases of the IDEAS framework are intended to be recurring and interwoven. Phase (1) in particular, represents user engagement at all stages of the

development process. Within STRENGTHS, the phases (2) and (3) are covered by working with the existing e-mental health intervention concept “Step-by-Step” (SbS) as a basis for further mobile mental health adaptation.

Step-by-Step

Step-by-Step (SbS) is an e-mental health intervention developed by the WHO for depression. SbS was originally conceptualized as an online self-help version of WHO's evidence-based Problem Management Plus (PM+) program (40–42). The intervention is part of a group of WHO evidence based psychological interventions that all share task-shifting and a strong focus on potential scalability as basic principles in reducing psychological distress and improving functioning in communities affected by adversity. The process of developing SbS and its content are described in more detail in a paper by Carswell et al. (43). In order to provide high adaptability, SbS consists of three core components: the content, the guidance model (e.g., from a human helper) and the delivery system (e.g., web or app). Each of these components can be adjusted, extended, and combined to create versions of SbS with a strong focus on acceptability, usability and feasibility to respond to diverse implementation contexts. SbS is modularized and rooted in evidence-based cognitive behavioral therapy (CBT) techniques such as behavioral activation, psychoeducation, stress management, increasing social support and relapse prevention. The SbS content comprises of sessions that tell a story through illustrated educative narratives and interactive exercises presented by a fictional main character and a fictional health professional (43). At the guidance level, SbS is a self-help intervention that can be offered with weekly minimal guidance in the form of contact with a trained and supervised non-specialist (called an “e-helper”), or with contact-on-demand or no guidance. At the delivery system level, SbS is suitable for a wide range of mediums to increase access to diverse user groups (e.g., illiterate users, or users without access to the internet), including websites, apps, audio, video or books (43).

The first version of SbS was developed, culturally adapted and piloted for use by Syrian, Lebanese and Palestinian populations in Lebanon (44). It addresses depression, is web-based, presents content in the form of Levantine Arabic texts (i.e., a broad Arabic dialect spoken by Syrians, Lebanese and Palestinians) with illustrations and provides minimal guidance through weekly e-helper contact. This paper builds on the earlier work of WHO and focuses on the phases (4–6) of the IDEAS framework. It reports on the early formative stages that were conducted to create and user-test initial prototypes of a second version of SbS that is optimized for self-guided use on smartphones and for a contact-on-demand guidance model through messaging (i.e., to provide assistance with questions on the program as well as technical support).

MATERIALS AND METHODS

Data Collection

The data for this study was collected as part of the Rapid Qualitative Assessment (RQA) phase of the STRENGTHS project under the lead of the International Federation of Red Cross and

Red Crescent Societies (IFRC) Reference Centre for Psychosocial Support based at Danish Red Cross. The aim of the RQA was to gain quick input from the target population using pragmatic data collection methods. Across all eight sites of the project, a shared adaptation protocol was developed on the basis of established methodologies developed by the WHO (45) and the Applied Mental Health Research (AMHR) Group at Johns Hopkins University (46). Based on module one of the AMHR Development, Implementation, Monitoring, and Evaluation (DIME) manual, three phases of qualitative research were conducted with adult Syrian refugees (18+ years) living in Germany, Sweden and Egypt. The three phases utilized different data collection methods: free list interviews in phase one, key informant interviews in phase two, and focus group discussions in phase three. Throughout all phases, data were collected by Arabic native speakers who received separate training sessions for the respective assessment method prior to each phase of data collection. The interviewer teams in Germany and Sweden were composed of Syrians while the team in Egypt consisted of Egyptians. In an iterative process of early prototype development, the user input collected in each phase was integrated into an initial prototype (presented in phase two) and a slightly updated version of the app prototype (presented in phase three).

Over all three phases and countries, a total of $N = 128$ adult Syrian refugees participated. To address privacy concerns, no audio recordings were used, neither in interviews nor focus groups. Instead, interviewers were trained to work in pairs, one asking the questions and the other creating a written record. After each interview, the two interviewers discussed and—where necessary—added to the protocol. This pragmatic approach was chosen in accordance with the DIME methodology in order to reduce response bias, time investment for transcription and the risk of violating confidentiality, as well as to enhance interviewer fidelity to the interviewing methods (46). Participants were remunerated financially for their time.

Phase 1: Free List Interviewing

The first assessment phase focused on the use of ICTs and potential problems associated with this among Syrian refugees residing in Egypt, Germany and Sweden. At this stage, free list interviews were conducted. This method uses standardized questions in a highly structured interview format that generates answers in the form of a list (46). The aim of free list interviews is to gain a quick overview of a relevant topic.

Participants

In each country, free list interviewees were recruited through Maximum Variation Sampling (MVS). MVS is a form of purposive sampling that aims at achieving a heterogeneous sample on a pre-selected number of key characteristics of the population. The free list interviews were conducted between July and August 2017. Recruitment in each country was facilitated through a combination of advertising and directly approaching Syrians within communities and NGO networks, as well as through snowballing. In order to include different perspectives on ICTs among Syrian refugees, we used MVS in order to approximate equal quotas with regard to gender, age, and

level of education. Apart from being 18 years or older and the MVS criteria, there were no other inclusion or exclusion criteria. In particular, there was no screening for symptoms of psychological distress. While there is no gold-standard for sample sizes in qualitative research, $n = 20$ interviews per country were considered as sufficient to gain a solid overview of the most important themes (47). The mean age of participants was 33.0 years ($SD = 11.0$). On average, they lived in their respective host countries for 3.1 years ($SD = 1.8$). 46.7% had a university level education background, 51.7% had a secondary school background and 1.7% had a primary school background.

Topics

Interviewers were instructed not to lead interviewees during the free list interview phase. To elicit more generic statements and to further protect the interviewees' privacy, all questions were asked in regard to the community (i.e., Syrian refugees residing in the respective country) and not in regard to the individual being interviewed. Participants were therefore encouraged by interviewers to think of responses that describe what is typical for the group of Syrian refugees as a whole. Among others, the following questions were asked (further questions focused on common problems and functioning that are not subject of this paper):

1. What digital technologies do Syrian refugees frequently use?
2. What problems or difficulties can occur when Syrian men/women use digital technologies like smartphones, computers, apps or the internet?
3. What could be done to overcome these problems or difficulties?

For each point mentioned, participants were asked to provide a short description. Participants were also asked to recommend key persons in their communities that could be approached as key informants for phase 2 of the study.

Phase 2: Key Informant Interviewing

The IDEAS framework recommends conducting early usability testing, where participants are observed while using the system and asked to “think aloud.” With this method, relevant (implicit and explicit) information on users' interest is gained, and specific aspects in the system that potentially foster or hinder its use are easily identified. In addition, early usability testing based on prototypes may provide new perspectives on the app that can lead to improvement or solutions not yet considered. Using the online prototyping software InVision by InVisionApp Inc. (2017), an interactive prototype of smartphone adapted SbS was created and presented to key informants recruited within Syrian refugee communities in each country. The prototype included the onboarding and introduction session of SbS in which users receive information on the intervention, answer screening questionnaires and create an account. As part of the introduction, users were also introduced to a slow-breathing exercise for relaxation. The prototype further included session 1 of SbS that focusses on behavioral activation through psychoeducation and introduces the planning of enjoyable activities (43, 44). For the interview, mobile devices were

handed to participants and they were asked to interact with the SbS app prototype specifically developed for this purpose. **Figure 1** presents a selection of key screens included in this prototype.

Participants

Twelve key informants were interviewed per country, resulting in a total of $N = 36$. At this stage, potential interviewees were selected based on their role as a key person within the community and their knowledge about the problems that Syrian refugees commonly face in the host countries. These participants were identified based on previous participant's recommendations and through local organizations. The key informant interviews were conducted between September and October 2017. In this phase, no attempt was made to get a variety in respondents in terms of age or education level. However, an equal number of men and women were included. The mean age of the key informants was 33.8 years ($SD = 10.9$). On average, they lived in their respective host countries for 3.5 years ($SD = 1.3$). 83.3% had a university level education background while the rest of the sample had a secondary school background.

Topics

Interviews with key informants while they were using the prototype app focused on their initial impressions and feedback. Respondents were first presented with a one-page information sheet providing general information about the SbS program. Afterwards, the interactive app prototype was presented and participants had the opportunity to test it.

While going through the information sheet and the app, participants were invited to freely express their thoughts, comments and feedback on what they saw, thought or experienced. These were written down by the interviewers. Subsequently, key informants were asked the following standardized questions regarding the intervention prototype:

1. Do you think that this app can be helpful for Syrian refugees here in [country] who experience sadness or distress?
2. What do you think is good about the app?
3. What do you think is not so good or bad about the app?
4. What could be done to improve the app?

In addition, interviewees were asked about potential barriers and facilitators for the use of the app:

5. What do you think might stop or prevent Syrian refugees here in [country] from using the app?
6. What do you think could be done to motivate Syrian refugees here in [country] to use the app?

Phase 3: Focus Group Discussions

Following the key informant interviews, the initial prototype was revised and a slightly adjusted second version (see **Figure 1**) was presented to participants in two focus groups per country, one with male and one with female participants, respectively. Focus groups were conducted with the following aims: (1) triangulation (i.e., using a different assessment method to verify previous findings) and (2) gathering feedback on changes that were made to the first prototype.

Participants

At this stage, the phase two recruitment procedures were repeated. A total of $N = 32$ persons participated in Germany (male: $n = 5$, female: $n = 6$), Sweden (male: $n = 5$, female: $n = 4$), and Egypt (male: $n = 6$, female: $n = 6$). The focus groups were conducted between October and December 2017. Apart from gender, no demographic characteristics were assessed for focus group participants.

Topics

Participants received the same information sheet that was used in phase two and had time to go through the prototype on a smartphone. After that, the group discussed the same questions that were asked in the key informant interviews while the interviewers created a written record. In order to gain feedback on the planned contact-on-demand feature, focus group participants received a description of the feature stating that users of the app can contact trained e-helpers (i.e., university graduates with a background in psychology) to ask questions regarding: (a) The SbS program, (b) issues around motivation and (c) technical issues. It was further stated that messages can be sent through a messaging system in the app and that e-helpers will reply within 48 h. Based on this information and a section in the interactive prototype demonstrating the feature, participants were then asked to give their feedback on the concept and to discuss whether e-helpers should have access to user input (i.e., texts, picture or audio input as part of the interactive exercises).

Data Analysis

Prior to data analysis, all interview transcripts were translated into English. Data was coded using the NVivo version 11 qualitative data analysis software by QSR International Pty Ltd. (2017). The data was analyzed by two independent researchers. One worked with the Arabic original transcripts (second author) and one with the translated transcripts (first author). Ambiguities and deviating results of the qualitative data analysis were discussed and resolved in consultation between both data analysts.

Free List Interview Data

All participant responses to the respective free list interview questions were listed and coded without a pre-existing coding framework. Multiple responses that reported the same information were grouped and the number of participants mentioning that aspect was noted. Responses that were different in wording but similar in meaning were combined and a shared wording was found. Through this inductive approach, a common coding framework for the free list interviews in all three countries was developed. This resulted in a list of responses for each free list question and quantitative data on the total number of interviewees reporting each entry (see **Table 2**). The relative frequency of the responses can be interpreted as an indicator of the importance of the item (46).

Key Informant Interview Data

The key informant interview protocols were analyzed using a combination of inductive and deductive thematic analysis



FIGURE 1 | Selected prototype screens (text on screen 3 and illustrations depicting Step-by-Step characters and icons are adapted and reproduced with permission from WHO).

(48). A pre-existing theoretical framework for usability testing, the Health IT Usability Evaluation Model (Health-ITUEM), was chosen as the basis for the coding frame used in the

deductive analysis (49). The Health-ITUEM is a comprehensive usability evaluation model on the basis of ISO 9241-11 (30) and the Technology Acceptance Model (TAM) by Davis (50).

The original set of usability dimensions was further adapted by Househ et al. (51) with the major addition of subjective health impact as a usability dimension. In accordance with recent publications on the factor structure of questionnaire items based on the Health-ITUEM, the dimensions were categorized and assigned to the following higher order themes: Impact, perceived usefulness, perceived ease of use and user control (52). As suggested by Brown et al. (49), each usability dimension was broken down into positive (+) and negative codes (-). No neutral codes were used (51), instead, a new code for suggestions (s) was included as interviewees were asked for ways of improving the prototype. **Table 1** provides an overview of the usability dimensions used for deductive data analysis in this study. In order to further explore the data, responses that were not covered by the Health-ITUEM were coded and checked for themes in an inductive manner. Using the same approach as described above for the free list interviews, the responses that participants gave in regard to potential barriers and facilitators to using the app were analyzed, aggregated and listed (see **Table 5**).

Focus Group Data

Focus group data was analyzed at the group and not at the individual level. Themes that were mentioned or discussed within a group were coded according to the complete coding scheme that was created in the process of analysing the key informant data—including themes that were found in the inductive analysis. The results are reported separately to complement or contrast the key informant interview findings.

RESULTS OF FREE LIST INTERVIEWS, KEY INFORMANT INTERVIEWS AND FOCUS GROUPS

Information and Communication Technologies (ICTs)

The use of digital technologies was found to be widespread among Syrian refugees in Germany, Sweden and Egypt. **Table 2** gives an overview of the responses that free list interviewees gave when asked about popular ICTs, common problems that occur when Syrian refugees use ICTs and suggested means of improving the use of ICTs. All of the main themes displayed in **Table 2** were identified after analyzing a maximum of 11 out of the 20 interviews per country.

Use of ICTs

Social media and digital communication technologies were mentioned most frequently in all three countries. Facebook was found to be the most widespread communication platform and was also often mentioned as a primary source of news and information. Smartphones were described as the main access technology to all kinds of information, communication and entertainment services on the internet. While smartphones were described as universal devices, laptops were rarely mentioned and described as devices that were mainly used for education purposes but also as too expensive for most Syrians. Only in Sweden, Syrian refugees also reported using apps for activities that would otherwise require visits to administrative government

offices or banks. These apps are used, e.g., in order to manage the job search with the employment office or to exchange information with the social security office. In addition, it was mentioned that financial transactions are often done via banking apps by Syrians in Sweden.

Problems With ICTs

In all three countries, respondents mentioned low technical literacy as well as limited language skills as hindering factors to using ICTs. In Germany, the most common problem reported was that many highly relevant webpages (e.g., government webpages) were only available in German or English. Technical literacy was the most common problem mentioned in Sweden. Respondents described the requirements as high and the potential consequences of mistakes as serious, as it was required to be able to use digital identification, app-based banking and to interact with a technically advanced administration. The interviewees stated that mistakes could cause losing claims on jobs or living space as well as unwanted outcomes due to wrong privacy settings on social media accounts. The responses from Egypt were more related to financial issues. The most reported problem was the high cost of smartphones and mobile data packages that were described as not sufficient for standard usage. This problem was further exacerbated by Syrians reportedly not being allowed to apply for access to landlines at rented homes in Egypt.

Means to Improve ICT Use

Asked about potential solutions for problems with ICTs, participants in all three countries suggested measures to improve technical literacy (e.g., training courses or multimedia tutorials). In Sweden it was added that these courses should specifically focus on government services. The interviewees also suggested to supply Arabic language support for all important services and to make sure that privacy settings in digital services were clearer and well understood. In Egypt, it was suggested to make access to the internet easier and to reduce the costs of mobile data packages.

Usability Dimensions

A number of usability themes in accordance with the Health-ITUEM were identified. **Table 3** summarizes the data. Percentages in the text below are provided to illustrate usability sub-themes that at least two independent respondents or focus groups commented on. 27 out of the 36 key informant interviews provided 90.5% of the codes that were used in the final coding scheme.

Health Impact

The majority of participants in key informant interviews (KI, $N = 36$) and focus groups (FG, $N = 6$) commented positively on the expected mental health impact of the SbS app when offered to Syrian refugees suffering from psychological distress. The respondents either generally considered the app to be useful (KI: $n = 19$; 53%; FG: $n = 6$; 100%) or further specified that it may be useful when dealing with stressors such as war memories or integration problems (KI: $n = 10$; 28%, FG: $n = 2$; 33%). Furthermore, respondents indicated that the app may

TABLE 1 | Definitions of the Health-ITUEM usability dimensions used for deductive data analysis (adapted based on (49, 51), and (52)).

Usability dimensions	Definitions	Examples (coding)
IMPACT		
Health impact	Expected impacts of the Step-by-Step app on the mental health of Syrian refugees.	G: "It will indeed help people, especially those with mental problems because those people are really looking for help." (+)
Information needs	The extent to which information content meets user's needs.	S: "Sometimes you don't know what is going on with you, but with such an app you can get an idea." (+) S: "There are a lot of repeated information and ideas." (-)
Other outcomes	Other system-specific outcomes representing higher levels of expectations.	S: "If I really need something like this I could browse the internet to find out the solution to my problem or I could visit a psychologist." (-)
PERCEIVED USEFULNESS		
Performance speed	Temporal efficiency when completing tasks within the app (e.g., learning from a narrative or practicing a technique).	S: "It should be short, clear, concentrated and up-to-date and shouldn't need a long time to use or it will be boring." (s)
Flexibility and customizability	Providing alternative ways for accomplishing tasks, which allows different users to operate the system as preferred.	G: "I can use it at home anytime I want." (+) E: "The availability of audio for those who cannot read." (+)
PERCEIVED EASE OF USE		
Learnability	First-time users are easily able to understand and operate the Step-by-Step app.	S: "It is easy to use, simple language and the vocabularies are not difficult everyone can understand them."
Competency	Users express confidence in their ability to use the Step-by-Step app.	(This theme did not occur in the data.)
Memorability	Users can remember easily how to perform tasks through the Step-by-Step app after not using it for a while.	(This theme did not occur in the data.)
USER CONTROL		
Error prevention	The Step-by-Step app offers error management, such as error messages as feedback, error correction through undo function, or error prevention, such as instructions or reminders, to assist users performing tasks.	(This theme did not occur in the data.)

Responses were coded as either positive (+), negative (-) or suggestion (s), E, comment from Egypt; G, comment from Germany; S, comment from Sweden.

improve access to psychological help for Syrians (KI: $n = 9$; 25%, FG: $n = 2$; 33%) and that it may help with feelings of loneliness, isolation, anxiety and depression as well as trauma-associated symptoms (KI: $n = 6$; 17%, FG: $n = 3$; 50%). The following key informant comment from Egypt illustrates the great need for easily accessible means to address psychological problems:

"Syrians are in a big need of such an app, especially those who are newly coming to Egypt because they are totally in shock of the Egyptian community. Men and youth also need this app, they suffer from many psychological problems and they do not have a lot of time because of their work."

While the majority of the participants commented positively on the app's potential mental health impact, some participants in the key informant interviews expressed skepticism, stating that the app will not very likely help those who suffer from severe problems or have experienced potentially traumatic events (KI: $n = 5$; 14%). Very rarely, users commented that using the app may result in negative consequences such as feeling more isolated or depressed (KI: $n = 1$; 3%, FG: $n = 1$; 17%). Respondents provided various suggestions on how to improve the health impact of the app. One common suggestion was to provide

contact with a real person, e.g., via chat or phone (KI: $n = 7$; 19%, FG: $n = 2$; 33%).

Information Needs

A number of comments in the key informant interviews referred to whether the information provided within the app prototype met the participants' information needs. Positive comments described the content and sequence of the sessions to be useful and relevant (KI: $n = 5$; 14%, FG: $n = 3$; 50%), while negative comments mainly focused on the content being too repetitive (KI: $n = 7$; 19%). Some participants made suggestions, e.g., to include links to external sources of information and support such as websites (KI: $n = 4$; 11%) and to provide additional information regarding local health systems (KI: $n = 2$; 6%).

Other Outcomes

Following the Health-ITUEM definition (49), the "other outcomes" category was coded whenever participants made references to non-phone app technology (i.e., books), non-mobile resources (i.e., therapists, parents, teachers, siblings), and other health related entities not directly related to the usability of mHealth. This was most often the case when participants expressed that the app cannot replace a psychologist or psychiatrist (KI: $n = 6$; 17%) or speaking to a real person

TABLE 2 | Results on the use of Information and Communication Technologies (ICTs) found in free list interviews in Germany, Sweden and Egypt (each $N = 20$).

		Number (n) and percentage of coding references per country					
		Germany		Sweden		Egypt	
FREQUENTLY USED ICTs							
Devices							
1	Smartphones	14	(70%)	10	(50%)	9	(45%)
2	Laptops	6	(30%)	1	(5%)	2	(10%)
Software							
1	WhatsApp	6	(30%)	13	(65%)	20	(100%)
2	Facebook	14	(70%)	19	(95%)	16	(80%)
3	Viber	–	–	8	(40%)	14	(70%)
4	IMO messenger	–	–	2	(10%)	12	(60%)
5	YouTube	7	(35%)	1	(5%)	8	(40%)
6	Banking apps	–	–	6	(35%)	–	–
7	Official government service apps	–	–	9	(45%)	–	–
FREQUENT PROBLEMS WITH ICTs							
1	High costs of mobile internet	–	–	1	(5%)	14	(70%)
2	No access to landlines	–	–	–	–	10	(50%)
3	Low technical literacy	5	(25%)	10	(50%)	8	(40%)
4	Bad mobile internet access/coverage	7	(35%)	–	–	6	(30%)
5	High costs of smartphones	–	–	–	–	5	(25%)
6	Language barrier	8	(40%)	7	(35%)	5	(25%)
MEANS TO IMPROVE THE USE OF ICTs							
1	Increasing the technical literacy	6	(30%)	7	(35%)	9	(45%)
2	Providing easier internet access	4	(20%)	1	(5%)	8	(40%)
3	Reducing the costs of mobile internet	–	–	1	(5%)	5	(25%)
4	Providing versions in Arabic	7	(35%)	3	(15%)	2	(10%)

Participants were asked to respond for the Syrian community as a whole and not on the basis of individual preferences or problems.

in general (FG: $n = 1$; 17%). Consequently, some participants suggested implementing a referral system to ensure that severe cases see a therapist (KI: $n = 5$; 14%, FG: $n = 2$; 33%).

Performance Speed

This usability dimension is given if users are able to use the system efficiently and get to the features or information they want in a subjectively appropriate amount of time. Here, several participants commented on the general time requirement of going through a narrative session of the intervention. The main points of criticism were the length of the sessions due to the long text passages (KI: $n = 6$; 17%) and the resulting need to go through a large number of screens (KI: $n = 2$; 6%). Respondents suggested to reduce the overall amount of text (KI: $n = 3$; 8%), to provide an interface for quicker navigation through content screens (KI: $n = 3$; 8%) and to provide shorter sessions at a higher frequency (KI: $n = 2$; 6%). One interviewee from Germany said:

“The program must be faster. I mean there should be more sessions every week, for example, a session every 3 days.”

Based on this suggestion, the length and frequency of the prototype's sessions were slightly adjusted, resulting in shorter but more frequent sessions in the focus group prototype. This was commented on positively in $n = 2$ of the focus groups (33%),

but participants in the majority of focus groups (FG: $n = 4$; 67%) still perceived some parts to be overly lengthy, especially the introduction section of the app, and suggested further text shortening (FG: $n = 3$; 50%).

Flexibility and Customizability

Many participants regarded this usability dimension as a strength of the presented app prototype. Participants often commented positively on the option to play text as audio (KI: $n = 8$; 22%, FG: $n = 2$; 33%), the possibility of using the app regardless of time and location (KI: $n = 6$; 17%) and the possibility of recording audio as an alternative method to (written) text input (KI: $n = 5$; 14%, FG: $n = 2$; 33%). Other perceived strengths were the planned offline capability of the app (KI: $n = 5$; 14%) and the choice of narrators with different clothing styles (KI: $n = 2$; 6%, FG: $n = 2$; 33%). A key informant from Sweden stated:

“The pictures are very useful and the idea of having many options and a girl with hijab and the other without is very nice.”

Negative feedback in regard to the prototype's flexibility and customizability were rare and included the strictly linear nature of the sessions (KI: $n = 2$; 6%, FG: $n = 1$; 17%). The font size was commented to be too small especially for older users and not adjustable (KI: $n = 2$;

TABLE 3 | Overview of feedback on the app prototype gathered through key informant interviews ($N = 36$) and focus groups ($N = 6$) in Germany, Sweden and Egypt (combined).

Themes	Coding references per feedback type:											
	Positive (+)				Number (n) and percentage				Suggestion (s)			
					Negative (-)							
	KI		FG		KI		FG		KI		FG	
IMPACT ^a												
Health impact	28	78%	6	100%	5	14%	3	50%	11	31%	2	33%
Information needs	5	14%	3	50%	9	25%	1	17%	7	19%	-	-
Other outcomes	2	6%	2	33%	6	17	1	17%	10	28%	3	50%
PERCEIVED USEFULNESS ^a												
Performance speed	-	-	2	33%	9	25%	5	83%	8	22%	3	50%
Flexibility/Customizability	19	53%	5	83%	4	11%	2	33%	11	31%	4	67%
PERCEIVED EASE OF USE ^a												
Learnability	12	33%	4	67%	8	22%	4	67%	11	31%	-	-
USER EXPERIENCE ^b												
Perceived credibility	8	22%	3	50%	4	11%	1	17%	3	8%	1	17%
Anonymity	9	25%	4	67%	-	-	-	-	-	-	-	-
Motivation	14	39%	4	67%	10	28%	3	50%	10	28%	4	67%
Aesthetics	8	22%	4	67%	12	33%	4	67%	10	28%	2	33%
Cultural adaptation	13	36%	2	33	5	14%	4	67%	9	25%	1	17%

KI, key informant interviews; FG, focus groups.

^a Themes based on the Health-ITUEM (dimensions without codes are omitted).

^b Additional themes generated through inductive data analysis.

6%, FG: $n = 1$; 17%). As a consequence, a few participants suggested implementing different font size settings (KI: $n = 3$; 8%).

Learnability

Learnability is defined as the experienced ease of use and clarity when starting the app for the first time. One third of the participants commented positively on this dimension, mainly indicating that the prototype was generally easy to use (KI: $n = 8$; 22%, FG: $n = 4$; 67%) and that the language used was easy to understand (KI: $n = 5$; 14%, FG: $n = 2$; 33%). Problems with learnability were mostly related to using the app through the graphical user interface (GUI) (KI: $n = 6$; 17%). It was revised for the focus group prototype, in which—with one exception—no further difficulties with the GUI were identified. Very few interviewees indicated that they did not understand the features of the app such as the exercises or the purpose of the camera feature (KI: 2; 6%, FG: 2; 33%) and the choice between narrators (KI: $n = 2$; 6%, FG: $n = 1$; 17%). Asked about suggestions to improve the app, participants suggested providing a more practical explanation of the app's features and objectives (KI: $n = 9$; 25%) as well as improving the GUI to make navigation for less technically literate users easier (KI: $n = 2$; 6%).

Other Usability Dimensions

The remaining Health-ITUEM usability themes “competency,” “memorability” and “error prevention” were not found within the interview and focus group data.

User Experience

Through inductive data analysis, a number of additional themes was identified. These included subjective accounts on how the participants felt regarding the app and were therefore subsumed under the global dimension of user experience (UX). UX is defined in ISO 9241-210 (53) as “A person's perceptions and responses that result from the use and/or anticipated use of a product, system or service.” (section 2.15). While usability themes represent the functional dimensions of using the app prototype, UX themes refer to the more subjective dimension of the tester feedback. Both aspects are closely interlinked with each other and with common barriers to using technologies. **Table 4** provides an overview of these themes, including definitions and examples of responses taken from the interview protocols. All of the main user experience themes (e.g., aesthetics) were identified after 9 out of the 36 interviews and 91.4% of the codes were identified after 27 interviews.

Perceived Credibility

A large proportion of respondents indicated trust in the program by mentioning privacy or data security as particular strengths of the approach (KI: $n = 8$; 22%, FG: $n = 2$; 33%). An interviewee from Egypt said:

“I have curiosity to know more, especially since I feel that the topic is handled with privacy and confidentiality.”

Only very few participants expressed concern, stating that they did not consider the app a reliable source of information (KI: $n = 4$; 11%, FG: $n = 1$; 17%) or that they did not receive

TABLE 4 | Definitions of user experience themes identified in the data through inductive analysis.

UX dimensions	Definitions	Examples (coding)
Perceived credibility	Users express that they trust the app or consider it a reliable source of help for Syrian refugees experiencing psychological distress.	E: "It's really obvious that the app contains privacy." (+) S: "How can I trust it? Is this medical information accurate?" (-)
Anonymity	Feelings in regard to the anonymity of using an app instead of seeing a professional in person.	G: "In my opinion, this app could help people who feel a bit shy to be treated by a psychologist." (+)
Motivation	Users express positive feelings toward the app such as being interested, excited or generally motivated to use the app.	E: "Anyone who will see the app will have curiosity to try it." (+) E: "It is boring." (-)
Aesthetics	User comments in regard to the visual design qualities of the Step-by-Step app prototype.	E: "The design is calming and relaxing." (+) S: "The design is not attractive and not modern." (-)
Cultural adaptation	Comments that refer to culturally adapted content of the app (i.e. narrative content, dialect and illustrations).	G: "The best thing is the spoken mother tongue." (+) S: "There is real information and incidents all of us have been through." (+)

UX, user experience; responses were coded as either positive (+), negative (-) or suggestion (s); E, comment from Egypt; G, comment from Germany; S, comment from Sweden.

TABLE 5 | Overview of barriers and facilitators to use of the Step-by-Step app gathered through key informant interviews ($N = 36$) and focus groups ($N = 6$) in Germany, Sweden and Egypt (combined).

Number (n) and percentage of coding references											
Barriers		KI		FG		Facilitators		KI		FG	
1	Acceptability	16	44%	3	50%	1	Promotion (general)	14	38%	3	50%
2	Credibility	11	31%	5	83%	1(a)	Outreach	18	50%	5	83%
3	Technical requirements	8	22%	2	33%	1(b)	Social media	14	39%	6	100%
4	Technical literacy	6	17%	2	33%	1(c)	Personal recommendation	5	14%	4	67%
5	Too distressed	4	11%	1	17%		Tutorials or trainings	-	-	3	50%

KI, key informant interviews; FG, focus groups.

enough information at the beginning (KI: $n = 2$; 6%). Participants suggested to strengthen users' trust in the app by ensuring data protection (KI: $n = 2$; 6%, FG: $n = 1$; 17%), e.g., through a password system.

Anonymity

The option to receive a mental health program without having to see a professional face-to-face was commented on by several participants. The comments were exclusively positive and stated that users would potentially feel less shy, embarrassed, afraid, ashamed or generally more comfortable when using the app instead of seeing a professional (KI: $n = 9$; 25%, FG: $n = 4$; 67%). One participant from Sweden put this aspect into context:

"Yes sure, especially in a country where we live in isolation mostly in winter, when we have our phones all the time in hand, it's nice to have some program like that home, easy going and that can help you when you're depressed while nobody else knows about that, this is a positive and interesting thing."

Motivation

Input on the motivation to use the app was a common theme for which both, positive and negative comments were given frequently. Positive statements expressed being interested, curious, impressed, motivated or generally liking the app (KI: $n = 14$; 39%, FG: $n = 4$; 67%). Negative comments almost

universally referred to feeling bored or not interested due to the repetitive content and long text passages (KI: $n = 10$; 28%, FG: $n = 3$; 50%). Participants in the key informant interviews and focus groups proposed a number of improvements to increase user motivation, including: (1) motivating messages, (2) shorter and more frequent sessions, (3) entertaining elements such as quizzes, (4) reminders, and (5) regular feature updates in order to keep the app relevant beyond the initial 5 weeks.

Aesthetics

A number of participants commented positively on the visual quality of the app prototype, referring to either the colors (KI: $n = 2$; 6%) or the illustrations (KI: $n = 4$; 11%, FG: $n = 1$; 17%). However, negative comments on aesthetics were more common and mainly focused on not finding the colors suitable or attractive (KI: $n = 6$; 17%), the overall impression that the prototype did not meet the design quality of current apps (KI: $n = 5$; 14%) or considering the design of the app as childish (KI: $n = 2$; 6%). As a consequence, the colors and design were adjusted for the focus group prototype. In regard to the colors, the feedback was positive in $n = 2$ focus groups (33%) but negative in $n = 4$ focus groups (67%). Participants mainly suggested to improve the aesthetic qualities of the app by changing the design to be more modern (KI: $n = 3$; 8%), by picking more comfortable or joyful colors (KI: $n = 3$; 8%, FG: 2; 33%) or by using photos instead of illustrations (KI: $n = 2$; 6%, FG: $n = 1$; 17%).

Cultural Adaptation

More than one third of the key informants provided feedback that specifically addressed how they felt about the content that had originally been designed for Syrian, Lebanese and Palestinian populations in Lebanon. These comments almost exclusively referred to the texts that were presented in the spoken form of Levantine Arabic. It was indicated that this way of presenting information instead of in formal Arabic felt closer to the person, easier and more comfortable for users of the app (KI: $n = 12$; 33%, FG: $n = 2$; 33%). An interviewee from Egypt stated:

"The language is good. It is very close to the Syrian accent, as if someone is speaking to you. One can understand this better because it is simple and not academic. Better than formal Arabic."

Another positive quality is related to how well respondents could identify with the content of the narratives (KI: $n = 1$; 3%, FG: $n = 2$; 33%). One participant in a focus group stated:

"I am suffering from the same issues; this story is very similar to mine."

A few respondents indicated that they didn't like the spoken dialect (KI: $n = 4$; 11%, FG: $n = 2$; 33%) or the illustrations (KI: $n = 4$; 6%, FG: $n = 1$; 17%), indicating that the latter were either childish or not representative of Syrians. Consequently, it was suggested to offer more language options such as formal Arabic, Kurdish, Assyrian or Syriac as well as to consider using real photos or videos instead of illustrations. In some cases, participants commented on single terms that could trigger negative associations (KI: $n = 3$; 8%, FG: $n = 1$; 17%). The specific terms discussed in this regard were "patient" (مريض), "grief" (الأسى) and "doctor" (دكتور).

Contact-On-Demand

The proposed feature was seen as not necessary in $n = 2$ focus groups (33%) and as useful in $n = 3$ focus groups (50%). Participants particularly pointed out that (1) e-helpers should not have access to user input within the app (FG: $n = 5$; 83%), (2) that only the e-helper (but no one else) should have access to such information (FG: $n = 4$; 66%), (3) that the 48-h response latency was too long (FG: $n = 4$; 66%), (4) that users should be allowed to decide what information they want to make available to e-helpers (FG: $n = 3$; 50%), and (5) that messages were preferred to calls (FG: $n = 3$; 50%).

Barriers and Facilitators

Based on their first impression of the prototype, interviewees identified a number of potential barriers that might prevent Syrians from using the Step-by-Step app and suggested measures to facilitate the uptake of the program (see **Table 5**).

Barrier: Acceptability

Many of the key informants identified a lack of acceptance among Syrians as a major barrier. This was confirmed by participants in several focus groups and includes (1) the acceptance of having psychological problems, (2) the acceptance of the concept of

psychological help itself, and (3) the acceptance of an app-based offer. An interviewee comment from Germany illustrates this:

"The idea of going to a psychologist is a bit hard to accept for Syrians. Most people don't admit that a psychological illness is exactly the same as any other illness. I don't know if all will use this app for mental treatment."

Barrier: Credibility

Almost every third key informant and participants in all but one focus group mentioned a lack of trust in the app as a potential initial barrier to using it. The respondents assumed that this could either be due to worries about data protection or due to doubts whether the program will actually help. An interviewee from Germany stated:

"Privacy? Is the data of the person really protected? Being unsure would prevent Syrians from using such an application."

Barrier: Technical Requirements

Interviewees and participants in focus groups further stated that a lack of smartphones or a lack of (reliable) internet connectivity would make it more difficult for Syrians to use the app. In addition, it was mentioned that this may especially affect older persons.

Barrier: Too Distressed

Another barrier mentioned by a couple of respondents was that some Syrians will be under too much psychological distress and therefore will likely not be willing or will not have the capacities to try the app. One interviewee comment from Egypt illustrates this point:

"Generally there are no obstacles to the deployment of this app except for a minority of people who have really complicated circumstances."

Barrier: Technology Literacy

Finally, participants also identified limited familiarity with the technology as a barrier, especially among older and illiterate people as expressed by this interviewee from Sweden:

"A very good idea but it won't be used by everyone, especially old people and people who can't read. So the idea will likely be spread among young people."

Facilitators: Promotion of the App

Asked about means to encourage Syrians to use the app, key informants and focus group participants exclusively mentioned different ways of promoting the app or the importance of making the app known in general. Three different approaches to the promotion of the app were identified in the data (see **Table 5**). The most commonly mentioned one was to conduct outreach in (1) community centers, (2) aid organizations, (3) government institutions, (4) language and integration classes, (5) public transportation, and (6) health care institutions. A second very common suggestion was to conduct social media campaigns and online advertising. As a third approach, a couple of respondents

suggested focusing on personal recommendations by other Syrians who are using the app, either by training volunteers or by working with trusted key persons within the communities. Only in focus groups, the additional recommendation was given to provide tutorials or trainings on how to use the app.

DISCUSSION

This paper presents findings on the early stages of the iterative user-centered development and evaluation process of Step-by-Step (SbS)—a mobile mental health intervention being adapted for Syrian refugees with increased psychological distress and impaired functioning. The aim of the study was to conduct a rapid qualitative assessment on user needs and initial prototype feedback in three different country settings to inform decisions on the app's requirements profile (i.e., the list of required features and characteristics) for the subsequent software development and design process. To this end, three phases of data collection were conducted, starting with free list interviews on the use of information and communication technologies (ICTs) and followed by key informant interviews on main usability dimensions of an early interactive app prototype. The study was concluded with focus group discussions in which a slightly revised prototype version was presented. At all stages, barriers and facilitators to the use of ICTs in general (phase one) or SbS in particular (phases two and three) were assessed. The free list interviews provided an important overview of the context in which ICTs are used by Syrian refugees, while the key informant interviews and focus groups provided valuable feedback on the initial app prototype.

Adaptation to Technical Literacy

It was found that the use of digital technologies was widespread among Syrian refugees in all three country settings and mostly occurred in the form of communication apps and social media that were accessed on mobile platforms by the majority of the target population. These findings are consistent with previous literature on ICT use among some refugee populations, underlining the omnipresent nature of mobile technologies (21) as well as the primary use of such technologies as communication tools (23). At the same time, low technical literacy was the most common barrier reported across all settings and in all three phases of data collection. As has been pointed out before (54), high usage of mobile phones among refugees does not necessarily mean a high level of overall technical literacy in this group. Instead, a significant proportion of Syrians may only be familiar with using smartphones within a very limited field of applications—namely as text or video messaging tools and as phones. In order to maximize the learnability of the app, essential features of the initial prototype were therefore designed in ways that were expected to feel familiar to users that have experience with messaging apps. For example, the narrative content screens (i.e., texts and illustrations) were presented in a format resembling prototypical messaging apps such as WhatsApp (see **Figure 1**). In addition, audio input via the phone's microphone and picture input via the phone's camera were added as alternatives to text input for all interactive exercises in order to increase the flexibility and customizability of the app. These input

options are standard features in many messaging apps and were therefore expected to also be familiar to a large proportion of the intended users.

In the first version of the prototype, certain elements of the graphical user interface (intended to guide users through the program) were not understood by all respondents, e.g., a “new” icon to indicate new sections of the app. This was dropped for an interface design that was closer to the “step-by-step” metaphor of the intervention in the second version of the prototype. Sessions were now displayed on the main screen of the app as a sequence of steps. In order to further improve navigation, a tab bar was added. There was no indication of learnability issues around the interface of the revised version.

Adaptation to Technical Barriers

Lack of (mobile) internet access was a major barrier and mentioned in all three phases of data collection. High costs as well as limited availability and coverage in certain regions were identified as the main causes of this barrier. Differences between the three countries became evident in the free list interviews as the issue was mainly thematized in Egypt, while participants in Sweden—a country with well-developed broadband coverage—did not mention mobile access and coverage at all. This supported initial work by WHO which had identified the need for any app to be usable in areas of poor internet. Given the shared aim of STRENGTHS and WHO to develop a mobile mental health solution with a high potential for scaling-up and robustness in diverse country settings, it was decided to design the app for less optimal conditions, including unstable and costly mobile connections. As many features of SbS as possible should therefore work offline after initial download, and use a minimum of mobile bandwidth (e.g., for data upload). The high cost of smartphones was mentioned quite frequently by free list interviewees in Egypt and was considered as another main barrier in conceptualizing the initial software requirements. It was concluded, that not all Syrians will be in possession of their own private devices. Instead, devices may be shared among family members. Previous research has shown that access to expensive communication devices tends to vary along age and gender lines. In a refugee camp context in Jordan, mobile phones were very common among younger Syrians (55), but also more often in the possession of male family members. Older women in particular often relied on their sons or grandsons when it came to the use of communication technologies (24). As shared devices could potentially lead to privacy issues due to the higher visibility of apps installed on mobile devices, it was decided to also provide a web-version of the program for use with standard mobile and desktop web-browsers. Instead of developing SbS as a native application, a hybrid approach to app development was chosen, resulting in an application for Android, iOS and web.

Language Adaptation

A commonly mentioned barrier to using ICTs was language, as many technologies are only available in English or other local languages in the respective host countries, e.g., German or Swedish. Consequently, respondents suggested providing content in Arabic. This requirement was already met with the pre-existing SbS content in culturally adapted Levantine

Arabic. While illiteracy itself was not mentioned in the free list interviews, there is indication of rising illiteracy rates in the younger generations of Syrian refugees who discontinued their education due to the war (54, 56). This suggests the importance of ensuring accessibility through an app. While the original web version of SbS addressed this to some degree by including videos of the narrative stories, the concept of the app extends this by making this feature easier to use through providing audio recordings of all texts in addition to the above mentioned audio input option. Respondents often pointed out that these features were of specific use to elderly or illiterate persons, underlining the importance of accessibility and barrier-free design (57).

Furthermore, respondents indicated that they found the prototype easy to use, not complicated and specifically pointed out the easy to understand language used in the texts. As this affects the potential applicability among diverse members of the target population, this usability dimension is closely related to the potential for scaling-up of a mobile mental health program (58). In addition to improving learnability, the language was also mentioned as a key positive aspect of the app's user experience. Participants mostly indicated that the texts in Levantine Arabic—which is similar to Syrian dialect—felt closer to the person. This theme often occurred in combination with expressions of interest, indicating that the cultural adaptation of the language not only improved ease-of-use but also engagement with the program. A lack of identification with narrative content has been identified as a barrier to adherence in previous e-mental health research and can occur when users feel that the information does not apply to them (59).

Adaptations to Improve Acceptability

In regard to the potential health impact of SbS, the majority of the respondents in all three countries recognized the significance, importance and potential for improving Syrian refugee mental health care through a mobile mental health approach. Participants commented on the perceived value of the program's premise as well as on its potential positive effects for Syrians affected by distress. It is important to note that this feedback was gathered during and immediately after the very first encounter that respondents had with the prototype. It can therefore also be interpreted as an indicator of the immediate acceptability of the presented mobile mental health approach. This is further underlined by a large number of comments in which participants indicated being interested or curious about the app. This result is consistent with recent findings of a high interest and openness toward mobile mental health among Palestinians in the West Bank (60). On the other hand, not accepting the need for psychological aid or not accepting the mobile mental health approach itself were indicated as major barriers to the uptake of the program. Consequently, respondents were predominantly of the opinion that SbS can have a positive health impact, but only if it was accepted by the target group. This underlines the importance of addressing the acceptability of the intervention within the cultural context by considering factors such as health literacy, health beliefs (61) and mental health related stigma (62, 63). The positive early user feedback on this theme is promising as it indicates that the mobile mental

health approach was well-received by many. However, some did not consider an app the appropriate medium for such a program. This facet of acceptability and its connections with potential user characteristics (e.g., symptom severity or health literacy) should be further investigated in order to clarify barriers to scalability and reach as well as appropriate measures to improve acceptability (e.g., avoiding certain terms, such as "patient").

However, in line with the well-documented treatment gap experienced by refugees in their respective host countries (9, 10), participants mentioned common structural barriers and how the app might be an alternative way of accessing care, e.g., by being free of charge, available in Arabic and without geographical restrictions. In addition, respondents mentioned that users of the app may feel more comfortable with the approach as seeing a professional can be accompanied by negative feelings such as fear or shame. The anonymous nature of the program may therefore render it more acceptable and specifically attractive for those who would otherwise be reluctant to seek professional help due to fear of stigmatization or embarrassment (64). Both findings underline the potential of mobile mental health to provide an alternative to standard care for Syrians affected by individual as well as structural barriers to mental health care.

Adaptations to Improve Credibility and Trust

Apart from acceptability, credibility was another very common barrier that may affect uptake. Here, respondents either indicated that potential users may not trust that the app will work (i.e., not having an effect on distress) or that they may not trust in the protection of their personal data. In this regard, several respondents specifically referred to the aspects of privacy and data protection. Trust is increasingly being recognized as an essential facet of system and software quality. It is one key aspect of UX and is defined in ISO 25010:2011 as the "degree to which a user or other stakeholder has confidence that a product or system will behave as intended" (section 4.1.3.2) (65). The standard further states that security is an essential contributor to trust. It is noteworthy that already at this early stage of user testing, participants in the key informant interviews and focus groups often pointed out the prototype's safety and credibility as positive aspects. While this indicates that the given information on data protection were successful in building trust, the findings also underline the importance of trust specifically within refugee populations that may struggle with trust in services due to potentially traumatic experiences in the past (66). The theme also occurred prominently when the e-helper system was discussed in the focus groups. Here, many respondents indicated that they would prefer that e-helpers did not see their inputs in the app at all or that the e-helpers should be the only persons to see this. Others suggested to give users control over what information they want to share with their e-helpers. This suggestion is in line with the principle of "privacy by default" (i.e., systems should be pre-configured for highest data protection, instead of expecting users to configure them accordingly). This principle was not only suggested by respondents in our study but has also recently become mandatory for systems collecting personal data in the

European Union as part of the 2018 General Data Protection Regulation (67).

Adaptation of the Guidance Model

One common misconception about e-mental health and mobile mental health is to consider them as replacements for existing sources of help while they are actually intended to provide alternatives. This can lead to higher expectations and may limit the acceptability of the approach. One common user comment in this regard was that the SbS app cannot replace a real psychotherapist. As this is not the aim of the approach, it is important to manage expectations as well as ensure clear interfaces with established structures within health care systems. STRENGTHS aims to not only provide scalable software but also identify barriers and facilitators to scaling-up within health care systems. To this end, user suggestions provided valuable insights. Key informants suggested to provide contact with professionals directly within the app. To learn more about what users expected from such a system, the planned contact-on-demand feature was included as part of the interactive prototype in the focus groups. Based on this, respondents either commented positively on the option or indicated that they did not consider it necessary to be able to contact e-helpers. Consequently, it was decided to keep contact optional. However, the suggested response latency of up to 48 h was universally considered as too long and needs to be reduced, e.g., through more efficient systems for e-helper management.

Furthermore, respondents suggested to integrate a referral system within the app to ensure that users with more severe symptoms can receive additional treatment or other forms of support by real persons. It was also indicated that too severe levels of distress may prevent Syrians from using the app. Here, a potential solution are stepped care models that often already include low-threshold digital programs like SbS for low severity cases and referral systems that give access to higher intensity face-to-face treatments for cases that are identified to be more severe or complex (68). Consequently, establishing gateways to existing health care structures should be considered from the early stages of software development on. Potential approaches to this can be (1) to include information (e.g., on the health care system in a country), (2) to provide contact information (e.g., to available emergency lines), or (3) to implement the program within existing mental health programs for refugees (e.g., offering it in treatment centers for war survivors).

Adaptations to the Narrative Sections of the Program

The usability dimensions of performance speed and information needs received most of the negative feedback which pointed out critical areas for future improvement of the app's concept. In general, participants found the texts and sessions of the program too long (performance speed) and too repetitive (information needs), resulting in feeling bored or not interested in continuing to use the app. Adjustments are therefore crucial in order to ensure user engagement. This finding may indicate a general key area of adaptation that needs to be taken into account when transferring content from a web-based intervention to a smartphone format. While web-based interventions oftentimes

work with longer text sections and session duration of up to 1 h, this format may not work as well on mobile devices due to smaller screens and different usage habits. Based on the clear user feedback, the content was restructured to fit into a format of overall shorter but more frequent sessions. A first attempt to shorten sections was presented in focus groups as part of the revised prototype. User feedback indicated that the changes may have improved but not solved the issue yet and that further adjustments to the overall length of sessions are required.

Adaptations to Improve Aesthetics

Many respondents mentioned the aesthetic qualities of the prototype in direct association with the motivation to use the program. While the feedback was diverse, it became clear that many respondents had clear expectations on how a modern app should look like. As Bakker et al. (69) pointed out: "Building an enjoyable app with good graphic design and a slick, intuitive, and satisfying interface is necessary for an effective intervention." (p. 13). Feedback on the revised prototype provided further insight into user expectations. On this basis, it was decided to involve a professional design company in the future development process.

LIMITATIONS

A number of limitations have to be mentioned. As this was a rapid qualitative assessment approach following the guidelines of DIME module 1 (46), recruitment and data collection were conducted with a pragmatic focus. Especially working without audio recordings likely has affected data quality and data depth. The approach specifically limits possibilities to check data quality ex-post. This issue was addressed by providing training and clear guidelines to interviewers. Interviews were always conducted by two interviewers that compared their notes immediately after the interview in order to ensure the quality and completeness of the written records.

The study had the advantage of being able to recruit a larger sample than is usually feasible in early prototyping. Ex-post analyses on saturation indicated that the number of interviews was sufficient for the purpose of coding initial user feedback. During the inductive development of coding frameworks for ICT usage and user experience dimensions, 11 out of 20 free list interviews and 9 out of 36 key informant interviews were required to identify all of the themes. In addition, 27 out of 36 key informant interviews provided more than 90% of the codes. Due to the iterative nature of the adaptation process chosen for SbS, it was decided to first implement the conclusions drawn from this stage of qualitative interviews before recruiting additional interviewees. The generated coding frameworks will be re-used and where necessary extended in future iterations of user testing.

Throughout all phases of the study, an equal distribution of men and women was achieved. However, recruiting diverse respondents on other factors such as age or education was only attempted at the free list interviewing stage. While a heterogeneous age distribution was achieved, it was especially challenging to recruit participants with a lower education background. One reason for this may be that, before 2011, the Syrian education system was considered one of the most advanced in the Middle East with a high proportion of graduates

with secondary education (70). In comparison with Syrians below the age of 18, the respondents in this study were therefore not as affected by the steep decline in school enrollment that started with the war (71). It is possible that the respondents in this study did not represent all layers of the Syrian refugee population. In the free list interviews, respondents still answered as representatives of the larger group instead of from a personal standpoint. Consequently, this approach may have introduced themes that were rather based on hearsay than on personal experience. While this cannot be ruled out, the results of the free list interviews were in line with previous research on the use of ICTs in refugee populations (21, 24, 55).

In addition, the interviewed refugees were not pre-screened for symptoms of distress. Consequently, the feedback does not necessarily originate from the exact target group of the app (i.e., Syrian refugees with increased distress and impaired functioning). While respondents were instructed to provide information from the communities' point of view or in regard to Syrians experiencing sadness or distress, the results may not necessarily reflect the impact of mental burden while using the app. Consequently, future user testing should also include clinical cases.

Other limitations are caused by the early nature of the prototype. Since respondents did not use the app for an extended period of time, feedback on usability dimensions such as health impact are based on first impression and not on an actual experienced effect. This may also have resulted in the absence of comments on the usability dimensions of competency, memorability, and error prevention. Future iterations of prototype testing should therefore enable users to try the app over a longer period of time in a natural environment. Since the prototyping software was used instead of providing a functioning version of an actual app, certain elements such as the interactive exercises could only be simulated at this stage. In order to receive actual feedback on a working prototype it will be necessary to provide access to a fully functioning version.

CONCLUSIONS

Early formative research allows the immediate adaptation and improvement of app concepts and early prototypes for specific target populations such as Syrian refugees. It is a crucial first step toward pilot testing and subsequent randomized controlled trials and an important addition to the previous work on contextually adapting the SbS intervention (44). A usability and user experience focus is still rare in the field of e-mental health for refugees and has only recently started to emerge in the literature (72). To our knowledge, this is the first mobile mental health intervention for a refugee population that uses early prototyping and usability testing.

The qualitative assessments in this study provided valuable guidance for the mobile mental health adaptation of SbS and app development for refugee populations in general. The following recommendations can be derived from the results: mobile mental health apps should provide more sessions in shorter intervals than web-based interventions. Moreover, they should ensure intuitive user interfaces, provide a clear structure for

less technical literate users and further improve motivation and engagement through interactivity. If contact-on-demand is used, it should happen with low response latencies.

User participation and usability evaluation will continue throughout the STRENGTHS project as part of the software development and process evaluation. Following the IDEAS framework, the next stage will be the creation of a minimum viable product (i.e., the first fully functioning version of the software). This version will be used in pilot RCTs to further evaluate its usability and feasibility in the study setting. Important topics such as the program's health impact and cost-effectiveness will be further assessed in definitive RCTs in the STRENGTHS project and by WHO in other RCTs. The qualitative results of the present study will inform the further process evaluation. While this study utilized rapid appraisal, other approaches such as questionnaires, in-depth interviews, "think out loud" sessions or user observation techniques will be used at later stages (73).

Given the valuable feedback that Syrian refugees provided in this study, user-informed approaches should find more application in the development of digital health projects for refugees and populations in low and middle income countries.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of the ethics committee of the Department of Education and Psychology at Freie Universität Berlin. All subjects gave written informed consent in accordance with the Declaration of Helsinki. The protocol was approved by the ethics committee of the Department of Education and Psychology at Freie Universität Berlin.

AUTHOR CONTRIBUTIONS

SB, MB, PH, and CK designed and conducted the study with the support of MA, KC, PC, EH, MH, MS, and EvH. SB and MA analyzed the data and all authors contributed to the interpretation of the data. SB wrote the manuscript with support from MA, MB, KC, PC, PH, EH, MH, MS, EvH, and CK. All authors gave final approval of the version to be published. The authors alone are responsible for the views expressed in this article and they do not necessarily represent the views, decisions, or policies of the institutions with which they are affiliated.

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A Clinical-Psychological Perspective on Somatization Among Immigrants: A Systematic Review

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Background: Somatic and psychopathological conditions (e.g., anxiety, depression, post-traumatic stress disorder, and somatization) are frequent among immigrants belonging to various ethnic groups. Worldwide findings on the epidemiology regarding specific mental conditions still vary with respect to different migration samples and migration contexts. This inconsistency also holds true in the incidence of somatization among migrants. We carried out a systematic review analyzing the relationship between migration and somatization by providing a qualitative data synthesis of original research articles on the topic.

Methods: According to PRISMA guidelines, we conducted a systematic search of the literature on PubMed, Scopus, ISI Web of Science, PsycINFO, Google Scholar, and ScienceDirect. The articles were selected using multiple combinations of relevant search terms (e.g., defined somatization and related disorders, and migration status). Each database was searched systematically from January 2000 to December 2017.

Results: The initial search identified 338 records, of which 42 research reports met the predefined inclusion criteria and were analyzed. Most studies ($n = 38$; 90%) were cross-sectional. The main findings of this study are that migrants with somatization exhibited more psychological distress, had an increased perceived need for healthcare service utilization, and reported more post-migration living difficulties and/or post-traumatic stress disorder than those without somatization. It was also found that specific individual features mediate the association between somatization and migration. The prevalence and correlates of somatization were found to vary across the immigrant groups, depending on cultural variation in reasons for migration, stress exposure, explanatory models of illness, coping, and other individual variables.

Conclusion: Somatization is a challenge for health professionals due to its vague nature. In this regard, clinical management of immigrant patients should include further efforts to address emotional distress, with special attention to social, cultural, and linguistic differences.

Keywords: immigrants, immigration, somatization, somatic symptoms, traumatic experience

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INTRODUCTION

Migration can be defined as “a process of moving, either across an international border, or within a State. Encompassing any kind of movement of people, whatever its length, composition and causes; it includes refugees, displaced persons, uprooted people, and economic migrants” (Perruchoud, 2004). During the period from 2000 to 2017, the total number of international

migrants increased from 173 to 258 million persons, an increase of 85 million (49%); 65 million of the world's internal and international migrants are forcibly displaced today (United Nations Population Division Department of Economic Social Affairs, 2009, 2017). Most migration processes may be conceptualized as a series of mainly stressful life events, each with the cumulative capacity to increase the risk for a broad range of mental health problems (Carta et al., 2005). Immigrants are often subjected to specific risk factors related mainly to exposure to stressful and traumatizing experiences (Shiroma and Alarcon, 2011; Rohlof et al., 2014), including the migrant status itself and, further, the associated acculturative stress and adaptation process to a new culture, racial discrimination, urban violence, abuse by law enforcement officers, and forced removal or separation from their families (Bermejo et al., 2010; Bragazzi et al., 2014). Several studies indicate that the incidence of psychological distress (Carta et al., 2005), post-traumatic stress disorder (PTSD) (Silove et al., 1998), major depressive disorder (Beirens and Fontaine, 2011), and somatization in diverse ethnic immigrant groups has increased all over the world (Haller et al., 2015).

Somatization is a complicated concept to define. Straddling the interface between physical and psychological ill health, it is often viewed from a range of different perspectives (Gureje et al., 1997). One finds in the literature definitions emphasizing the presence of multiple complaints in diverse areas of the body (Mai and Merkey, 1980; Escobar et al., 1989), formulations in which fear of having a serious physical disorder in the absence of supporting physiologic impairments is stressed (Barsky and Klerman, 1983), and others in which physical complaints are seen as manifestations of hidden psychiatric morbidity (Bridges and Goldberg, 1987). The concept of somatization has its origins in the work of Freud (Breuer and Freud, 1893–1895), who proposed the idea of conversion as a main defense mechanism. Following that, Alexander (Alexander, 1950) brought the notion of emotional equivalents, also proposed by Freud, into the concept of vegetative neurosis and psychosomatic diseases. Of late, somatization is often regarded as “a tendency to experience and communicate somatic distress in response to psychosocial stress and to seek medical help for it” (Lipowski, 1988). Somatization is most often associated with depressive and anxiety disorders (Simon et al., 1999; Haller et al., 2015); its persistent form is especially costly and difficult to prevent and manage. It thus poses major medical, social, and economic challenges (Lipowski, 1988).

Physical manifestations implicated in somatization can be aligned across a spectrum of numerosity, severity, and functional impairment, extending from just one or a few transient symptoms at one end, to having multiple severe symptoms for a long period of time and therefore meeting diagnostic criteria for somatoform disorder (SD) according to the Diagnostic and Statistical Manual of Mental Disorders (4th ed.; DSM-IV) (American Psychiatric Association, 1994) or somatic symptom disorder (SSD) according to the 5th edition (DSM-5) (American Psychiatric Association, 2013), at the other end (Jackson and Kroenke, 2008).

In the most recently released DSM-5, the conceptualization of somatization and what was previously termed somatoform

disorder has changed substantially compared with previous diagnostic systems. This reflects an effort to overcome the limitations of the DSM-IV definition, which was organized centrally around the concept of medically unexplained symptoms (MUS). The current diagnostic criteria for SSD requires the presence of somatic symptoms combined with a substantial impact of these symptoms on thoughts, emotions, and behaviors (Carta et al., 2005), by emphasizing the extent to which feelings concerning their somatic symptoms are disproportionate or excessive. Somatization is a psychological dimension common to all people; it manifests in response to psychosocial stress brought about by life events and situations that are personally stressful to the individual (Lipowski, 1988). It has been strongly associated with the migrant status itself, as a coping or adapting mechanism extremely disadvantageous for health (Castillo et al., 1995; Escobar, 1995; Kirmayer and Sartorius, 2007; Radl-Karimi et al., 2018).

There are major differences in somatization among immigrants according to the moderating effects of psychosocial features such as their ethnic, cultural and religious background; exposure to trauma; reasons for migration; and other individual differences (Kirmayer and Young, 1998). These characteristics also differentially affect illness perception, communication of symptoms, and help-seeking behavior. Clinical-psychological assessment and treatment of somatization thus can be particularly challenging in multicultural contexts (Carta et al., 2005), imposing a considerable economic burden on health services.

To our knowledge, systematic attempts to investigate the frequency and clinical-psychological correlates of somatization in a wide spectrum of migrant populations have thus far not been undertaken. To address these gaps, we carried out a systematic review examining the prevalence, clinical manifestation, etiology, and treatment of somatization in individuals with migratory background, by providing a qualitative data synthesis of the studies. The inclusion of papers in this review was extended to those investigating somatization as the somatic clinical presentation of psychological distress, high levels of somatic preoccupation, MUS, or mental disorder (according to DSM-IV or DSM-5).

Based on the extant literature, we expected that: (1) somatization would be significantly associated with migration because of the supposed high exposure to stressful experiences in individuals with migratory backgrounds; and (2) the prevalence and correlates of somatization would vary across immigrant groups, depending on cultural variations in reasons for migration, trauma exposure, coping, and other individual variables.

MATERIALS AND METHODS

Eligibility Criteria

Eligible articles included all English language papers published in peer-reviewed journals from January 2000 to December 2017, reporting data on the presence of somatization in first-generation immigrants. When a title or abstract seemed to describe a study eligible for inclusion, the full text was examined to consider

its relevance according to the inclusion criteria. Reviews, meta-analyses, commentaries, letters to the editor, books or book chapters, abstracts, and clearly irrelevant papers were excluded. Since somatization is particularly difficult to operationalize, we also excluded articles published before 2000 for a greater homogeneity on the meaning of somatization.

The included studies had to:

- (1) examine a population of first-generation adult immigrants. Immigrants are defined as foreign born people who have moved to another country for the purpose of settlement (Perruchoud and Redpath-Cross, 2011). This definition includes economic migrants, temporary foreign workers, foreign students, documented and undocumented migrants, refugees, and asylum seekers;
- (2) investigate somatization defined as somatic presentation of psychological distress, or MUS, or high levels of somatic preoccupation and worry about illness, or the clinical presentation of psychiatric disorder according to DSM-IV or DSM-5;
- (3) use questionnaires, subscales, semi-structured interviews, or DSM criteria for assessing somatization.

Information Sources and Searches

This systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Liberati et al., 2009). PubMed, Scopus, ScienceDirect, ISI Web of Science, PsycINFO, and Google Scholar databases were systematically searched in November 2017 using the following Boolean string: ("immigrant*" OR "migrant*" OR "immigration" OR "migration" OR "refugee*" OR "asylum seeker*") AND ("somatization" OR "somatizer*" OR "medically unexplained symptom*" OR "functional disease" OR "functional symptom*" OR "somatic symptom* disorder" OR "illness anxiety disorder" OR "conversion disorder" OR "functional neurological symptom*" OR "psychological factors affecting med*" OR "factitious disorder") [All Fields]. Each database was systematically searched for articles from January 2000 to December 2017. After performing the initial search, duplicates were identified and discarded. Titles and abstracts were screened and, for reports thus identified as potentially relevant, full texts were checked for eligibility. Studies were discarded where the full text was unavailable. Searching and determining the eligibility of target responses were carried out independently by the three investigators.

Selection of Articles and Data Extraction

Two of the authors (R.L., M.S.) performed the initial data extraction by removing duplicates and all the articles that appeared clearly irrelevant based on the salience of the title and after reading the specific abstract. The full texts of the remaining studies were independently assessed for eligibility by all authors. After a full-text evaluation of the potentially relevant studies, the three authors reached a consensus regarding eligibility and excluded all the research articles that not meet the inclusion criteria.

Analysis and Data Synthesis

The methods described here fulfilled the PRISMA guidelines (Liberati et al., 2009), as a meta-analysis was deemed inappropriate due to the heterogeneity of the examined study designs. To assess the risk of bias, and working independently; the reviewers each determined the adequacy of the methodology in terms of reliability. Within the sample selected for review, studies were categorized by summarizing and comparing significant information and specifying the measures of the assessed variables for each (see **Table 1** for a detailed description of the reviewed studies).

RESULTS

The search of electronic databases initially yielded $N = 338$ citations, as reported in the PRISMA flowchart (**Figure 1**). After removing the duplicates, $N = 217$ records remained. Of these, $n = 139$ citations were eliminated as they were reviews, meta-analyses, commentaries, letters to the editor, books or book chapters, abstracts, or non-English language papers, or because they did not meet the inclusion criteria. Of the 78 full text articles assessed for eligibility, $n = 36$ studies were excluded by focusing both on inclusion and exclusion criteria. Ultimately, $N = 42$ studies were selected for inclusion in the systematic review (see **Table 1** for a detailed description of the reviewed studies).

The reviewed studies were published between 2000 and 2017. These 42 papers reported the results of 38 cross-sectional analyses and four longitudinal analyses. In this section, the studies are mainly grouped and described based on the characteristics of migrant populations at risk for somatization.

Measurement and Assessment of Somatization

Table 1 summarizes the measurement and assessment of somatization in the included studies. Twenty-nine records used self-report questionnaires; of these, 22 specified in which language the questionnaires were administered and whether the scales were adapted to the language of the participants (see **Table 1**). Thirteen articles (Mak and Zane, 2004; Nickel et al., 2006; Cwikel et al., 2008; Sachs et al., 2008; Shiroma and Alarcon, 2011; David et al., 2012; Heredia Montesinos et al., 2012; Mölsä et al., 2014, 2017; Rask et al., 2015, 2016; Spiller et al., 2016; Choi et al., 2017) used the Symptom Checklist-90-R (SCL-90-R) Somatization subscale (Derogatis, 1977). The SCL-90-R consists of nine subscales aimed at measuring psychopathology, including somatization. Seven studies (Aragona et al., 2005, 2008, 2010, 2011, 2012, 2013; Deisenhammer et al., 2012) assessed somatization using the Bradford Somatic Inventory (BSI-21) (Mumford et al., 1991), a widely validated self-assessment questionnaire specifically designed for transcultural research and formerly used to assess somatization among groups of primary care immigrants. The Patient Health Questionnaire-15 (PHQ-15) (Dreher et al., 2017; Mendoza et al., 2017; Morawa et al., 2017) and the Hopkins Symptom Checklist-37 (HSCL-37) (Breuer and Freud, 1893–1895; Alexander, 1950; Derogatis, 1977; Mai and Merkey, 1980; Barsky and Klerman, 1983; Bridges and Goldberg,

TABLE 1 | Distribution of the 43 relevant selected studies, including the reference, the population target, the aims, the measures of somatization, and the main results of the investigation.

Reference	Aims	Population target and geographic location	Country of origin	Measures of somatization	Results
Aragona et al., 2010	To explore the relationship between somatization and self-reported traumatic experiences and post-traumatic symptoms in patients attending a primary care service for immigrants.	N = 101 ♀ ♂ Age = 19–67 Primary care outpatients Italy	Europe, Asia, South America, Africa	- BSI-21*	Somatization prevalence: 38.6%; Somatization + traumatic experiences: 69.2%.
Aragona et al., 2008	To investigate the effect of gender and marital status on somatization in immigrants of four ethnic groups.	N = 301 ♀ ♂ Age (M) = 35.85 Primary care outpatients Italy	Europe, Asia, South/Central America, Africa	- BSI-21*	Somatization prevalence: female > male; married > unmarried; Caucasians and South-Central Americans > other ethnic groups.
Aragona et al., 2011	To evaluate the role of post-migration living difficulties (PMLD) on somatization.	N = 101 ♀ ♂ Age = 19–67 Primary care outpatients Italy	Europe, Asia, South America, Africa	- BSI-21*	Somatization prevalence: 38.6% Somatization + traumatic experiences: 69.2% Somatization + PTSD: 30.7% PMLD: somatizers > non-somatizers.
Aragona et al., 2013	To study potentially traumatic events, PTSD, anxiety, depression, somatization and PMLD in primary care immigrants.	N = 391 ♀ ♂ Age = 18–79 Primary care outpatients Italy	Europe, Asia, South America, Africa	- BSI-21*	Somatization + PTSD: 80% Somatization + No PTSD: 23.1% No somatization + PTSD: 20% No somatization + No PTSD: 76.9%.
Aragona et al., 2012	To study somatization in a large sample of immigrants.	N = 3,051 ♀ ♂ Age = 17–86 Primary care outpatients Italy	Europe, Asia, South America, Africa	- BSI-21*	Somatization prevalence: 25.6%; female > male; older > younger; South Americans > other ethnic groups.
Aragona et al., 2005	To investigate the current prevalence of somatization and to evaluate the comparative rates of somatic complaints in immigrants of four ethnic groups.	N = 301 ♀ ♂ Age = 16–70 Primary care outpatients Italy	Europe, Asia, South/Central America, Africa	- BSI-21*	Somatization prevalence: 35.2%; female > male; South Americans > other ethnic groups.
Bäärnhielm and Ekblad, 2000	To explore structures of illness meaning among somatizing Turkish-born migrant women.	N = 10 ♀ Age = 31–48 Psychiatric or primary care outpatients Sweden	Turkey	- SCID-RV - Medical records	All participants experienced and communicated psychological distress in the form of physical symptoms.
Beirens and Fontaine, 2011	To investigate the combination of two cultural explanations (somatization vs. psychologization and emotion mediation) with two acculturative explanations (acculturative stress vs. acculturative transition) to explain these differences.	N = 719 ♀ ♂ Age = 18–58 Turkish immigrants, Turkish majority members, Belgian majority members Belgium	Turkey	- Not standardized interview	Somatization prevalence: Turkish majority members > Turkish immigrants > Belgian majority members.
Borra, 2011	To explore Turkish women's idioms of distress; to contribute to the development of a valid and reliable diagnostic technique for depressive disorder in Turkish women.	N = 20 ♀ Age = 20–50 Depressed outpatients Netherlands	Turkey	- Not standardized interview	Distress: somatizers > non-somatizers.

(Continued)

TABLE 1 | Continued

Reference	Aims	Population target and geographic location	Country of origin	Measures of somatization	Results
Bragazzi et al., 2014	To investigate differences in the somatic perception between immigrants and Italians and between two groups of immigrants living in Italy.	N = 329 ♀ ♂ Age (M): 35.0 (Immigrants); 38.3 (Italians) Clinic outpatients Italy	South America, Africa	- MSPQ*	Somatization: female > male; no immigrant group differences ($p = 0.18$); immigrant groups > Italian group.
Choi et al., 2017	To examine the relationship between trauma, psychiatric symptoms and life satisfaction of North Korean refugees resettled in South Korea.	N = 211 ♀ ♂ Age: (M, SD) = 38.49, ± 12.22 North Korean refugees Republic of Korea	North Korea	- SCL-90-R	Somatization + previous traumatic events: positive correlation ($r = 0.33$, $p < 0.001$). Somatization + economic satisfaction: negative correlation ($r = -0.19$, $p < 0.01$). Somatization: female > male; no ethnic group differences.
Owikel et al., 2008	To examine the prevalence and correlates of a full range of mental health diagnoses in primary care clinics in Israel.	N = 976 ♀ ♂ Age = 25–75 Primary care patients Israel	Various ethnic groups	- SCL-90-R	Hyperemesis gravidarum: Immigrant patients > native patients; Somatization: no group differences.
David et al., 2012	To evaluate the effect of migration on psychosocial state of hyperemesis gravidarum patients.	N = 753 ♀ Age = 15–44 Women treated for hyperemesis gravidarum Germany	Turkey, Southwest Asia, Northeast Africa, Ex-Yugoslavia	- SCL-90-R*	Somatic symptoms: Turkish immigrants > Turkish living in Turkey > Austrian-origin.
Delsenhammer et al., 2012	To study the impact of both ethnicity and migration on the manifestation of depression.	N = 136 ♀ Age = 18–76 Depressed patients: Austrian-origin, Turkish immigrants, Turkish living in Turkey Austria	Turkey	- BSI-21*	Severe somatization rates: Vietnamese patients (32.7%), German patients (12.8%).
Dreher et al., 2017	To compare Vietnamese and German patients regarding cultural dynamics of symptom presentation upon first admission to a psychiatric outpatient service	N = 219 ♀ ♂ Age = 17–65 Psychiatric outpatients: Vietnamese immigrants, German-origin Germany	Vietnam	- PHQ-15*	Somatic symptoms prevalence: Ethiopian patients (63.2%); female > male; Healthcare service use: somatizers > non-somatizers.
Fenta et al., 2006	To examine the mental health service utilization patterns of Ethiopians in Toronto.	N = 342 ♀ ♂ Age = 18–59 Immigrant outpatients Canada	Ethiopia	- DIS	Positive association between depression, psychological distress, and somatic symptoms.
Heredia Montesinos et al., 2012	To analyze the interrelationship of stigma, depression, overall psychological distress, and somatic symptoms.	N = 63 ♀ Age = 28–72 Depressed patients Germany	Turkey	- SCL-90-R - SOMS-II	Positive association between violent events, post-migration living difficulties, and somatic complaints.
Hondius et al., 2000	To analyze the relative contribution of different forms of violence, demographic, and asylum variables to the health complaints of refugees.	N = 636 ♀ ♂ Primary care outpatients Netherlands	South/Central America, Western Asia, Turkey, Iran	- Not standardized interview	

(Continued)

TABLE 1 | Continued

Reference	Aims	Population target and geographic location	Country of origin	Measures of somatization	Results
Karasz et al., 2007	To examine evidence for several theoretical processes shaping the relationship between culture and illness experience.	N = 73 ♀ ♂ Age = 19–62 European and Asian immigrants living in US US	South Asia, Europe America	- Not standardized interview	Somatization prevalence: no group differences. 20% of EAs psychological problems (but none of SAs) were explained entirely by somatic causes; 43% of EAs psychological problems included at least one physical cause; 4% of SAs psychological problems included at least one physical cause. Somatization: 57.2% on SCL-90-R; 12.9% on SSI; female > male; older > younger; low education level > high education level. Positive association between somatization, symptoms severity, and post-migration stress ($p < 0.01$). No association between social support and somatization.
Mak and Zane, 2004	The phenomenon of somatization was explored in relation to the experiences of acculturation, stress, support, and distress.	N = 1,747 Age = 18–65 Community sample US	China	- SCL-90-R - SSI	Somatization: no group differences.
Mendoza et al., 2017	To evaluate the role the role of migration stressors and social support on poor mental health among Filipino female domestic workers.	N = 261 ♀ Age = 18–64 Domestic workers China	Filipino	- PHQ-15*	Positive association between somatization, symptoms severity, and post-migration stress ($p < 0.01$). No association between social support and somatization.
Miranda et al., 2005	To examine the prevalence of depression, somatization, alcohol use and drug use among black American women.	N = 9,151 ♀ Age <43 US-origin, African-origin, and Caribbean-origin US	America, Africa, Caribbean	- PRIME-MD	Somatization: no group differences.
Mirdal, 2006	To study whether and how the changes that had taken place in actual living conditions would be reflected in the women's subjective perception of their health condition.	N = 46 ♀ Age >31 Community sample Denmark	Turkey	- Not standardized interview	Although the living condition of the women had improved and the number of somatic complaints had decreased, the level of distress was still high 20 years later.
Mölsä et al., 2014	To investigate mental and somatic health, and to evaluate the role of pre-migration trauma and post-migration stressors among the refugees.	N = 256 ♀ ♂ Age = 50–80 Somali immigrants, Finnish controls Finland	Somalia	- SCL-90-R	Somatization: no group differences. High levels of pre-migration traumatic events were associated with high levels of somatization symptoms ($p < 0.01$).
Mölsä et al., 2017	To analyze healthcare services utilization patterns of older immigrants in Finland, and to investigate the presence of somatization in older Somali refugees and pair-matched Finnish controls.	N = 256 ♀ ♂ Age = 50–80 Somali immigrants, Finnish controls Finland	Somalia	- SCL-90-R	Somatization: no group differences.
Morawa et al., 2017	To analyze variations in the severity of somatization according to sociodemographic and migration-related variables.	N = 335 ♀ ♂ Age = 20–69 Community sample Germany	Turkey	- PHQ-15*	Somatization prevalence: 24.2%; female > male; first generation immigrants > second generation immigrants; lower language proficiency > higher language proficiency; Severe somatization + severe depression: 53.1%.

(Continued)

TABLE 1 | Continued

Reference	Aims	Population target and geographic location	Country of origin	Measures of somatization	Results
Nadeem et al., 2008	To examine the relations between sociodemographic characteristics, stigma, depression, somatization, and treatment preferences.	N = 1,893 ♀ Age (M; SD) = 29.1, ±8.6 Immigrant and US-born outpatients with mental health problems US	America, Africa, Caribbean	- DSM-IV	Somatization: no group differences.
Nadeem et al., 2009	To investigate the differences in treatment preferences and to examine perceived need for care for mental health problems as a possible contributor to ethnic disparities in receiving care.	N = 1,577 ♀ Age (M; SD) = 28.9, ±8.5 Immigrant and US-born depressed outpatients US	American, Africa, Caribbean	- DSM-IV	Somatic complaints: 67% Somatization: no group differences. > 1 Somatic symptoms: < Perceived need for mental health.
Nickel et al., 2006	To examine whether bioenergetic exercises significantly influence the inpatient psychotherapeutic treatment results for Turkish immigrants with chronic somatoform disorders.	N = 128 ♀ ♂ Age > 18 Immigrants with chronic somatoform disorders Germany/Austria	Turkey	- SCL-90-R*	Bioenergetic exercises improved somatization.
Perron and Hudelson, 2006	To study how asylum seeker and refugee patients who were identified by their physicians as somatizing make sense of their suffering.	N = 26 ♀ ♂ Age (M) = 36 General medicine outpatients Switzerland	Ex-Yugoslavia	- Not standardized interview - Medical records	Patients attributed the onset of somatic symptoms to past traumatic experiences and tended to attribute their persistence to current living conditions and uncertain legal status. Patients formulated their suffering in both medical and social/legal terms and sought help from physicians for both types of problems. Mobility limitation: somatizers > non-somatizers.
Rask et al., 2015	To examine the association between mental health symptoms and mobility limitation in migrants.	N = 2,249 ♀ ♂ Age = 18–64 Russian, Somali and Kurdish migrants Finland	Russia, Somalia, Kurdistan	- SCL-90-R*	Somatization prevalence: Kurdish (28.9%); Russian (14.8%); Somali (12.9%). Somatization: female > male.
Rask et al., 2016	To assess the prevalence of mental health symptoms in Russian, Somali and Kurdish origin migrants in Finland.	N = 2,322 ♀ ♂ Age = 18–64 Russian, Somali and Kurdish migrants Finland	Russia, Somalia, Kurdistan	- SCL-90-R*	Somatization prevalence: Kurdish (28.9%); Russian (14.8%); Somali (12.9%). Somatization: female > male.
Ritsner et al., 2000	To examine somatic distress in an immigrant population in Israel, to explore its relationship with psychological distress symptoms and health care-seeking behavior, and to determine its correlation with the length of residence in Israel.	N = 966 ♀ ♂ Age = 18–87 Russian-born Jewish Israel	Russia	- BSI*	Somatization prevalence: 21.9%; older > younger; divorced/widowed > others; Number of somatic symptoms: female > male; high length of residence > low length of residence. Distress + somatization prevalence: 20.4%. Somatization + psychological distress: positive correlation; Somatization + help-seeking behavior: positive correlation.

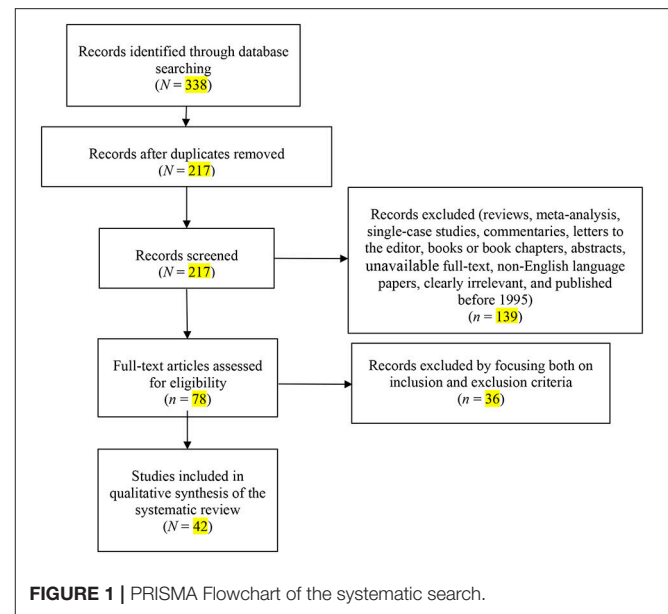
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TABLE 1 | Continued

Reference	Aims	Population target and geographic location	Country of origin	Measures of somatization	Results
Sachs et al., 2008	To explore the experiences, coping strategies, and psychological distress of Tibetan refugees who reported trauma exposure.	N = 769 ♀ ♂ Age = 16–78 Tibetan refugees India	Tibet	- SCL-90-R*	Low somatization scores on SCL-90-R ($M = 1.28$, $SD = 0.30$).
Salinero-Fort et al., 2015	To estimate and compare the prevalence of the most common mental disorders between Latin American-born and Spanish-born patients.	N = 1,594 ♀ ♂ Age = 18–55 Primary care outpatients Spain	South/Central America	- PRIME-MD	Somatiform disorder prevalence: Latin-American migrants (18.1%); native Spanish (6.6%). No significant group differences when adjusting for sociodemographic and social support variables.
Schweitzer et al., 2011	To investigate the contributions of pre-migration and post-migration factors in predicting mental health among Burmese refugees.	N = 70 ♀ ♂ Age = 18–80 Burmese refugee Australia	Myanmar	- HSCL-37*	Somatization prevalence: 37%. Pre-migration trauma events ($p < 0.05$), traumatization ($p < 0.01$), and PMLD ($p < 0.01$) were found correlated with somatization.
Shiroma and Alarcon, 2011	To examine the possible connection between demographic factors and acculturation level with somatization.	N = 180 ♀ ♂ Age = 20–60 Chronically mentally ill immigrants US	Latin America, Russia	- SCL-90-R*	Higher somatization: Russians > Hispanics; high school or above education; lower acculturation; shorter length of residence in the US (only among Russians).
Small et al., 2003	To explore cultural assumptions about somatization in three groups of immigrant women who had recently given birth in Melbourne.	N = 318 ♀ Age = n/a Women who had recently given birth, Australia	Vietnam, Turkey, Filipino	- SF-36*	Levels of somatic symptoms: Turkish > Vietnamese, Filipino.
Spiller et al., 2016	To examine factors associated with increased symptom severity of PTSD.	N = 134 ♀ ♂ Age > 18 Psychiatric outpatients Switzerland	Various ethnic groups	- SCL-90-R*	Somatization + PTSD: positive association ($p < 0.01$). PTSD symptoms were mainly predicted by somatization ($p < 0.001$).
Stewart et al., 2012	To evaluate if migrant women who experienced violence associated with pregnancy had a difference health profile compared to other childbearing migrant women.	N = 774 ♀ Age (M) = 28.3 Pregnant migrants Canada	South/Central America, Africa, Europe	- HSCL-37*	Somatization prevalence: abused migrants > non-abused migrants. Somatization + social support: no significant association.
Van Wyk et al., 2012	To examine the impact of therapeutic interventions for people from refugee backgrounds within a naturalistic setting.	N = 62 ♀ ♂ Age = 18–80 Adult refugees Australia	Myanmar	- HSCL-37*	Therapeutic intervention improved somatization (Effect size $r = 0.60$).
Whitley et al., 2006	To explore illness narratives, explanatory models, symptom-attribution and help-seeking in the community.	N = 15 ♀ ♂ Age: 21–67 Community sample Canada	West Indies	- MINI	MUS were ascribed to the chronic effect of overwork, lack of routine and irregular patterns of daily living.

BSI, *Bradford Somatic Inventory*; DSM-IV, *Diagnostic and Statistical Manual of Mental Disorders 4th ed.*; SCID-RV, *Structured Clinical Interview for DSM-IV Axis I Disorders – Research Version*; MSPQ, *Modified Somatic Perception Questionnaire*; SCL-90-R, *Symptom Check List-90 Items-Revised*; HSCL-37, *Hopkins Symptom Checklist-37*; DIS, *Diagnostic Interview Schedule Somatization Disorder Module*; SOMS-II, *Screening for Somatoform Symptoms-II*; SSI, *Somatic Symptoms Index*; PHQ-15, *Patient Health Questionnaire*; PRIME-MD, *Primary Care Evaluation of Mental Disorders*; BSI, *Brief Symptom Inventory*; SF-36, *SF-36 Health Survey*; MINI, *McGill Illness Narrative Interview*. *Authors specified in which language the questionnaires were administered and whether the scales were adapted to the language of participants. Authors specified in which language the questionnaires were administered and whether the scales were adapted to the language of 836 participants.

1987; Lipowski, 1988; Escobar et al., 1989; Mumford et al., 1991; American Psychiatric Association, 1994, 2013; Castillo et al., 1995; Escobar, 1995; Gureje et al., 1997; Kirmayer and Young, 1998; Silove et al., 1998; Simon et al., 1999; Mak and Zane, 2004; Aragona et al., 2005, 2008, 2010, 2011, 2012, 2013; Nickel et al., 2006; Kirmayer and Sartorius, 2007; Cwikel et al., 2008; Jackson and Kroenke, 2008; Sachs et al., 2008; Liberati et al., 2009; Bermejo et al., 2010; Beirens and Fontaine, 2011; Perruchoud and Redpath-Cross, 2011; Schweitzer et al., 2011; Shiroma and Alarcon, 2011; David et al., 2012; Deisenhammer et al., 2012; Heredia Montesinos et al., 2012; Stewart et al., 2012; Van Wyk et al., 2012; Bragazzi et al., 2014; Mölsä et al., 2014, 2017; Rohlf et al., 2014; Haller et al., 2015; Rask et al., 2015, 2016; Spiller et al., 2016; Choi et al., 2017; Dreher et al., 2017; Mendoza et al., 2017; Morawa et al., 2017; Radl-Karimi et al., 2018) were each used in three records. The PHQ-15 consists of four subscales: Somatoform Disorder, Depressive Disorder, Panic Disorder, and Functioning of the Patient. The HSCL-37 measures symptoms along three subscales: Anxiety, Depression, and Somatization (Derogatis et al., 1974). The other questionnaires, i.e., Screening for Somatoform Symptoms-II (SOMS-II) (Heredia Montesinos et al., 2012), the Somatic Symptoms Index (SSI) (Mak and Zane, 2004), the SF-36 Health Survey (SF-36) (Small et al., 2003), the Modified Somatic Perception Questionnaire (MSPQ) (Bragazzi et al., 2014), and the Brief Symptom Inventory (BSI) somatization subscale (Ritsner et al., 2000) were used in one article each. The SOMS-II evaluates somatization disorder according to DSM-IV (Rief et al., 1997). The SSI measures somatization disorder and is based on the DSM classification (Escobar et al., 1989). The SF-36 provides a measure of physical, mental, and social functioning (Ware and Sherbourne, 1992). The MSPQ is a scale used to measure somatization and to investigate body perception and physiologic functions (Main, 1983). The BSI was developed from the SCL-90-R; its Somatization subscale measures the distress arising from perceptions of bodily dysfunction (Derogatis and Spencer, 1982). Four studies (Bäarnhielm and Ekblad, 2000; Miranda et al., 2005; Fenta et al., 2006; Salinero-Fort et al., 2015) assessed somatization administering standardized semi-structured interviews based on the DSM-IV classification, i.e., Structured Clinical Interview for DSM-IV Axis I Disorders – Research Version (SCID-RV) (Bäarnhielm and Ekblad, 2000), Diagnostic Interview Schedule (DIS) Somatization Disorder Module (Fenta et al., 2006), and Primary Care Evaluation of Mental Disorders (PRIME-MD) (Miranda et al., 2005; Salinero-Fort et al., 2015). Each aims to give a measure of common mental health problems, including somatoform disorders (Swartz et al., 1986; Spitzer et al., 1994; First et al., 1997). Whitley et al. (Whitley et al., 2006) administered the McGill Illness Narrative Interview (MINI) (Groleau and Kirmayer, 2004). The MINI has been used in cross-cultural research in many cultures and contexts to explore diverse health issues and conditions, including MUS. Six records assessed somatization using unstandardized semi-structured interviews (Hondius et al., 2000; Mirdal, 2006; Perron and Hudelson, 2006; Karasz et al., 2007; Beirens and Fontaine, 2011; Borra, 2011) mainly focused on: MUS (Perron and Hudelson, 2006; Karasz et al., 2007), emotional distress associated with physical



symptoms (Beirens and Fontaine, 2011), and somatic complaints (Hondius et al., 2000; Mirdal, 2006; Borra, 2011). Finally, in two studies conducted by Nadeem et al. (Nadeem et al., 2008, 2009), participants were classified as somatizers when they reported six or more DSM-IV symptoms of somatization disorder.

International Migrants Compared to Host Country Natives

Eight studies did not find significant differences in levels of somatization between migrant and local populations. In a study undertaken to assess the prevalence of mental disorders in 1,594 outpatients seen in primary care, Salinero-Fort et al. (2015) found that the prevalence of somatoform disorders was significantly higher ($p < 0.001$) among Latin American immigrants (18.1%) than in Spanish native-born outpatients (6.6%); however, the association became not statistically significant after adjusting for sociodemographic variables. Miranda et al. (2005) compared 9,151 low-income African-born, Caribbean-born, and US native-born black women on rates of somatic symptoms. Rates of somatization were similar across the three groups (3.2, 3.3, and 2.8%, respectively). In two studies, Nadeem et al. (2008, 2009) recruited low-income immigrant and US-born women with perceived mental health problems. In both studies the groups did not differ significantly in somatization rates. Two studies conducted in Finland (Mölsä et al., 2014, 2017) investigated the presence of somatization in older Somali refugees and pair-matched Finnish controls; no group differences were found. In a comparative study, David et al. (2012) investigated group differences in somatization using a sample of 753 immigrant and German native-born women treated for hyperemesis gravidarum. Although the number of immigrant women treated for hyperemesis gravidarum was higher compared to the resident population, both groups showed high levels of somatization. Finally, in a study that compared 576 immigrants of different

ethnic groups and 400 Israeli native-born patients accessing primary care clinics (Mirdal, 2006), no significant group differences in rates of somatization were found.

Somatization was found to be significantly prevalent in immigrants in only four studies that compared samples of immigrants with the host country's natives (Beirens and Fontaine, 2011; Deisenhammer et al., 2012; Bragazzi et al., 2014; Dreher et al., 2017). An Italian study (Bragazzi et al., 2014) investigated the differences in somatic perception between a group of 143 immigrant outpatients from South America and Africa vs. a control group of 186 Italian outpatients. After adjusting for gender and age differences, the immigrant group showed significantly higher mean scores of somatic disturbances than the control group ($p < 0.01$). In a comparative study involving Vietnamese immigrant and native German outpatients (Dreher et al., 2017), 32% of Vietnamese patients were classified as suffering from severe somatic symptoms, while only 12.8% of the German patients reported severe somatic symptoms ($p < 0.001$). Deisenhammer et al. (Deisenhammer et al., 2012) compared 40 Turkish immigrant women, 55 Turkish women residing in Turkey, and 41 Austrian native-born women. Results showed that Turkish immigrants had the highest prevalence of somatic symptoms, though not significantly higher than Turkish persons living in Turkey. Beirens and Fontaine (2011), who investigated somatization-related complaint differences between 144 Turkish immigrants, 222 Turkish living in Turkey, and 353 Belgians native-born, found that Turkish groups living in Turkey reported a higher tendency to somatize, followed by Turkish immigrants and Belgians.

Sociodemographic and Cultural Predictors of Somatization

Thirteen studies investigated the relationship between specific sociodemographic characteristics and somatization in immigrants. Reports showed that being female (Ritsner et al., 2000; Mak and Zane, 2004; Aragona et al., 2005, 2008, 2012; Fenta et al., 2006; Cwikel et al., 2008; Bragazzi et al., 2014; Rask et al., 2016; Morawa et al., 2017), older (Ritsner et al., 2000; Mak and Zane, 2004; Mölsä et al., 2014, 2017), and having low language proficiency (Dreher et al., 2017; Morawa et al., 2017) are significant and common sociodemographic risk factors for somatization among immigrants.

Conflicting results have been found on marital status (Ritsner et al., 2000; Aragona et al., 2008), education level (Aragona et al., 2008; Shiroma and Alarcon, 2011), acculturation level (Mak and Zane, 2004; Shiroma and Alarcon, 2011), length of residence (Ritsner et al., 2000; Mak and Zane, 2004; Shiroma and Alarcon, 2011; Aragona et al., 2012), and economic satisfaction (Mirdal, 2006; Choi et al., 2017), relative to somatization. The effect of education level on somatization was investigated in an American study involving 1,747 Chinese immigrants (Mak and Zane, 2004). The authors found that the experience of somatization was more prevalent among individuals with less than college education. In contrast, in a study involving 180 Russian and Latino immigrants in the US (Shiroma and Alarcon, 2011), high school or above levels of education were found to be significantly

associated with higher somatization. The effect of marital status on somatization was investigated in an Italian study involving 301 outpatients of various ethnic groups (Aragona et al., 2008). The authors showed a significantly increased risk for somatization among Caucasian-married subjects ($p = 0.035$). Ritsner et al. (2000) examined somatic distress and its correlation with specific demographic characteristics in 966 Russian-born Jews who had migrated to Israel. Overall, the prevalence of somatization was 21.9%; divorced and widowed respondents, compared to married and single respondents, were more likely to meet the criteria for somatization. The authors also found that longer length of residence in the host country was associated with higher levels of somatization symptoms ($p < 0.0001$). A cross-sectional study (Shiroma and Alarcon, 2011), involving Russian and Hispanic immigrants living in the US, found conflicting results. In the univariate and multivariate analyses, shorter length of stay in the US was significantly related to somatization (though only among Russians; $p < 0.001$) and higher somatization scores were significantly related to lower acculturation ($p < 0.001$) within both groups. Conversely, in a study of 1,747 Chinese Americans in Los Angeles County, length of residence in the host country and acculturation were not related to somatization (Mak and Zane, 2004). In this investigation, the prevalence of somatization for the total sample was 12.9%. Aragona et al. (2012) assessed differences in somatization among Europeans, Asians, South Americans, and Africans living in poor social conditions. Among the 3,051 recruited outpatients, 25.6% were somatizers, but there were no significant differences in the duration of permanence in Italy and immigrant regular/irregular status. Focusing on economic satisfaction, a follow-up study conducted in the US (Mirdal, 2006) showed that, although living conditions of subjects had improved (i.e., economic independence and social improvement) during the last 20 years, and the number of somatic complaints had decreased, levels of distress were still high. In a study examining the relationship between somatization and life satisfaction of North Korean refugees resettled in South Korea (Choi et al., 2017) somatization was found to be related only to the economic satisfaction domain ($r = -0.19$, $p < 0.01$).

Six of the examined studies compared immigrants of different ethnic groups and considered the associations between ethnicity or other sociodemographic factors and somatization. (Aragona et al., 2005) evaluated the prevalence of somatization in a sample of 301 immigrants of four ethnic groups (Caucasian, Asian, South-Central American, and African) attending a primary care service in Italy. The prevalence of somatization in the total sample was found to be 35.2%. Somatization was significantly higher in South-Central Americans than in other ethnic groups ($p = 0.012$). In a subsequent study involving the same sample (Aragona et al., 2008), subgroup analysis of the ethnic groups showed a significantly increased risk for somatization only for Caucasian ($p = 0.001$) and South-Central American ($p = 0.003$) women and Caucasian married persons ($p = 0.035$). In another multicultural study conducted in Italy, Aragona et al. (2012) assessed the differences in somatization among immigrant outpatients living in poor social conditions. Among the 3,051 recruited participants, 25.6% were somatizers, the greatest proportion of whom were from South America (30.1%), followed

by Europeans (23.2%), Africans (21.2%), and Asians (16.3%). Specifically, the authors found that somatization occurred more frequently in Peruvians (32.9%). Small et al. (2003) compared 107 Turkish, 104 Vietnamese, and 107 Filipino women who had recently given birth in Australia. Results showed that Turkish women were the most likely of the three groups to report high levels of somatic symptoms, followed by Vietnamese and Filipino women. In two studies, Rask et al. (2015, 2016) assessed and compared the prevalence of mental health symptoms among Russian, Somali, and Kurdish immigrants in Finland. The prevalence of somatization was 14.8% for Russians, 12.9% for Somalis, and 28.9% for Kurds (Rask et al., 2016). The authors also reported that somatization increased the odds for mobility limitation within all migrant groups (Russians OR 4.29; Somalis OR 18.83; Kurds OR 3.53) (Rask et al., 2015).

Clinical Psychological Features of Immigrants at Somatization Risk

To date, ten investigations have examined the association between somatization, general psychological distress, and other vulnerability or protective psychological factors in individuals with migratory backgrounds. Three studies found positive associations between psychological distress and a wide range of somatic complaints in depressed patients (Mak and Zane, 2004; Borra, 2011; Heredia Montesinos et al., 2012). Borra (2011) showed higher levels of psychological distress in Turkish depressed women living in the Netherlands who reported somatic symptoms than Turkish depressed women without somatic symptoms. Heredia Montesinos et al. (2012) showed significant correlations between depression ($p < 0.101$), overall psychological distress ($p < 0.001$), and somatic symptoms in Turkish depressed women living in Germany. Mak and Zane (2004) found similar results in a sample of 333 Turkish immigrants in Germany, where 24.2% of the total sample exhibited severe levels of somatization. Among these somatizing persons, 53.1% also reported comorbid severe levels of depression ($r = 0.74$).

In a Swedish qualitative study, Bäärnhielm and Ekblad (2000) found that Turkish migrant participants ($N = 10$) experienced and communicated psychological distress in the form of physical symptoms, even when somatic diagnoses were present. Distress was communicated by concrete expressions about the body, emotions, and social and life situations. The participants' illness attribution patterns were mostly characterized by not verbalizing causal explanations, but rather links of coherence between health and various aspects of life. Ritsner et al. (2000) investigated the relationship between psychological distress and somatization in an immigrant population in Israel. The co-occurrence of these factors was 20.4%. Somatization was positively correlated with the intensity of psychological distress ($p < 0.001$). Similar results were found in a study involving a representative community sample of Chinese Americans (Mak and Zane, 2004); it was reported that anxiety ($p < 0.001$), depression ($p < 0.001$), adverse lifetime events ($p < 0.05$), and social support ($p < 0.05$) were significantly related to somatization.

Focusing on perceived social support, in a recent study (Mendoza et al., 2017) that evaluated the role of migration stressors on poor mental health among Filipino female domestic workers in China ($N = 261$), Mendoza et al. (2017) applied hierarchical multiple regression analysis to test for direct and moderating effects of social networks on psychological distress. Post-migration stress was significantly and positively correlated with somatization symptoms ($p < 0.001$) and with somatization symptom severity ($p < 0.01$). Social network support from family was not associated with somatization, nor did it modify the association between stress and these symptoms. Social network support from friends, however, was positively associated with somatization and significantly moderated the relationship between stress and these symptoms ($p < 0.01$). Stewart et al. (2012), investigating a sample of pregnant immigrant women, found that although abused women were more likely to have inadequate social support and to report more depression, anxiety, somatization, and PTSD ($p < 0.001$), social support status did not affect somatization.

Two studies examined the effect of cultural differences on somatization in immigrants, taking into account specific clinical-psychological features. A study that compared Turkish persons living in Belgium, Turkish living in Turkey, and Belgians native-born. Turkish majorities scored higher on all somatic factors, anxiety-sadness, and self-conscious emotions followed by Turkish immigrants and Belgian majorities (Beirens and Fontaine, 2011). Indeed, the authors found a mediation effect of anxiety-sadness and self-conscious factors on the differences in somatic factors only between Belgians and non-migrated Turkish persons (Beirens and Fontaine, 2011). Sachs et al. (2008) explored the experiences, coping strategies, and psychological distress of Tibetan refugees in India who reported trauma exposure. The authors used data on coping strategies and cognitive appraisal of experience severity to test the hypothesis that these mechanisms mediate psychological outcomes. Participants reported notably low psychological and somatic symptoms; thus, coping activity (primarily religious) and subjective appraisals of the severity of their experiences (i.e., social comparison) appeared to mitigate the psychological effects of trauma exposure.

Finally, only two studies sought to evaluate the effects of treatment interventions on somatization in immigrants. In a 6-week randomized prospective controlled trial aimed at examining whether bioenergetic exercises significantly influenced the inpatient psychotherapeutic treatment results for 128 Turkish immigrants with chronic somatoform disorders, this activity appeared to improve symptoms of somatization (Nickel et al., 2006). A longitudinal non-randomized study (Van Wyk et al., 2012) examined the impact of therapeutic interventions of mental health conducted with the aim of facilitating adjustment and acculturation for adult Burmese refugees within a naturalistic setting in Australia. Over the course of the interventions, participants experienced a significant decrease in symptoms of PTSD, anxiety, depression, and somatization ($r = 0.60$).

Somatization and Health Behavior

Six studies explored the associations between somatization and variations in perceptions of health, service utilization patterns, and treatment preferences in migrant populations. Karasz et al. (2007) investigated cultural differences in illness experience using a sample of immigrants divided into two groups: European Americans ($n = 36$) and South Asians ($n = 35$). The groups reported similar symptoms, but the organization of illness episodes and explanatory models associated with these episodes differed sharply. Twenty percent of all European American psychological illness problems (but none of South Asian problems) were explained entirely by physical or somatic causes. Moreover, 43% of European American psychological problems included at least one physical cause, while only 4% of psychological problems in the South Asian group included at least one physical cause.

The health service utilization patterns of immigrants and refugees were analyzed by Fenta et al. (2006) in a sample of 342 Ethiopians residing in Canada. The authors found that 63.2% of the respondents had experienced one or more somatic symptom(s) in the previous 12 months. The number of somatic symptoms experienced was positively associated with increased rate of medical services utilization ($p < 0.05$) and with increased utilization of nonmedical services (e.g., religious leaders, traditional healers, and other non-health professionals; $p < 0.001$). Ritsner et al. (2000) investigated the relationship between psychological distress and somatization symptoms and healthcare-seeking behavior. Somatization was positively correlated with self-reported poor health and with healthcare-seeking behavior ($p < 0.001$). Additionally, Mak and Zane (2004) found that a significantly higher percentage of Chinese American somatizers rated their health as poor or fair, compared to non-somatizers ($p < 0.0001$) and reported seeking help from both traditional Chinese and Western medicine ($p < 0.01$). In two studies, Nadeem et al. (2008, 2009) compared low-income immigrants with US-born women with acknowledged mental health problems to investigate the differences in treatment preferences and perceived need for care. In the first study, somatization was found to be positively associated with endorsing medication ($p < 0.05$) and faith ($p < 0.05$) as a helpful treatment, with no significant differences between ethnic groups (Nadeem et al., 2008). The subsequent study (Nadeem et al., 2009) involved 1,577 low-income immigrant and US-born women with depression and found that having multiple somatic symptoms increased the likelihood of endorsing perceived need for care compared with having few somatic symptoms ($p < 0.001$), across all the ethnical groups.

The Clinical Link Between Trauma and Somatization

Immigrants frequently experience multiple traumatic events in pre-migration as well as post-migration life. Hondius et al. (2000), in a study aimed at estimating the contribution of different forms of violence to the health complaints of refugees, confirmed that high frequencies of torture events and substantial numbers of medical complaints were common

among immigrants. Specifically, the authors found that refugees attributed their somatic and psychological complaints to torture (29%) and to worries related to PMLD (40%). A positive correlation between somatization and the number of previous traumatic events ($r = 0.33$, $p < 0.001$) was also observed in North Korean refugees resettled in South Korea (Choi et al., 2017). Similarly, studies that compared mental and somatic health among 256 elderly Somali refugees and Finnish controls found that high levels of pre-migration traumatic events were associated with high levels of somatization symptoms ($p < 0.01$) (Mölsä et al., 2014, 2017).

Several studies have shown significant associations between somatization, traumatic events, PTSD and PMLD. Pre-migration traumatic experience and PTSD are both frequently observed in immigrant somatizers. Many studies (Aragona et al., 2010, 2011, 2013; Schweitzer et al., 2011; Mölsä et al., 2014) have found a comorbidity between PTSD and somatization, ranging from 30.7% to 80%. Aragona et al. (2010, 2011, 2013) identified a high prevalence of somatization in a sample of immigrants who had experienced traumatic events, in three studies undertaken in 2010, 2011, and 2013. The first study (Aragona et al., 2010) conducted on 101 immigrant outpatients attending a primary care service, found that the number of somatizers reporting at least one traumatic event (69.2%) was significantly higher than that of non-somatizers (40.3%). In the second study (Aragona et al., 2011), conducted on the same sample, the authors found that having PTSD was significantly more common in somatizers (30.7%) than in non-somatizers (6.4%). This study also reported that the number of somatizers having serious or very serious PMLD was significantly higher than that of non-somatizers ($p = 0.016$). Finally, the third study (Aragona et al., 2013), conducted on 391 immigrant outpatients, found that patients with PTSD had highest potentially traumatic events rates (49.95%), PMLD rates (56.94%), and somatization rates (80%). Consistent with these findings, Schweitzer et al. (2011) investigated the contributions of pre-migration and post-migration factors in predicting mental health among Burmese refugees in Australia. In this study, a substantial proportion of participants reported PTSD (9%) and somatization (37%). Pre-migration trauma events ($p < 0.05$), traumatization ($p < 0.01$), and PMLD ($p < 0.01$) were found to be correlated with somatization. Stewart et al. (2012) recruited 774 pregnant immigrant women to evaluate whether immigrant women who experienced violence associated with pregnancy had a different health profile compared to other childbearing immigrant women. The study showed that immigrant women who reported abuse associated with pregnancy (7.6%) were more likely to have symptoms of somatization ($p < 0.001$) and PTSD ($p < 0.001$).

A positive correlation between somatization and the severity of PTSD symptoms is also reported. Spiller et al. (2016) conducted a cross-sectional study to examine the factors associated with increased symptom severity of PTSD in 134 severely traumatized refugees. Somatization was found to be significantly related to PTSD ($p < 0.01$), trauma exposure ($p < 0.01$), and PMLD ($p < 0.01$). Specifically, PTSD symptoms were mainly predicted by somatization ($p < 0.001$) and anger ($p < 0.001$). Interestingly, only a cross-sectional study (Sachs

et al., 2008) involving 769 Tibetan refugees found that levels of somatization were extremely low, despite the high prevalence of potentially traumatizing events. The authors observed that coping activity appeared to mediate the effects of trauma exposure on psychological distress [$F_{(2,763)} = 17.96, p < 0.001, R^2 = 0.02$].

Finally, two studies focused on the illness narratives of immigrants suffering from somatic, emotional or MUS with the aim of exploring how immigrants made sense of their suffering. A Canadian study (Whitley et al., 2006) highlighted that West Indian immigrants ascribed their MUS almost exclusively to the chronic effect of post-migratory factors (overwork, lack of routine and irregular patterns of daily living). By contrast, a Swiss study (Perron and Hudelson, 2006) showed that Yugoslav asylum seekers attributed the onset of somatic symptoms to past traumatic experiences such as war, flight, and loss of loved ones, and talked about current difficult life conditions (financial worries, concerns about their children, uncertainty about the future, fear of expulsion, and lack of social support) as perpetuating their symptoms and posing barriers to improvement.

DISCUSSION

The present study aimed to systematically investigate published original research reports, evaluating the emerging clinical links between migration and somatization by providing a qualitative data synthesis of the studies. The main findings of this study are that migrants with somatization were more psychologically distressed, had an increased perceived need for healthcare service utilization, and reported more PMLD and/or PTSD than those without somatization. Specific individual features mediated the association between somatization and migration. The prevalence and correlates of somatization were found to vary across the immigrant groups, depending on cultural variation, in reasons for migration, stress exposure, explanatory models of illness, coping, and other individual variables.

In our first hypothesis, somatization would be significantly associated with migration because of the supposed high exposure to stressful experiences in individuals with migratory backgrounds. Rates of somatization in immigrants ranged between 12.9 and 67% (Nadeem et al., 2009; Rask et al., 2016). As shown in the results reported in the collected articles, there was an extreme variability in the association between somatization and migration according to the heterogeneity of the studied migrant populations, both in terms of mental health as well as other individual variables. Being female, older, and having low language proficiency are significant sociodemographic risk factors for somatization among immigrants (Ritsner et al., 2000; Mak and Zane, 2004; Aragona et al., 2005; Bragazzi et al., 2014; Dreher et al., 2017; Morawa et al., 2017). This suggests that some sociodemographic variables may represent specific risk factors for somatization across all ethnic groups. Studies showed conflicting results when taking into account other sociodemographic variables such as length of residence (Ritsner et al., 2000; Mak and Zane, 2004; Shiroma and Alarcon, 2011;

Aragona et al., 2012), income (Mirdal, 2006; Choi et al., 2017), acculturation (Mak and Zane, 2004; Shiroma and Alarcon, 2011), education level (Mak and Zane, 2004; Shiroma and Alarcon, 2011), and marital status (Ritsner et al., 2000; Aragona et al., 2008). Additionally, some studies (Miranda et al., 2005; Mirdal, 2006; Nadeem et al., 2008, 2009; David et al., 2012; Mölsä et al., 2014, 2017) did not find significant differences in levels of somatization between migrants and the host country's natives; alternatively, the differences became not statistically significant after adjustment for sociodemographic confounding variables (Salinero-Fort et al., 2015). These findings could be explained by the "healthy migrant" effect (Razum et al., 2000). Several studies have suggested that recent immigrants are generally healthier than native-born populations, notwithstanding that they frequently have a lower socioeconomic status and less access to health care services. This "epidemiological paradox" is usually attributed to a self-selection process prior to migration, "cultural buffering," and official health screening and employability in receiving countries (Domnich et al., 2012). Another consideration is that the somatization disparities became not statistically significant when migrant and native populations were recruited from psychiatric (Nadeem et al., 2008, 2009), socioeconomic (Miranda et al., 2005), and clinically disadvantaged settings (Mirdal, 2006; David et al., 2012).

By contrast, somatization was found to be significantly prevalent in immigrants in only four studies that compared samples of immigrants with the host country's natives (Beirens and Fontaine, 2011; Deisenhammer et al., 2012; Bragazzi et al., 2014; Dreher et al., 2017). Among these, only two studies (Beirens and Fontaine, 2011; Deisenhammer et al., 2012) tried to clarify the independent relationship between migration and somatization, by comparing individuals of the same nationality with and without migratory backgrounds. Contrary to expectations, results showed that levels of somatization in migrants were not significantly higher than those reported by non-migrant individuals with the same nationality. These results could be explained by the "health selection hypothesis." This construct suggests that immigrants tend to be different from their compatriots who do not migrate (Chiquiar and Hanson, 2002; Chiswick et al., 2008). Thus, immigrants may be more educated, less risk exposed, more entrepreneurial and better prepared to confront stressful situations (Anderson et al., 2004). Instead, some studies (Small et al., 2003; Karasz et al., 2007; Aragona et al., 2008, 2011; Sachs et al., 2008; Schweitzer et al., 2011; Shiroma and Alarcon, 2011; Deisenhammer et al., 2012; Rask et al., 2015, 2016) have underscored that the impact of life events, sociodemographic and clinical features, and the prevalence of somatization and its symptomatology varied between different ethnic groups. For example, in three multicultural studies (Aragona et al., 2005, 2008, 2012), the likelihood of somatization varied widely among the different groups and was significantly higher in Latin Americans. These results suggest that the relationship between somatization and migration is particularly complex and culturally mediated; hence, any diagnosis or treatment of the individual with migratory background must be grounded in some knowledge of the person's ethnic origin. Postulating the existence of such an

intimate and harmonious connection between somatization and ethnicity, however, overlooks a pivotal distinction: while it is true that ethnic variations can and do affect psychopathological presentations, some pathogenic features are so overwhelming that they will be expressed in any environment.

In our second hypothesis, the prevalence and correlates of somatization would be different, based on cultural variation in reasons for migration, trauma exposure, coping, and explanatory models of illness across immigrant groups and receiving contexts. Most of the examined papers (Hondius et al., 2000; Sachs et al., 2008; Aragona et al., 2010, 2011, 2013; Stewart et al., 2012; Choi et al., 2017; Mölsä et al., 2017) reported that immigrants use somatization to express their distress associated with pre-migration (e.g., material deprivation, religious persecution, torture, sexual abuse, being forced to harm others, loss of loved ones) and to post-migration (e.g., difficulties in accessing health and welfare services, difficulties in finding work or bad job conditions, stressors linked to the acculturation process, poverty, and discrimination) adverse life events. Pre-migratory traumatic events may have ongoing indirect effects by increasing the vulnerability of immigrants to future stressors, thus leading to more frequent PMLD. The presence and amount of PMLD are positively correlated with somatization (Aragona et al., 2011; Schweitzer et al., 2011). Moreover, PMLD in somatizers may exacerbate an existing predisposition to PTSD caused by exposure to pre-migration trauma (Schweitzer et al., 2011). This relation between pre-migratory traumas, PTSD, PMLD, and overall psychopathological symptoms is relevant because it stresses that traumatic experiences are key factors in immigrant psychopathology. Patients attribute their symptoms to past traumatic experiences and believe that PMLD contributes to their chronicity (Perron and Hudelson, 2006; Whitley et al., 2006). As a result, they formulate their suffering in both medical and social or legal terms, seeking help from physicians for all of them (Perron and Hudelson, 2006). Somatization increases the perceived need for care and health care service utilization (Nadeem et al., 2009). Moreover, increased rates of medical service utilization (especially family doctors) and increased utilization of non-medical services (i.e., traditional healers, religious leaders) were found to be strongly associated with somatization in immigrants (Ritsner et al., 2000; Fenta et al., 2006; Nadeem et al., 2008). Although somatizing immigrants tend to present high levels of help-seeking behaviors (Ritsner et al., 2000) and social interactions generally appear to play an important role in mental health and wellness for immigrants (Ahn et al., 2017), studies have shown that perceived social support did not affect somatization when post-migration stress (Mendoza et al., 2017) or traumatic experiences (Stewart et al., 2012) occur.

Studies have suggested that immigrants all over the world experience significantly more stressful life events, negative emotions, and psychological distress than non-immigrants, and therefore have a higher risk of somatization (Buchwald et al., 1986; Castillo et al., 1995). The tendency to somatize emotional distress was associated with poor mental health and quality of life in migrant populations (Mirdal, 2006; Rask et al., 2015, 2016; Choi et al., 2017). Studies have also found a comorbidity

between severe depression and somatization (Mak and Zane, 2004; Borra, 2011; Heredia Montesinos et al., 2012; Morawa et al., 2017). Moreover, research has shown that the tendency to report physical complaints could be an expression of overall psychological distress and depressive symptoms in immigrants (Borra, 2011; Deisenhammer et al., 2012; Heredia Montesinos et al., 2012).

However, negative emotions seem to be associated with somatization, independent of the migration factor (Beirens and Fontaine, 2011). The explanatory models of illness episodes may differ sharply among different cultural groups, yet psychological attribution is rarely accepted; instead, individuals tend to communicate distress through concrete expressions about the body (Bäärnhielm and Ekblad, 2000; Karasz et al., 2007). From this perspective, somatization may not necessarily be a pathological mechanism among migrant populations, but rather a product of cultural differences.

Caution, however, should be exercised when interpreting the findings of this systematic review because of the limits of the reviewed studies. Overall, studies prevalently adopted a cross-sectional design ($n = 38$), used only one method for assessing somatization (Ritsner et al., 2000; Small et al., 2003; Mak and Zane, 2004; Heredia Montesinos et al., 2012; Bragazzi et al., 2014), and are difficult to compare because different definitions for somatization were applied. Different somatization measures were used, with different cutoff points for somatization. In addition, most studies did not look at coexisting somatic disorders; a thorough somatic examination was rarely included. Thus, in most cases, a full diagnosis of the somatic symptom disorder could not be reached. Moreover, 29 studies used self-report questionnaires to evaluate somatization; among these, seven (Mak and Zane, 2004; Cwikel et al., 2008; Heredia Montesinos et al., 2012; Mölsä et al., 2014, 2017; Rask et al., 2015, 2016) did not specify in which language the scales were administered or whether the scales were adapted to the language of the participants. Therefore, it would be advisable for future studies to use the same instruments, with consistent cutoff points for somatization. When translated, there should be a back-translation, and after that a validation of the questionnaire.

During our examination of the environmental factors related to health in immigrants, it became clear that there was a lack of tailored therapies that included psychological, social, and legal assistance with the aim of promoting adjustment and acculturation, improving mental health, and mitigating the symptoms of somatization in immigrant patients. Indeed, only two studies sought to evaluate the effects of treatment interventions on somatization in immigrants (Nickel et al., 2006; Van Wyk et al., 2012). In addition, as patients and health care professionals face differences in cultural backgrounds (e.g., linguistic barriers, variant health/illness beliefs, different medical practices, lack of knowledge about health care systems), understanding and treating somatization in multicultural settings is particularly challenging (Perron and Hudelson, 2006; Bäärnhielm, 2012; Dastjerdi, 2012). Based on the available literature, there is a clear need for better access to healthcare services for immigrants that is both culturally and linguistically appropriate and, as well, affordable for low-income

individuals (Radl-Karimi et al., 2018). Clinically, depending on the country of origin, health care professionals should be aware of the immigrant patients' tendency to somatize psychological distress and of their ascriptions of meaning of symptoms within a multicultural milieu. Pre-migration, migration, and post-migration experiences all include risk factors for mental health. In this regard, the complexity of both the migratory phenomenon and acculturative stress, with their potentially traumatic burden, should be considered.

The present review supports the need to determine the psychological processes and socioeconomic factors that may increase the tendency to somatize in individuals with migratory backgrounds. From a clinical perspective, it seems essential to identify those subgroups at higher somatization

risk through their social and psychological characteristics. Clinical management should include efforts to address inherent emotional distress, as may be generated through their migratory experience. Further, special attention should be paid to the social, cultural and linguistic issues that can pose additional obstacles in the assessment and treatment phases and in the development of a therapeutic alliance with the patient.

AUTHOR CONTRIBUTIONS

All authors participated in the concept and writing of this manuscript. All authors approved the final version of the manuscript.

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Course of Mental Health in Refugees—A One Year Panel Survey

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Background: Cross-sectional studies indicate that a substantial proportion of refugees have psychiatric disorders. However, longitudinal studies on the course of psychiatric symptoms and on influencing factors are scarce. The current study investigates the development of symptoms in an untreated refugee sample in Germany and seeks to identify potential predictors.

Methods: Over the course of 1 year, 57 refugees participated in monthly assisted self-reports on the phone assessing emotional distress. At the same time, semi-annual, semi-structured clinical interviews focusing on posttraumatic stress disorder (PTSD) and depression were conducted. The overall dropout rate for the year was 23% for the assisted self-reports and 33% for the clinical interviews.

Results: Symptoms did not systematically change over the course of the year. On the individual level, a reliable change in PTSD symptoms was observed in 13% who showed improvement and 24% who showed worsening symptoms. Figures for depression symptoms were 24 and 16% respectively. A higher number of traumatic experiences was related to a greater intensity of PTSD symptoms. In addition, postmigrational stressors were associated with a worsening of PTSD symptoms over the course of the year. Emotional distress was associated with current negative life events, unemployment, and frequent visits to physicians.

Conclusions: There is on average no improvement or worsening of symptoms over the period of 1 year. However, individual courses vary, and thus show the importance of risk factors. Accordingly, the identification of risk factors such as trauma load and postmigrational stressors can be useful to determine the need of further monitoring and to provide appropriate interventions when necessary.

Keywords: refugee, mental disorders, longitudinal study, PTSD, depression, traumatic experiences, postmigrational stressor, Germany

INTRODUCTION

Increasing numbers of refugees worldwide have been recorded in the last years (1). In a careful meta-analysis of studies examining rates of psychiatric disorders in samples of refugees relocated to high-income western countries, Fazel et al. (2) emphasized the heterogeneity of the samples and of the findings. From these data, Miller et al. (3) concluded that about a third of the refugees in well-to-do countries present with PTSD. However, these authors also argued that a

general, standard rate of PTSD in refugees worldwide may not be meaningful, as the likelihood of developing PTSD depends largely on the cumulative exposure to traumatic stressors (4, 5) as does its spontaneous remission (6). Recent reviews and studies with current refugee groups in Germany and other European countries showed similar prevalence rates (7–12). Research on the long-term mental health problems of refugees also showed a high variability and high prevalences, with depression rates ranging between 2 and 80% and PTSD rates between 4 and 86% (13). In certain conditions, PTSD or depression can affect half of the refugees even one to two decades after resettlement (14–16).

While most research in this area is conducted in the form of cross-sectional designs, longitudinal studies are essential for designing healthcare. Findings of longitudinal studies in refugee populations vary immensely—results range from improving to unchanging to aggravating mental health symptoms over time. Several studies showed improvements in the refugees' mental health symptoms, for example, a decline in the PTSD and depression rate of 55% within 3 years (17–19). On the other hand, a few studies found an overall increase in PTSD symptoms over time—for example, from 37 to 80% within 1.5 years (20, 21). Other studies reported no overall change in mental health symptoms, but highlighted the high variation in symptoms within persons over time (22, 23). For example, Lamkaddem et al. (24) found no change in PTSD prevalence after 7 years; however, half of the refugees being diagnosed with PTSD at the 7 years follow-up were new cases.

Refugees frequently experienced adversities such as domestic violence and poverty during their upbringing (1, 25, 26). Furthermore, they often faced organized violence in their home country, such as war and torture, and criminal violence during their flight (1). All of these factors are known to contribute to mental ill-health (27–29). Additionally to the exposure to traumatic stressors, it has been argued that postmigrational stressors (PMS)—especially social and interpersonal factors, but also factors connected to the asylum procedure and socioeconomical situation—may play a major role in the development and course of PTSD, depression, and anxiety disorders in refugees (13, 30–32).

To our knowledge, there are no longitudinal studies on the naturalistic course of refugees' mental health across extended periods. Thus, we aimed to examine the course of mental health symptoms in an untreated refugee sample living in Germany. We combined semi-structured clinical interviews assessing PTSD and depression, conducted semi-annual, with monthly assisted self-ratings on emotional distress (screening for symptoms of PTSD, depression, and anxiety). Furthermore, we intended to reveal potential predictor variables influencing the course of these symptoms. Therefore, we examined the association of traumatic experiences and PMS with the changes in mental health. As research on daily stressors and their effect on mental health is scarce, we moreover analyzed the effect of daily stressors on emotional distress. We also aimed to detect further variables associated with mental health problems such as higher numbers of medical visits.

METHOD

Study Design

To closely monitor the course of mental health symptoms in refugees, the current study consisted of two complementary parts:

(1) Monthly assisted self-report (t1–t12): Monthly telephone interviews were conducted over the course of 1 year and started 1 month after the first clinical interview (t0, see below). Trained native speakers conducted an interview with the participating refugees using a self-report instrument about emotional distress and life changes over the past month. The duration was around 15 min.

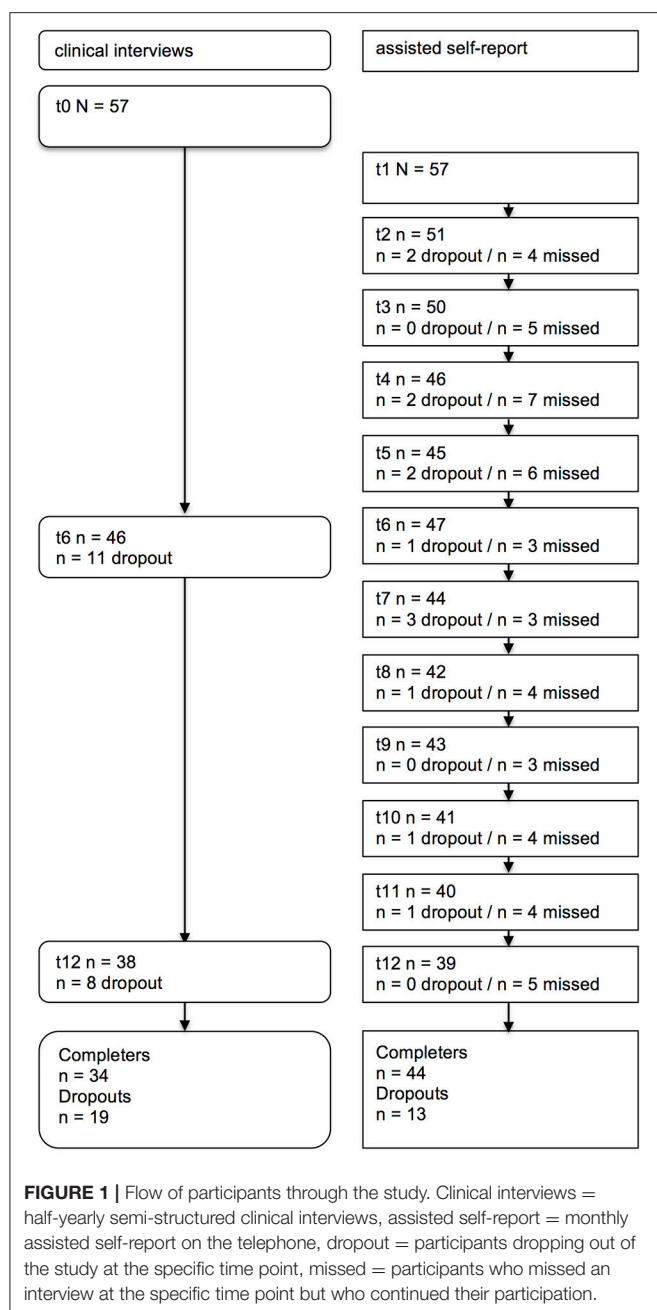
(2) Semi-annual clinical interviews (t0, t6, t12): Expert psychologists performed semi-structured clinical interviews at baseline (t0), after 6 months (t6), and after 12 months (t12). The initial interview (t0) was conducted within the scope of other studies performed at the Center of Excellence for Psychotraumatology (CEP) and took around 2–4 h to complete, often split in two sessions. The interviews at t6 and t12 took around 1 to 2 h to complete. All interviews included questionnaires about posttraumatic stress disorder (PTSD) and depression. Additionally, traumatic experiences were assessed at t0, and postmigrational stressors at t12.

The study design and the flow of participants is depicted in **Figure 1**. Dropout was defined as the last point in time a person participated in the study. Missed was defined as one absent time point of a person who is still participating in the study. Completers for the assisted self-report were defined as those who participated in at least 8 interviews or in all 3 time points for the clinical interview, respectively. The dropout rate for the assisted self-report was 23% ($n = 13$). The reasons were deportation to the home countries ($n = 5$), the wish to end the participation ($n = 4$), and unavailability on the phone ($n = 4$). The dropout rate for the clinical interviews was somewhat higher (33%; $n = 19$) due to the relocation of some participants to distant regions ($n = 6$). Characteristics between study completers and dropouts were comparable in most aspects; however, completers had a shorter duration of stay in Germany and a higher number of traumatic event types compared to dropouts (for further information, see **Supplementary Table 1**).

Procedures

Most refugees of the present study were actively recruited by research assistants in asylum accommodations in and surrounding a medium-sized city in southern Germany. Some were referred to the CEP by social workers, volunteers, or lawyers because they were conspicuous in their behavior. After the initial interview (t0), the further procedure was discussed with the participants.

Participants with mental health problems were thoroughly informed about their symptoms and if wished, they either were offered therapy at the CEP or they were referred to other institutions. Only refugees who did not receive psychological treatment were included in the study. Some of the refugees showed clinically-relevant symptoms but either (a) were put on our waiting list because of limited capacities of the CEP



and when offered a therapy after some months, they did not start a therapy (because they did not fulfill the PTSD criteria anymore, moved away, or had no time because of their job or family issues), or (b) did not wish a treatment at that point in time. At the end of the study some of the participants wished and accordingly received treatment. Refugees who accepted psychological treatment at the CEP were also monitored, but this investigation is still ongoing. No more than 2 persons of the same family were included, this was the case for 5 dyads. Written informed consent was given by the participants, and in case of minors, additionally by the legal guardian. Participants received an information sheet with relevant information on

the study. Monetary compensation (€40) was given for their contribution. In case of arising problems, participants were able to contact the investigators and, if necessary, an additional appointment was arranged. The Ethical Review Board of the University of Konstanz, Germany approved the study. Including the participants receiving psychological treatment, the project was registered at Clinical Trials (clinicaltrials.gov) with the registration number NCT02852616. The goal of the present investigation was not to evaluate treatment success, but to closely monitor changes in those who do not seek treatment.

Setting

The study was conducted at the CEP between 2015 and 2017. Each participant was monitored for a period of 12 months. The CEP is a specialized research center for asylum seekers and refugees, which in particular studies the effects of traumatic stress on mental health and offers treatment to refugees with severe trauma-related suffering. The clinical interviews were conducted by clinical psychologists trained and experienced in the work with refugees and the diagnostic of mental health problems. Most interviews were conducted with the help of experienced interpreters who were also trained and supervised in this context. To ensure blindness in respect to the prior mental health status, we aimed to assign a different interviewer and interpreter for each clinical interview of one participant. However, the available interpreters for languages rarely requested were below three, resulting in a limited blindness of the interpreters for some participants.

The assisted self-report was conducted by native speakers who received a training especially designed for the purpose of this study ($n = 23$). The training included theoretical and practical lectures on mental health issues, how to conduct an assisted self-report as a telephone interview, how to handle possible upcoming problems, and supervised practicing of the assisted self-report. Supervision was provided regularly. Participants had the same interviewer for all assisted self-reports. However, due to the unavailability of five interviewers in the course of the study, changes in the interviewer were necessary for the according participants. The phone calls for the assisted self-reports were conducted at the CEP or the homes of the interviewers without the presence of other people. To create a confidential setting, respondents were asked to find a calm and undisturbed place. On average, telephone interviewers tried to contact the participant $M = 2.9$ ($SD = 2.4$, range 1–20) until the interview could be successfully completed. The assisted self-reports took on average $M = 18.6$ min ($SD = 7.4$, range 5–45).

Participants

Fifty-seven refugees and asylum seekers participated in the study. Inclusion criteria were status as asylum seeker or refugee and age above 12 years. Exclusion criteria were continuous psychotherapy, presence of acute psychotic symptoms, or no access to a phone. Sociodemographic characteristics are depicted in Table 1.

TABLE 1 | Socio-demographic characteristics.

Characteristics	Total sample (N = 57)
Female sex, No. (%)	34 (60)
Age, M (SD, range), years	30.3 (11.5, 12–56)
Adolescent, No. (%)	8 (14)
Education, M (SD, range), years	8.0 (4.1, 0–15)
Stay in Germany, M (SD, range), months	9.3 (6.6, 2–36)
Core family members in Germany, No. (%)	41 (72)
COUNTRY OF ORIGIN, NO. (%)	
Syria, No. (%)	22 (39)
Afghanistan, No. (%)	15 (26)
Iran, No. (%)	7 (12)
Balkan states, No. (%)	6 (11)
Iraq, No. (%)	4 (7)
West Africa, No. (%)	2 (4)
Russia, No. (%)	1 (2)
ACCOMMODATION, NO. (%)	
Emergency shelter	23 (40)
Standard refugee accommodation	22 (39)
Private accommodation	12 (21)
ASYLUM STATUS, NO. (%)	
First instance application	40 (70)
Rejection	9 (16)
Recognition	8 (14)

Measures

Assisted Self-Reports

The assisted self-reports consisted of questions about daily life, changes in the past month and the Refugee Health Screener–13. Questionnaires were identical for all 12 interviews.

Daily life and changes in the past month

Five self-constructed questions about the participants' occupation, life events, medical visits, and changes in the accommodation and the asylum procedure were asked. If participants answered with yes, subsequent in-depth questions were asked (e.g., which kind of change occurred, what kind of occupation they had; see **Supplementary Table 2** for the wording of the questions). For calculations, occupation was defined as a regularly attended work, apprenticeship, or school. Only a few people reported changes in their housing situation or asylum status; accordingly, no calculations with these factors could be conducted. New life events were split into positive and negative events. For visits to physicians, the number of visits to the general practitioner and other medical doctors (psychiatrists were excluded) were summarized. Visits to psychotherapists, psychiatrists, or inpatient health care were rarely reported and therefore not included in the calculations.

Refugee Health Screener–13

The Refugee Health Screener–13 [RHS-13; (33)] is a shortened 13-item version of the original RHS-15 (34). It is an efficient self-rating instrument which assesses emotional distress in refugees, thereby comprising symptoms of PTSD, depression, and anxiety.

The 13-item version shows good psychometric properties in refugee samples in the US and in Germany, comparable to the characteristics of the RHS-15 (8, 9, 33). Cronbach's α varied between 0.89 and 0.95 for the 12 time points. The RHS-13 correlated significantly with the measures used for PTSD and depression symptoms at the according time points (PTSD: $r_{t01} = 0.33$ ($p < 0.05$); $r_{t06} = 0.55$ ($p < 0.001$); $r_{t12} = 0.45$ ($p < 0.01$); depression: $r_{t01} = 0.43$ ($p < 0.001$); $r_{t06} = 0.63$ ($p < 0.001$); $r_{t12} = 0.52$ ($p < 0.001$)).

Semi-Structured Clinical Interviews

All the instruments used in the semi-structured clinical interviews are described below and are organized thematically.

Sociodemographic data

Sociodemographic information was asked in detail at t0 and included, inter alia, sex, age, education, country of origin, duration of stay in Germany, type of accommodation, and asylum status.

PTSD

Due to the change from DSM-IV to DSM-5, PTSD, and traumatic events were assessed with two differing instruments in t0. Thereby, we applied one PTSD instrument for each participant. For those participating at the beginning of the study, the PTSD Symptom Scale—Interview Version [PSS-I; (35)] for DSM-IV was used. It consists of 17 questions and is rated on a 4-point Likert scale. The PSS-I shows good psychometric properties (36, 37). For DSM-5, the Posttraumatic Stress Disorder Checklist-5 [PCL-5; (38)] was used. It consists of 20 questions and is rated on a 5-point Likert scale. Studies show a good validity and reliability for the PCL-5 (39, 40). Both PSS-I and PCL-5 were administered as a semi-structured clinical interview, including severity and frequency of the symptoms in equal parts. Each item which was rated with at least “moderately” was considered for the evaluation of the DSM-5 criteria. Additionally, we assessed the remaining criteria (duration of symptoms and functionality). In the 6- and 12-month follow-up interviews, the PCL-5 (DSM-5) was used consistently.

The PSS-I and PCL-5 have a different scaling (PSS-I: 0–3, PCL-5: 0–4), therefore the original scores needed to be transformed for calculations. As the majority of the data was assessed with the PCL-5, we transformed the PSS-I scale to make it comparable to the PCL-5 scale. Following Wortmann et al. (41) who have done the same transformation, the PSS-I scale was transformed by multiplying the original values with 4/3. The three items that were not assessed in the PSS-I were imputed using the individual mean of all measured items. The total sum score of the PCL-5 (range 0–80) and diagnosis according to DSM-5 are used in this study. Cronbach's α at t0 is 0.89, at t6 0.95, and at t12 0.90.

Depression

The Patient Health Questionnaire –9 [PHQ-9; (42)] was used at t0, t6, and t12. It assesses all 9 depression symptoms on a 4-point Likert scale. The PHQ-9 is a commonly used instrument and shows good psychometric properties (42, 43). Cronbach's α at t0, t6, and t12 is 0.87, 0.90, and 0.85. We used the symptom severity and diagnosis according to DSM-5 in this study. Depression

diagnosis was met when at least 5 items were rated to be present “more than half the days” or “nearly every day” in the past 2 weeks, with at least one of those items being item 1 or 2 (depressed mood or loss of interest/ pleasure).

Traumatic events

Traumatic events were assessed in detail at t0 with two different instruments: The event checklist of the PSS-I (44) contains 12 different traumatic events types and was used in combination with the PSS-I. The Life Events Checklist [LEC-5; (45)] was used in combination with the PCL-5. It contains 17 categories of traumatic events and shows good psychometric properties (46). For each participant only one of the two questionnaires was assessed. For calculations, the overlapping 12 events which were experienced or witnessed by the participants were used. To also include all events named by the participants where the LEC-5 was used, namings in the additional 5 items were re-sorted to the most suitable of the 12 events. Calculations were conducted with the sum score of the 12 dichotomous items. The occurrence of new traumatic events was assessed in t6 and t12.

Postmigrational stressors

Postmigrational stressors (PMS) were assessed using the Post-Migration Living Difficulties Checklist [PMLD; (47)] at t12. The checklist was especially developed for refugees and has been used in diverse refugee populations (48). It consists of 24 potential PMS and is rated on a 5-point Likert scale for the last 12 months. Items can be grouped into three domains: Protection concerns (e.g., fear of being sent home, delays in processing applications, worries about family at home), access to health and welfare (e.g., poor access to emergency care, little governmental help), and stress related to resettlement conditions (e.g., not being able to find work, poverty, loneliness and boredom; (22)). To meet the particular circumstances of the refugee population in Germany, one item called “living situation” was added. No change in Cronbach's $\alpha = 0.83$ could be detected by adding the item. For calculations the sum score ranging from 0 to 100 was used.

Data Analysis

The statistical program SPSS 24.0 supported the descriptive data analysis and the program R 3.3.2 was used for statistical calculations such as linear growth models, multiple imputation, and for graphical displays. To check if participants who dropped out of the study differed in their characteristics to those who stayed in the study, *t*-tests for independent samples, Mann-Whitney U tests, and LR χ^2 tests were conducted.

Individual Symptom Changes

Meaningful symptom changes in the individuals were calculated with the reliable change index [RCI; (49)]. For the calculations, the test-retest reliability of $r = 0.82$ for the PCL-5 (50) and $r = 0.84$ for the PHQ-9 (51) was used. Further, the SD of the baseline assessment of the present sample was included. Significant improvement or worsening of symptoms was considered as statistically significant if the difference between t0 and t12 exceeded 1.96 ($\alpha = 0.05$). Participants were divided in four groups: improvement, worsening, ongoing clinically

relevant symptoms without a significant change (defined as fulfilling the diagnosis according to DSM-5 at least at one of the two included time points), and subclinical symptoms without a significant change.

Linear Growth Models

Linear growth models (LGM; also called mixed effects or multi-level models) offer an appealing approach to analyse longitudinal data by including within- and between-subject changes (52). In the present study, LGMs were used to assess potential changes in symptoms in the course of time as well as to identify possible predictors. Calculations were conducted with the nlme package in R (53).

We calculated LGMs for the response variables RHS-13, PCL-5, and PHQ-9. Fixed and random effect components were specified in the following manner:

(a) Fixed factors: Time, possible predictors, and their interaction were considered as fixed main effects. Analyzed predictor variables for RHS-13, PCL-5, and PHQ-9 were sociodemographic variables, traumatic events, and PMS. Additional predictor variables for the RHS-13 were occupation, positive and negative events, and medical visits. We only allowed two factors and their interaction per model to avoid overfitting. To control for the cumulated alpha error due to multiple testing, we applied the Benjamini-Hochberg procedure (54), resulting in a corrected *p*-value of $\alpha = 0.013$ for the RHS-13 and $\alpha = 0.025$ for the PCL-5. Because there were no close to significant results for the PHQ-9, no corrected *p*-value could be calculated.

(b) Random factors: For each fixed effect model, random intercept and random slope model were compared. First, we added a random intercept which included the variable *subject*, thereby allowing each participant to have an individually different initial level of symptoms. In a second step, we formulated a random slope model which included the variables *subject* and *time*. Additionally to the random intercept, the random slope allows for individual changes in symptoms over time. To determine the model with the best fit, the random intercept and slope model were then compared using the likelihood ratio χ^2 test. In case of a non-significant difference between the models, and following the law of parsimony, the random intercept model was chosen. Further, we included the autocorrelation structure AR(1) because symptoms of adjacent time points are likely to correlate to a higher degree (52). As an estimator, the restricted maximum likelihood estimator was used because it accounts for the uncertainty in the fixed effects and is therefore preferable in small samples (55).

The assumptions of LGMs were met (55). Following Maas and Hox (56), LGMs also show accurate results in small sample sizes comparable to the present sample. The inclusion of all available data ($N = 57$ participants) was allowed because LGMs can handle missing data that are missing completely at random (the missings are completely unrelated to the data) or missing at random (the missings are not related to the missing values itself but to other variables; (55)). Visual inspection of the raw values led us to the conclusion that the data in the present study was found to be missing at random. To check the stability of the results, we compared the LGMs with all participants included vs.

the LGMs excluding participants with less than 2/3 of the data. No differences could be detected; therefore, the results for the whole sample will be reported. To graphically illustrate the course of symptoms, we used spaghetti plots and exemplary individual courses of symptoms as described in Bolger and Laurenceau (52).

Missing Values

Missing values are a difficulty often faced in multilevel data (57). The replacement of missings was done with multiple imputation (MI)—a commonly used and recommended method in estimating missing values in multilevel data (58). MI was applied with the help of the R package mice 2.30 (59). The assumption that the missing data can be classified as missing at random can be seen as fulfilled by visual inspection (60). Missing values in individual scores were imputed to calculate sum scores of response variables when less than 10% of the according questionnaire was missing. Additionally, missing time points were imputed for the graphical presentation of the exemplary individual courses of symptoms if <1/3 of the data was missing. This led to a reduced sample size of $n = 44$ for the RHS-13 and $n = 34$ for PCL-5 and PHQ-9. For the LGMs no MI was conducted. As the missing 3 items in the PSS-I don't fulfill the assumption of random missingness, we imputed these items with the individual mean.

RESULTS

Traumatic Experiences, Postmigrational Stressors, and Mental Health

Participants experienced between 1 and 12 different traumatic event types ($M = 4.9$, $SD = 2.6$, $n = 57$). Postmigrational stressors (PMS) were rated on average with $M = 30.1$ ($SD = 14.9$, range 4–75, $n = 38$). A PTSD was diagnosed for 32% (18 of 57 cases; PCL-5 score $M = 15.4$, $SD = 12.6$, range 0–48) at t0, for 27% (12 of 44; $M = 18.6$, $SD = 16.6$, range 0–60) at t6, and 24% (9 of 38; $M = 16.7$, $SD = 12.5$, range 0–51) of the participants at t12. Criteria for a major depression were fulfilled by 16% (9 of 57; PHQ score $M = 8.2$, $SD = 6.1$, range 0–27) at t0, by 27% (12 of

45; $M = 9.5$, $SD = 7.0$, range 0–25) at t6, and by 16% (6 of 38; $M = 7.4$, $SD = 5.7$, range 0–22) of the participants at t12.

Course of Mental Health Symptoms

First, we examined the course of symptoms for the response variables RHS-13, PCL-5, and PHQ-9 by including the fixed effect time only, and subject and time as a random slope. For all three symptom parameters, time did not represent a significant factor for the linear growth curve of the symptoms (RHS-13: estimate = -0.13 , $SE = 0.14$, $t = -0.95$, $p = 0.342$; PCL-5: estimate = 1.22 , $SE = 1.36$, $t = 0.90$, $p = 0.373$; PHQ-9: estimate = -0.11 , $SE = 0.63$, $t = -0.18$, $p = 0.856$; for further information on the estimates see **Supplementary Table 3**). Respectively, in **Figure 2**, no change in the symptom level of emotional distress, PTSD, and depression could be detected for an average person of the sample. However, the fitted lines for the individuals show considerable between-subject variability of the intercepts and also of the slopes. The within-subject variability is illustrated in **Figure 3** on exemplary raw and fitted courses of symptoms.

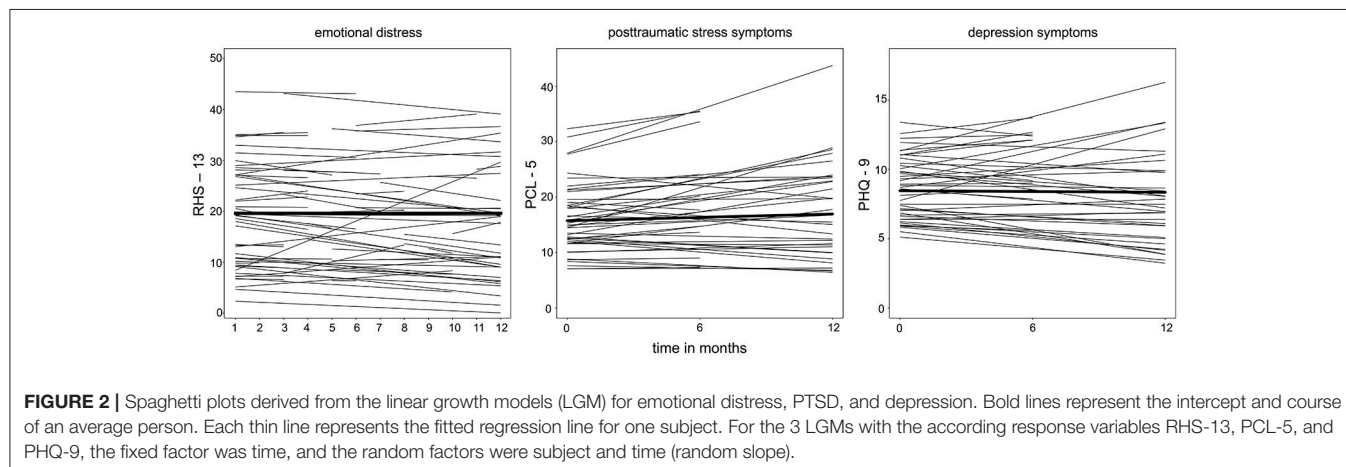
Individual Symptom Changes

The majority of participants showed no significant change in PTSD and depression symptoms between t0 and t12. For PTSD symptoms, 24% ($n = 9$ of 38) of the participants showed a worsening and 13% ($n = 5$ of 38) an improvement of their symptoms. No clinically significant changes were found in 40% ($n = 15$ of 38) of the participants showing constantly subclinical and 24% ($n = 9$ of 38) showing ongoing clinically relevant PTSD symptoms. Results for changes in the depression symptoms are comparable, showing a worsening in 16% of the participants ($n = 6$ of 38), an improvement in 24% ($n = 9$ of 38), and 53% ($n = 20$ of 38) with subclinical depression symptoms, and 8% ($n = 3$ of 38) with ongoing clinically relevant depression symptoms.

Predictors for the Course of Mental Health Symptoms

Emotional Distress

For the RHS-13, predictors detecting changes within the year were examined and tested with LGMs (see **Table 2** for



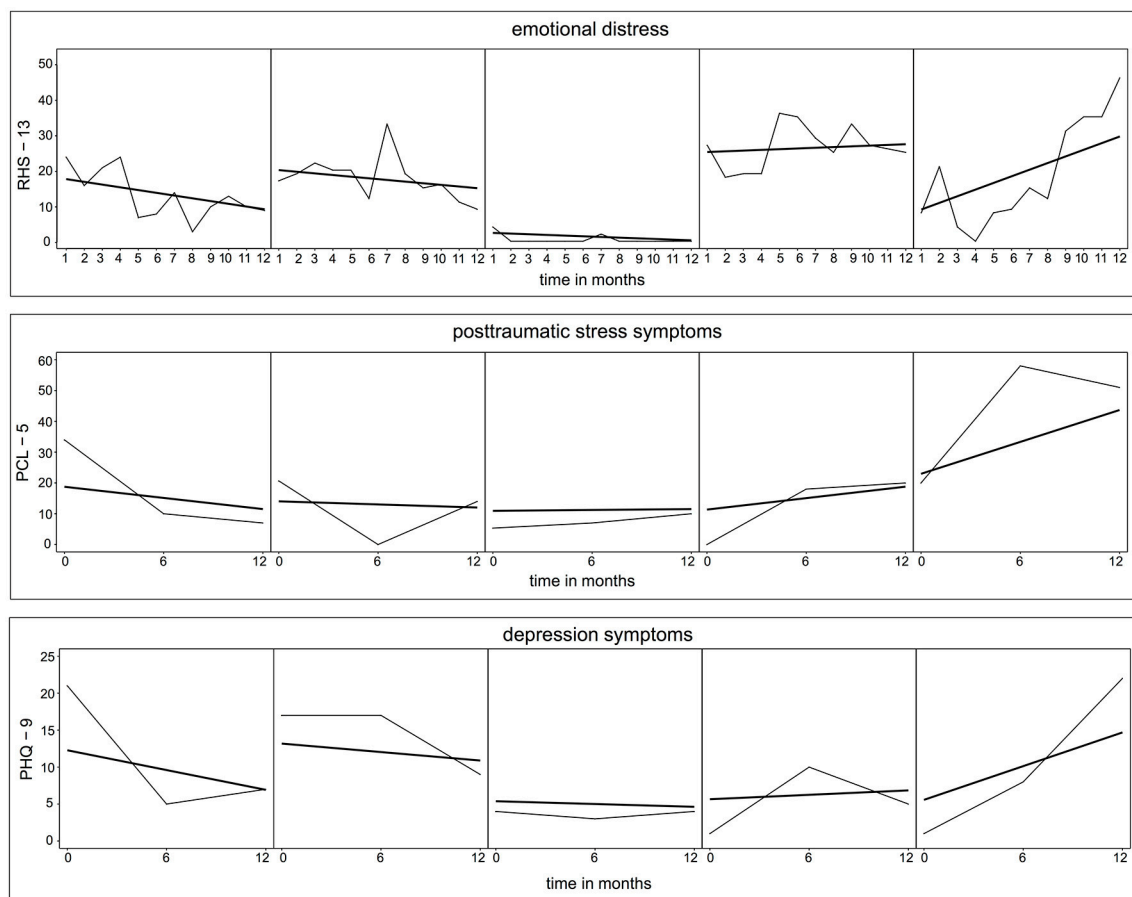


FIGURE 3 | Raw and fitted individual time courses of emotional distress, posttraumatic stress symptoms, and depression symptoms for exemplary participants. Thin lines represent the actual course of symptoms. Bold lines depict the individually predicted LGMs. Selection procedure: Participants were ordered by the gradient of their slope and based on the quartiles exemplary participants were chosen.

the estimates). By including occupation (school, work, or apprenticeship) and time as fixed effects in the model, a significant main effect for occupation was found. That is, participants with a regular occupation reported less emotional distress.

In the second model, with the quantity of visits to physicians and time included as fixed effects, the quantity of visits revealed a significant main effect. Hence, participants who reported higher levels of emotional distress visited physicians more often.

Further, we constructed 2 models examining the effect of negative and positive events and time on the level of emotional distress. The most common positive events reported by the participants were the marriage of relatives or friends ($n = 14$), birth of relatives ($n = 7$), and celebrations ($n = 4$). The occurrence of positive events was not found to be associated with emotional distress. However, including the occurrence of negative events and time as fixed effects in the model, a significant main effect for negative events was found. Consequently, participants reporting more negative events showed a higher level of emotional distress. Negative events most often mentioned were the death of relatives

($n = 26$), severe disease of relatives ($n = 18$), and own illness ($n = 16$).

Sociodemographic variables (gender, education, age), traumatic events, and PMS did not reveal a significant main effect and / or interaction with time.

PTSD and Depression

Sociodemographic variables as predictors for PTSD and depression were tested with LGMs. No significant main effects and interactions with time of the variables gender, education, age, partnership, duration of stay in Germany, duration of flight, asylum status at t_0 , and living situation at t_0 were found. Furthermore, for depression, no significant effects with traumatic events or PMS were found (see **Table 3**).

When modeling the symptom level of PTSD along the time, the analysis revealed a significant fixed effect of the number of different traumatic event types, but no interaction with time (compare **Table 3** for estimates). Consequently, across time, participants with a greater number of different types of traumatic events showed higher PTSD symptoms.

TABLE 2 | Parameter estimates for linear growth models—Refugee Health Screener-13.

Models for RHS	Predictor occupation ^a	Predictor physician ^a	Predictor positive event ^a	Predictor negative event ^a
FIXED EFFECTS (INTERCEPT, SLOPES)				
Intercept, estimate (SE), 95% CI	19.37 (1.77), [15.89, 22.85]	18.95 (1.57), [15.87, 22.03]	19.75 (1.57), [16.65, 22.84]	18.34 (1.56), [15.27, 21.42]
<i>t</i> , <i>p</i>	10.93, <0.001	12.09, <0.001	12.54, <0.001	11.72, <0.001
Predictor ^a , Estimate (SE), 95% CI	−4.51 (1.44), [−7.35, −1.68]	3.39 (0.93), [1.57, 5.21]	−1.32 (1.53), [−4.32, 1.68]	4.88 (1.14), [2.64, 7.12]
<i>t</i> , <i>p</i>	−3.13, 0.002	3.66, <0.001	−0.87, 0.386	4.28, <0.001
Time, estimate (SE), 95% CI	−0.17 (0.15), [−0.48, 0.13]	−0.12 (0.14), [−0.39, 0.16]	−0.13 (0.14), [−0.40, 0.14]	−0.09 (0.14), [−0.36, 0.18]
<i>t</i> , <i>p</i>	−1.14, 0.256	−0.85, 0.395	−0.94, 0.350	−0.66, 0.509
Interaction, estimate (SE), 95% CI	0.37 (0.20), [−0.02, 0.77]	−0.21 (0.15), [−0.50, 0.08]	−0.13 (0.26), [−0.64, 0.38]	−0.08 (0.19), [−0.46, 0.29]
<i>t</i> , <i>p</i>	1.86, 0.063	−1.43, 0.155	−0.50, 0.616	−0.43, 0.669
RANDOM EFFECTS				
Intercept, SD	10.60	11.02	11.09	10.84
Slope, SD	0.66	0.71	0.70	0.64
Intercept x time, correlation	−0.33	−0.26	−0.21	−0.17
Residuals, SD	5.66	5.93	6.00	5.88
Autocorrelation	0.26	0.18	0.19	0.24
MODEL SELECTION				
AIC random intercept	3494.60	3576.76	3680.20	3638.35
AIC random slope	3486.42	3566.78	3670.29	3632.75
LR χ^2 , <i>p</i>	12.19, 0.002	13.98, <0.001	13.91, 0.001	9.59, 0.008

Corrected $\alpha = 0.013$ with Benjamini-Hochberg procedure, SE = standard error; CI = confidence interval; AIC = Akaike information criterion; LR = likelihood ratio; ^a predictor as defined in the respective column.

In a second model, PMS and time as fixed effects for the level of PTSD symptoms were tested. No significant fixed effect for PMS was found; however, a significant main effect for time and a significant interaction between PMS and time were found. The result revealed that participants who reported more PMS for the past year showed an increase in PTSD symptoms over the course of the year, while participants with less PMS showed a reduction in their symptoms (compare **Table 3** for estimates).

To test whether both significant factors for PTSD—traumatic event types and PMS—remain significant in a combined model, we tested an exploratory LGM including traumatic event types, PMS, and time as main factors, and subject and time as random effects. Results revealed the same effects: a significant main effect was found for traumatic event types (estimate = 1.76, SE = 0.76, $t = 2.31$, $p = 0.027$), but not for PMS or time. A significant interaction was detected between PMS and time (estimate = 0.25, SE = 0.09, $t = 2.89$, $p = 0.005$), but not between traumatic events and time.

DISCUSSION

The aim of the present study was to depict the representational course of mental health symptoms in untreated refugees residing in Germany. Results indicate no overall change in emotional distress, PTSD, and depression symptoms over the course of 1 year. This can also be found on the individual level, with the majority showing no significant change in PTSD or depression symptoms. Risk factors for the severity and course of PTSD symptoms were the amount of different traumatic experiences

and PMS. The intensity of emotional distress symptoms was associated with current negative life events, no occupation, and the amount of visits to physicians.

In line with previous longitudinal studies, the present findings showed on average no change in symptoms over time (22–24). However, other studies find a trend of improving or worsening symptoms of refugees' mental health over time (19, 21). At first sight, these results seem contradictory; however, we believe that the results mainly reflect the variability of mental health symptoms due to differing refugee characteristics, experiences in the home country, and the host country's surroundings—a conclusion also drawn for differing prevalence rates (12, 13). Accordingly, the results first and foremost show that the occurrence and the course of mental health symptoms in refugees depends on a variety of factors thereby also influencing the overall course of symptoms. This is also depicted in the high within- and between-subject variability found in the present study. Furthermore, around 40% show a significant worsening or improvement of their symptoms over time—this is in line with other studies finding a high heterogeneity in the courses of individuals (23, 24).

Consistent with previous research, we found high trauma exposure and PMS to be risk factors for PTSD symptoms (13, 32). Additionally, the exploratory LGM including both PMS and traumatic events revealed that traumatic events influence the severity of PTSD symptoms, while experiencing many PMS is associated with a deterioration of the PTSD symptoms over time. This finding highlights the importance of both traumatic events and PMS. To our knowledge, this result is new, as previous

TABLE 3 | Parameter estimates for linear growth model—PCL-5 and PHQ-9.

Models for PCL-5 and PHQ-9	PCL-5		PHQ-9	
	Predictor traumatic events ^a	Predictor PMLD ^a	Predictor traumatic events ^a	Predictor PMLD ^a
FIXED EFFECTS (INTERCEPT, SLOPES)				
Intercept, estimate (SE), 95% CI	6.58 (3.80), [−0.99, 14.15]	21.36 (4.37), [12.65, 30.07]	7.29 (1.75), [3.80, 10.78]	8.61 (2.06), [4.49, 12.73]
<i>t</i> , <i>p</i>	1.73, 0.088	4.89, <0.001	4.16, <0.001	4.17, <0.001
Predictor ^a , Estimate (SE), 95% CI	1.89 (0.69), [0.51, 3.27]	−0.21 (0.13), [−0.48, 0.05]	0.25 (0.32), [−0.38, 0.89]	−0.03 (0.06), [−0.15, 0.10]
<i>t</i> , <i>p</i>	2.75, 0.008	−1.62, 0.113	0.80, 0.428	−0.47, 0.638
Time, estimate (SE), 95% CI	4.27 (3.08), [−1.86, 10.40]	−6.97 (2.77), [−12.49, −1.45]	−0.92 (1.46), [−3.81, 1.98]	−2.19 (1.34), [−4.86, 0.47]
<i>t</i> , <i>p</i>	1.39, 0.170	−2.52, 0.014	−0.63, 0.531	−1.64, 0.105
Interaction, estimate (SE), 95% CI	−0.66 (0.54), [−1.75, 0.42]	0.26 (0.08), [0.10, 0.43]	0.12 (0.26), [−0.39, 0.63]	0.07 (0.04), [−0.01, 0.15]
<i>t</i> , <i>p</i>	−1.22, 0.226	3.18, 0.002	0.46, 0.646	1.72, 0.090
RANDOM EFFECTS				
Intercept, SD	0.32	0.36	0.13	0.18
Residuals, SD	13.61	12.13	6.31	5.75
Autocorrelation	0.37	0.35	0.31	0.35
MODEL SELECTION				
AIC random intercept	1088.33	855.24	888.92	698.58
AIC random slope	1090.97	858.79	892.73	702.07
LR χ^2 , <i>p</i>	1.36, 0.506	0.45, 0.800	0.20, 0.905	0.51, 0.775

Corrected $\alpha = 0.025$ with Benjamini-Hochberg procedure, SE = standard error; CI = confidence interval; AIC = Akaike information criterion; LR = likelihood ratio; ^a predictor as defined in the respective column.

studies including PMS were mainly cross-sectional or focused on particular PMS (13, 30). However, despite of the longitudinal design, the causality of this relationship cannot be determined. While most cross-sectional literature assumes that PMS influence mental health (30), a longitudinal study by Tingvold et al. (31) showed that psychological distress leads to more acculturative hassles a decade later. Accordingly, an interaction between mental health and PMS seems to be likely. Furthermore, we looked in detail at particular stressors present in the host country. Thereby, we found a surprisingly high occurrence of negative events in the examined sample. The experience of those negative events was associated with higher levels of emotional distress at the according time point. This goes in line with other studies reporting that negative events in the host country or bad news about family members in the home country negatively influence mental health (61–63). The finding that a regular occupation such as work, school, or apprenticeship goes along with lower emotional distress is consistent with the literature (14, 64). However, the question of whether employment and mental health symptoms interact or lead to the respective other one remains open.

The heterogeneity of the naturalistic course of symptoms implies that especially vulnerable persons with a variety of risk factors need to be identified and suitable interventions should be offered. The influencing factors found in this study correspondingly lead to certain implications for practice and future research: Frequent visits to physicians can be an indicator of mental health problems. Together with other studies showing that refugees tend to receive little specialized treatment and are often not or wrongly diagnosed (65), this

leads to the conclusion that physicians and mental health specialists should cooperate to provide the best possible and timely treatment - for example, by conducting mental health screenings in medical practices and referring those with mental health issues to the according mental health experts. Furthermore, appropriate treatment should be offered to reduce the effect of traumatic experiences on the mental health. Thereby, trauma-focused psychotherapeutic treatment shows good results in decreasing related mental health symptoms (66, 67).

The present study has certain limitations: The examined sample is a convenience sample, including 5 family dyads. Further, refugees receiving treatment—that is, especially those with more severe mental health symptoms—were excluded from this study. The slightly differing characteristics between study completers and dropouts with regard to the number of traumatic events and duration of stay in Germany might be due to the distinct characteristics of the participants being deported to their home countries during the study period. In addition, we cannot rule out that the use of the two somewhat differing PTSD instruments and traumatic event checklists in the baseline assessment due to the change from DSM-IV to DSM-5 led to a potential measuring inaccuracy. The assisted self-ratings and the interviews rely on the participants' subjective reports.

Conclusion

On average, no change in the course of mental health symptoms could be detected—however, on an individual level, an improvement or worsening of symptoms was observed in

around 40% of the cases. Traumatic experiences seem to lead to generally higher PTSD symptoms, while PMS experienced during the study period seem to be related to increasing PTSD symptoms over time. Emotional distress is associated with unemployment, current negative life events, and visits to physicians. Consequently, intensifying the cooperation of physicians and mental health experts to identify mental health problems in refugees is indicated. Further, evidence-based psychotherapeutic treatment is needed to reduce the mental suffering and allow integration into the host society, thus breaking the cycle of PMS and mental dysfunction.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of the Declaration of Helsinki and the Ethics Committee of the University of Konstanz, Germany. The protocol was approved by the Ethics Committee of the University of Konstanz, Germany. All subjects gave written informed consent in accordance with the Declaration of Helsinki and the Ethics Committee of the University of Konstanz, Germany.

AUTHOR CONTRIBUTIONS

EK, TE, KH, and MS developed the study concept and design. EK, KH, and MS collected data. EK guided the study realization, performed the data analyses and interpretation of

findings, and wrote the first draft of the manuscript. IS and TE supervised the data analyses and interpretation. All authors revised the manuscript. All authors read and approved the final manuscript.

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SUPPLEMENTARY MATERIAL

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Stigmatization Is Associated With Increased PTSD Risk After Traumatic Stress and Diminished Likelihood of Spontaneous Remission—A Study With East-African Conflict Survivors

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Studies in conflict population have repeatedly documented that the number of traumatic event types experienced (trauma load) increases the risk to develop posttraumatic stress disorder (PTSD) in a dose-dependent manner. Misconceptions about survivors' experiences and actions during the war, as well as mental health symptoms frequently lead to stigmatization by their own families and the community, which might render them even more vulnerable for PTSD development and prevent successful recovery. We therefore investigated whether stigmatization affects trauma-related psychopathology beyond the well-known effect of trauma load. The study sample comprised $N = 1131$ survivors of the rebel war led by the Lord's Resistance Army (LRA) in Northern Uganda, including a large proportion of formerly abducted individuals and child soldiers. We investigated how the experience of stigmatization affects PTSD risk and the likelihood of spontaneous remission, taking trauma load into account. Further, the association of stigmatization with treatment outcome was determined in a subsample of $N = 284$ individuals with PTSD who received trauma-focused psychotherapy. More than one third of the total sample, and almost two-thirds of the therapy subsample, reported experiences of stigmatization. The main reasons for stigmatization were related to an association with a rebel group (e.g., being called a rebel), followed by mental health problems/PTSD symptoms and HIV/AIDS. Stigmatization was strongly associated with a higher prevalence of lifetime and current PTSD, a diminished probability of spontaneous remission and higher PTSD symptoms before and after trauma-focused psychotherapy, beyond the effect of trauma load. In sum, our results support the assumption that stigmatization aggravates trauma-related psychopathology and impede symptom improvement. In post-conflict regions, community and family interventions which aim at reducing stigmatization and discrimination might therefore complement individual psychotherapy in order to allow survivors to recover and reintegrate into society.

Keywords: stigmatization, discrimination, mental health, posttraumatic stress disorder (PTSD), narrative exposure therapy, post-conflict population, spontaneous remission, treatment outcome

INTRODUCTION

Stigmatization is usually caused by misconceptions and social disapproval based on different beliefs or perceptions, which lead to negative stereotyping and labeling of an individual, and can be followed by social exclusion and unjust treatment (1–3). A meta-analysis, mainly based on empirical studies conducted in Western countries, found stigmatization to be associated with poorer mental health and reported different reasons for the experience of stigmatization, e.g., symptoms of mental health problems, gender, HIV/AIDS, and sexual abuse during childhood (4). In accordance with that, Betancourt et al. (5) showed that the perceived stigmatization of former child soldiers from Sierra Leone correlated positively with levels of anxiety, hostility and depression. Further studies conducted in post-conflict settings associated stigmatization with decreases in prosocial behavior in children, as well as internalizing and externalizing problems, leading to even more stigmatization (6–8).

So far, only a small body of research investigated stigmatization as an essential risk factor for the development of mental diseases in post-conflict societies. Different studies conducted in post-conflict areas agree on a particularly high burden of stigmatization, rejection and exclusion of girls and women who experienced sexual violence and returned from captivity with children conceived from rape (9–11). Further, Betancourt et al. (5) showed that 71% of former child soldiers from Sierra Leone reported stigmatization. The main reasons were *being a former child soldier*, *female gender* and the *low financial status* of the family. It can be assumed that continuing stigmatization and discriminating actions have a strong negative effect on everyday life, leading to low self-esteem, long-lasting negative psychological effects and finally, preventing a successful re-integration into society (5, 12, 13).

To this day limited research has been conducted investigating the direct impact of stigmatization on PTSD risk in a post-conflict context. Studies conducted with survivors of sexual assault showed that the reaction of society, including stigmatizing responses, was highly predictive of PTSD symptom severity (10, 14, 15). Similar findings were shown by a study examining HIV positive women, showing that the severity of stigmatization was the strongest predictor for PTSD risk besides physical HIV symptoms and negative life change (16).

Research in post-conflict settings has repeatedly shown that the experienced amount of different types of traumatic events (trauma load) increases PTSD risk in a dose-dependent manner and leads to prevalence rates of up to 100% at extreme levels of trauma exposure (17–21). Furthermore, a higher trauma load decreases the likelihood of spontaneous remission (22) and results in the persistence of higher PTSD symptoms even after effective psychotherapy (Schneider et al., submitted). Nevertheless, it remains unclear how much variability of PTSD risk, spontaneous remission and therapy outcome, can be explained through stigmatization beyond the robust effect of trauma load. The investigation of the effects of stigmatization on trauma-related psychopathology is particularly interesting since, unlike trauma load, stigmatization can be addressed through interventions.

We investigated the effects of stigmatization in Northern Uganda, a region that was severely affected by the war between the rebel group “Lord’s Resistance Army” (LRA) and the Ugandan governmental soldiers for almost 20 years. Between 1986 and 2006 the LRA forcibly recruited approximately 60,000–80,000 people, most of them children (23, 24). Individuals abducted by the LRA were forced to commit atrocities, e.g. murder friends and families. Abducted girls were given to commanders as “wives,” leading to a huge number of rapes and unwanted pregnancies (25). In a population-based study on the post-conflict population of Northern Uganda, 98% of the participants reported at least one traumatic event, and 25% of former child soldiers fulfilled the diagnosis of PTSD at the time of the assessment (18).

Even though the Ugandan government granted amnesty for the returnees (26), many of them still face stigmatization in their day to day lives. Re-integration into civil society appears to be difficult, as returnees are frequently confronted with different social, economic, medical and psychological problems (9). As a consequence of the time spent in captivity or of the experienced atrocities by the LRA, many survivors suffer from medical issues, like HIV, present with mental health impairments, e.g., PTSD, depression, suicidality, and report to be stigmatized. In studies with individuals returning from the LRA (9, 23), every tenth participant reported rejection by his or her family and community. Of the interviewed women, 39% were called names and 35% had the feeling that their communities were afraid of them. Another five percent even reported the experience of physical violence by their relatives (9).

The aims of the present study were two-fold: First, we intended to investigate the prevalence of stigmatization in an exceptionally large cohort of Northern Ugandan rebel war survivors and assess the main reasons for stigmatization. Second, we wanted to determine the impact of the experienced stigmatization on PTSD risk taking trauma load into account, and unravel its impact on the likelihood of spontaneous remission and therapy success.

MATERIALS AND METHODS

Sample

The study was part of a larger project investigating gene \times environment interactions in PTSD etiology and treatment among survivors of the war between the rebel group LRA and the Ugandan governmental troops. On the one hand measures for the accurate assessment of the environmental factor trauma load were analyzed (27, 28), on the other hand genetic factors, in particular memory-related genes, were investigated in previous studies (29, 30). The data was collected in the former Internal Displaced People (IDP) camps Anaka, Pabbo and Koch Goma, and in villages of Gulu and Nwoya district, Northern Uganda. In total, 1813 individuals were interviewed and provided written informed consent prior to study participation. We excluded individuals with missing information on the experience of stigmatization or discrimination ($N = 638$), signs of current alcohol abuse ($N = 11$) and missing data regarding current and lifetime PTSD diagnostic status from the study ($N = 33$). Thus, statistical analyses on PTSD risk were based on a sample of

$N = 1131$ (627 females, $M_{age} = 32.80$, $SD_{age} = 10.38$, age range: 18–80 years). For investigations on the effect of stigmatization on treatment outcome a subsample of this cohort ($N = 317$) who received psychotherapy was used and will hereafter be referred to as *therapy sample*. All individuals in the therapy sample fulfilled the criteria for a current PTSD diagnosis according to DSM-IV-TR (31) with a minimum symptom score of 10 at the time of the first assessment and were offered treatment with Narrative Exposure Therapy [NET; according to the manual (32)]. Exclusion criteria were the use of psychotropic medication or former trauma-focused therapy, current signs of alcohol or substance addiction, presence of psychotic symptoms and age under 18 years. Since four individuals refused to participate in NET and 29 dropped out or were excluded from the study (see **Supplementary Material** for more information on drop-out and exclusion reasons) the sample used for statistical analyses on treatment outcome comprised $N = 284$ individuals (160 females, $M_{age} = 32.49$, $SD_{age} = 9.33$, age range: 18–62 years).

Materials and Study Procedure

The Institutional Review Board of Gulu University, the Lacor Hospital Institutional Research Ethics Committee, the Ugandan National Council for Science and Technology (UNCST), Uganda, and the ethics committee of the German Psychological Society (Deutsche Gesellschaft für Psychologie, DGPs), approved the study procedures. Local counselors, who were intensively trained on the concepts of mental health disorders, trauma and PTSD, counseling skills, and quantitative data collection, performed the interviews under close supervision of experienced psychologists. All diagnostic instruments were translated into Luo, the local language of Northern Uganda, following a procedure of translation, blind back-translation and independent review by trained interpreters to avoid any misinterpretation.

Demographics and Stigmatization

Besides demographic information, participants were asked whether they perceive stigmatization or discrimination (Do you feel people are stigmatizing or discriminating you [e.g., are bullying you, calling you names, laugh at you, act surprised or startled when they see you, or don’t know what to say to you?]). Even though the item assessed both stigmatization and resulting discriminating actions, we will in the following only use the term “stigmatization” for a better readability. If answered with “yes,” participants were furthermore asked to describe the reason(s) for stigmatization. For a descriptive overview of these reasons, the qualitative answers were assigned to the following 14 categories by two independent raters: LRA-related, HIV/AIDS, physical injury/disease (other than HIV/AIDS), mental health problems/PTSD symptoms, family-related problems, land issues, financial problems, different ethnicity, widowed, orphan, low education, political reasons, unknown and others. In case of a mismatch between the two raters, an independent third rater made a final decision. In the subsequent analyses, the impact of stigmatization on mental health outcomes was analyzed irrespective of the reason(s) for stigmatization (cf. **Table 1**).

TABLE 1 | Reasons for stigmatization in total sample and therapy sample.

Sample	Reasons for stigmatization (sorted by frequency in decreasing order)	N
Stigmatized individuals in total sample (N = 352; 31.12%)	LRA-related	216
	HIV/Aids	37
	Mental health problems/PTSD symptoms	31
	Family-related problems	26
	Others	24
	Physical injury/disease (other than HIV/Aids)	12
	Unknown	9
	Orphan	8
	Land-issues	7
	Different ethnicity	5
	Widowed	3
	Financial problems	3
	Low education	3
	Political reasons	1
Stigmatized individuals in therapy sample (N = 172; 57.53%)	LRA-related	134
	Mental health problems/PTSD symptoms	19
	HIV/Aids	9
	Family-related problems	4
	Land-issues	4
	Others	4
	Unknown	3
	Financial problems	3
	Different ethnicity	3
	Widowed	2
	Orphan	2
	Low education	1
	Physical injury/disease (other than HIV/Aids)	1
	Political reasons	0

PTSD, Posttraumatic Stress Disorder. Multiple answers were possible, therefore no percentages are reported. Reasons for stigmatization were sorted by frequency in decreasing order.

Trauma Event Types

Trauma exposure was assessed with a 62-item event list already used and validated in previous studies (28–30), which included events related to war and violence in general, the LRA war in particular, natural disasters, domestic violence and other traumatic events (e.g., life-threatening illness or accidents). Participants should indicate whether they ever experienced the described event or not. Afterwards, the sum score of the different traumatic event types experienced was calculated as a precise and the most economic measure of trauma exposure (27, 28).

Posttraumatic Stress Disorder (PTSD)

The diagnosis of current and lifetime PTSD according to DSM-IV-TR (31) was assessed with the Posttraumatic Stress Diagnostic Scale [PDS; (33)], which was applied as a diagnostic interview.

In addition to exposure to a traumatic event, participants had to fulfill one symptom in the intrusion cluster, three symptoms in the avoidance cluster and one symptom in the hyperarousal cluster. Furthermore, a functionality impairment as well as a symptom duration of at least one month was required to fulfill the diagnosis of PTSD.

The reliability and validity of the translated PDS has been previously assured for this context (34). An individual was classified as spontaneously remitted when he or she presented with a PTSD diagnosis in the past, but did not fulfill the symptom requirements for a current PTSD diagnosis any more at the time of the interview.

Narrative Exposure Therapy (NET)

NET is an exposure-based short-term therapy that has been developed particularly for survivors of multiple traumatic experiences suffering from PTSD (32). A common problem among PTSD patients constitutes their inability to allocate trauma-related cognitions and emotions to the past, resulting in the unwanted re-experience of traumatic memories with here and now quality, e.g., in the form of flashbacks or nightmares. During NET, the therapist assists the patients in re-integrating the defragmented memories of the traumatic experiences into a coherent and chronological narrative. By means of imaginative exposure, the client can thus locate the origins and cues of fearful emotions and learns to discriminate actual threats from traumatic memories of the past, which finally leads to symptom reduction (32). The effectiveness of NET for the treatment of PTSD in resource-poor as well as high-income countries has been shown in multiple studies [for reviews see (35, 36)]. Furthermore, NET has been successfully disseminated to local counselors in different conflict regions including Northern Uganda, who provided treatment with similar outcomes as expert psychologists (37–39).

In this study, well trained local counselors conducted the treatments under close supervision of expert psychologists. Treatment adhesion was monitored by weekly supervision meetings, intense case discussions, and a close review of the therapy session protocols. Participants received on average 12 sessions of NET that lasted 90–120 min and generally took place twice a week. Diagnostic assessments were carried out before treatment (t_1), and four (t_2), and 10 months (t_3) after the end of treatment. The timing of the follow-up assessments was chosen since NET, which aims at a chronological reconstruction of autobiographical memory, initializes a process of recovery which continues over time. Confirming this, evidence from Northern Uganda shows that NET treatment effects increase over time (39).

Data Analysis

All statistical analyses were performed with R version 3.4.1 (40). The alpha level for all analyses was 0.05.

Stigmatization and the Likelihood of PTSD and Spontaneous Remission

To investigate whether the prevalence for lifetime or current PTSD is higher among stigmatized than non-stigmatized individuals, χ^2 -tests were applied. Furthermore, we

hypothesized that stigmatization predicts lifetime and current PTSD risk beyond the influence of trauma load and may even intensify the cumulative effect of trauma load on PTSD risk. Both diagnostic variables were binary coded into 0 (no diagnosis) and 1 (diagnosis). Logistic regression models of increasing complexity were compared based on Akaike's information criteria (AIC) (41) and included trauma load, stigmatization and their interaction, to test whether the effect of stigmatization remains stable across all levels of trauma load. Further, sex and age were included as covariates. The assumptions of logistic regressions [no outliers, no multicollinearity, linearity of the logit; (42, 43)] were tested and did not reveal significant multicollinearity (variance inflation factor ≤ 1.1 in all analyses) or non-linearity of the logit. Nevertheless, we detected a few outliers. However, since extreme values of trauma load can be expected in this sample and represent valid data points, and since logistic regression analysis is known to be robust to outliers in large samples, outliers were not removed from the analyses (44, 45). Similar to the procedures for current and lifetime PTSD, χ^2 -tests were used to investigate stigmatization-dependent differences in the prevalence for spontaneous remission. Further, logistic regression models were calculated to unravel the effect of stigmatization on the likelihood of spontaneous remission using the same model selection procedure as described for lifetime and current PTSD. By exponentiating the regression coefficients of logistic regression models, the odds ratio (OR) can be obtained as a measure of effect size. The OR represents the change in the relative probability of the dependent variable being true, e.g., the patient has a PTSD diagnosis, if the independent variable increases by one unit. Hence, an OR > 1 represents an increase and an OR < 1 a decrease in probability. An OR of 1 means no change in probability (46). To evaluate the statistical significance of stigmatization, trauma load and the covariates included in the models for binary outcome variables, we calculated likelihood ratio (LR) tests (47).

Stigmatization and Therapy Outcome

Finally, linear mixed effect models were used to investigate whether stigmatization similarly influences PTSD treatment response, i.e., changes in current PTSD symptom severity over time [R package "nlme" version 3.1.120; (48)]. Therefore, models were compared with the AIC and included the PDS sum score as outcome variable, time as a within-subject fixed factor, stigmatization as a between-subject fixed factor and their interaction. The predictor variable time was factorized to be able to test for non-linear symptom reduction. Additionally, the covariates trauma load, sex and age were included as additional fixed factors and participants were modeled as a random effect, with random intercepts for each participant. Due to non-normally distributed model residuals, statistical significance was evaluated by means of permutation tests using 1,000 random permutations and empirical p -values (p_{emp}) are reported. Cohen's d is reported for the treatment effect size. In addition, χ^2 -tests were calculated to investigate whether stigmatized compared to non-stigmatized individuals have a higher risk to still fulfill the diagnostic criteria for current PTSD four and 10 months after the end of therapy.

Finally, it has to be noted that although all study participants survived the same conflict, the time of trauma exposure varied strongly between the participants, as the LRA conflict lasted two decades. To test for a potential influence of the time interval between the worst traumatic experience and the interview on our results, we repeated all our analyses including the variable “time since worst traumatic event”.

RESULTS

Descriptive Statistics

Our total sample comprised $N = 1131$ individuals with complete information on the experience of stigmatization (627 females, $M_{\text{age}} = 32.80$, $SD_{\text{age}} = 10.38$, age range: 18–80 years). Of those, $N = 352$ (31.12%) participants reported that they felt stigmatized, while this was not the case in the remaining sample ($N = 779$, 68.88%). The major reason for stigmatization ($N = 216$) concerned the individual's abduction by and experiences within the LRA (e.g., people say that I am a rebel, that I was in the bush with the LRA, that I am a former abductee or a returnee and that I killed other people). The second most prevalent reason for stigmatization was HIV/AIDS ($N = 37$), followed by mental health problems/PTSD symptoms ($N = 31$). More than half of the individuals in the therapy subsample ($N = 284$) perceived stigmatization ($N = 166$; 58.45%). Similar to the total sample, a history with the LRA was the main reason for stigmatization ($N = 134$), followed by mental health problems/PTSD symptoms ($N = 19$) and HIV/AIDS ($N = 9$). For an overview of the reasons for stigmatization in both samples see **Table 1**.

Stigmatization and the Risk for PTSD

First, we investigated whether the prevalence for lifetime and current PTSD was higher among stigmatized than non-stigmatized individuals. For the exact numbers of healthy individuals and those with lifetime and current PTSD diagnosis in each group, as well as for a demographic and clinical data comparison, see **Table 2**. χ^2 -tests indicated a significantly higher prevalence of lifetime [$\chi^2(1) = 63.68$, $p < 0.001$] and

current PTSD [$\chi^2(1) = 191.91$, $p < 0.001$] among stigmatized compared to non-stigmatized individuals.

To further investigate whether stigmatization was associated with lifetime and current PTSD risk beyond other factors, i.e., trauma load, sex and age, logistic regression models were compared based on AIC. For both outcome variables, lifetime and current PTSD diagnosis, the main effect model including trauma load, stigmatization and sex revealed best model fit (see **Supplementary Tables 1, 2**). Neither the inclusion of additional variables nor the interaction trauma load \times stigmatization improved model fit. For lifetime PTSD, the predictors trauma load [$LR_{(1)} = 158.62$, $p < 0.001$, OR (95% CI) = 1.12 (1.10–1.14)] and stigmatization [$LR_{(1)} = 15.84$, $p < 0.001$, OR (95% CI) = 2.21 (1.47–3.31)] reached statistical significance (**Figure 1**), while a marginally significant effect of sex [$LR_{(1)} = 3.76$, $p = 0.052$, OR (95% CI) = 0.74 (0.55–1.00)] was found. Similar results were observed for current PTSD and are displayed in **Figure 2** [trauma load: $LR_{(1)} = 259.64$, $p < 0.001$, OR (95% CI) = 1.16 (1.14–1.19); stigmatization: $LR_{(1)} = 61.47$, $p < 0.001$, OR (95% CI) = 3.60 (2.61–4.97); sex: $LR_{(1)} = 3.00$, $p = 0.083$, OR (95% CI) = 0.76 (0.55–1.04)].

Stigmatization and the Likelihood of Spontaneous Remission

The frequency of spontaneous remission among stigmatized and non-stigmatized individuals can be obtained from **Table 2**. Of the $N = 839$ individuals fulfilling the criteria of a lifetime PTSD diagnosis, more than half ($N = 466$; 55.54%) had remitted spontaneously (note that the LRA had no more been active in Uganda in the recent past). Yet, χ^2 -tests showed that among stigmatized individuals, spontaneous remission was less likely compared to non-stigmatized individuals [$\chi^2(1) = 121.94$, $p < 0.001$].

Subsequently, logistic regression models with spontaneous remission as outcome variable were compared with the AIC. The best fit was obtained for a model including trauma load and stigmatization as predictors (**Supplementary Table 3**). We

TABLE 2 | Comparison of demographic and clinical data of stigmatized and non-stigmatized individuals in the total sample.

Variable	Stigmatized group ($N = 352$)	Non-stigmatized group ($N = 779$)	Statistics
N female (%)	208 (59.09)	419 (53.79)	Fisher's exact test: $p = 0.106^a$
Age	Mdn = 31, IQR = 13	Mdn = 31, IQR = 17	$U = 14,1693$, $p = 0.348^b$
Trauma load	Mdn = 33.5; IQR = 12	Mdn = 25; IQR = 13	$U = 73,621$, $p < 0.001^b$
N lifetime PTSD diagnosis (%)	316 (89.77)	523 (67.14)	$\chi^2(1) = 63.68$, $p < 0.001^c$
N current PTSD diagnosis (%)	218 (61.93)	155 (19.90)	$\chi^2(1) = 191.91$, $p < 0.001^c$
PDS sum score t1	Mdn = 13, IQR = 13	Mdn = 2, IQR = 7	$U = 71,878$, $p < 0.001^b$
N spontaneous remission (%)	98 (31.01 ¹)	368 (70.36 ²)	$\chi^2(1) = 121.94$, $p < 0.001^c$

Mdn, Median; IQR, Interquartile range; PTSD, Posttraumatic Stress Disorder; PDS, Posttraumatic Stress Diagnostic Scale.

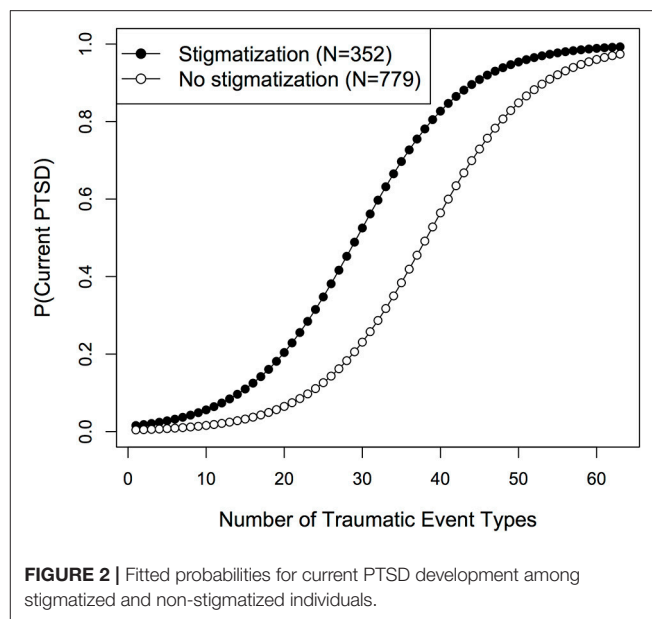
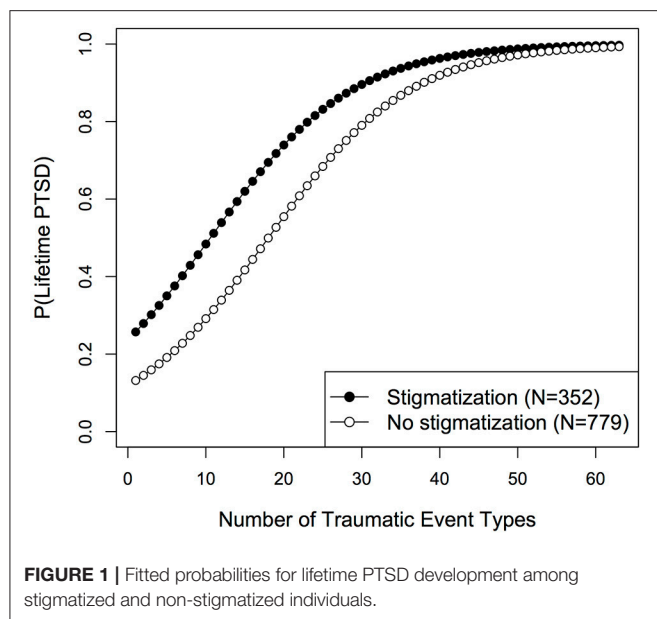
^aFisher's exact test for count data.

^bMann-Whitney U-test for continuous data, as model residuals were not normally distributed.

^c χ^2 -test for categorical data.

¹Based on a total of $N = 316$ stigmatized individuals showing a lifetime PTSD.

²Based on a total of $N = 523$ non-stigmatized individuals showing a lifetime PTSD.

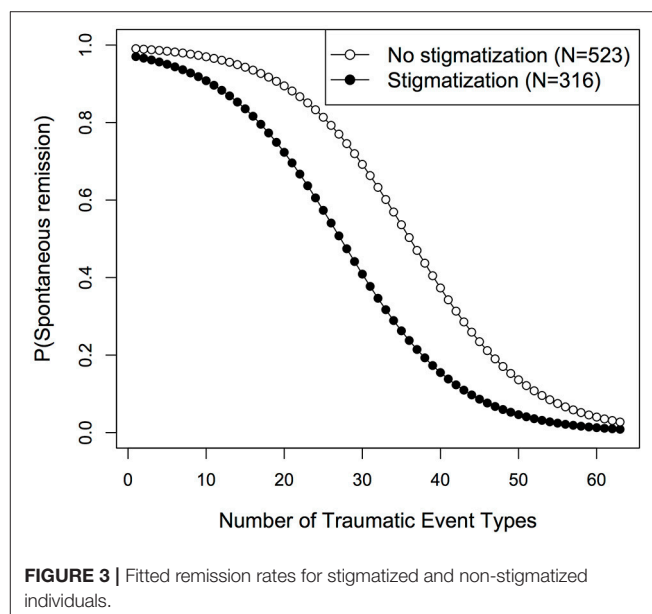


found significant main effects for both variables [trauma load: $LR_{(1)} = 168.52$, $p < 0.001$, OR (95% CI) = 0.88 (0.86–0.90); stigmatization: $LR_{(1)} = 46.70$, $p < 0.001$, OR (95% CI) = 0.31 (0.22–0.43)]. As shown in **Figure 3**, the predicted likelihood of spontaneous remission decreased with increasing trauma load in both groups. However, in the stigmatized group the probability for spontaneous remission was consistently lower than in the non-stigmatized group over all levels of trauma exposure.

Stigmatization and Therapy Outcome

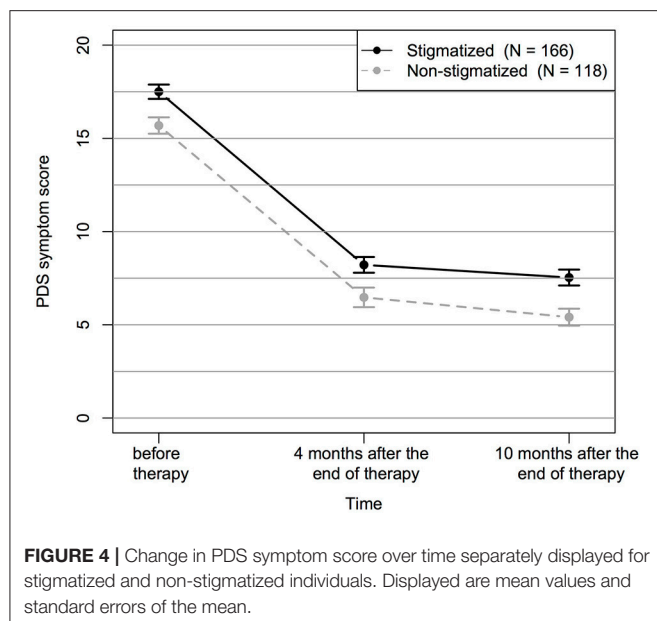
Finally, we investigated whether treatment outcome, i.e., symptom change in the PDS sum score over time, was predicted by stigmatization. Therefore, linear mixed effect models were compared (**Supplementary Table 4**) with regard to the AIC and revealed the best fit for the main effect model including time, trauma load, stigmatization, age and sex. Adding the interaction time \times stigmatization did not improve model fit. As model residuals were non-normally distributed, statistical significance was confirmed by means of permutation tests (p_{emp}). As displayed in **Figure 4**, we found significant main effects for the factor time [$F_{(2, 555)} = 397.38$, $p < 0.001$, $p_{\text{emp}} < 0.001$] and for stigmatization [$F_{(1, 279)} = 5.57$, $p = 0.019$, $p_{\text{emp}} = 0.003$]. Furthermore, trauma load [$F_{(1, 279)} = 29.92$, $p < 0.001$, $p_{\text{emp}} < 0.001$] and sex [$F_{(1, 279)} = 9.25$, $p_{\text{emp}} = 0.003$, $p_{\text{emp}} = 0.006$] significantly predicted treatment outcome, whereas a marginally significant effect was found for age [$F_{(1, 279)} = 4.93$, $p = 0.027$, $p_{\text{emp}} = 0.073$]. Treatment effect sizes for the stigmatized and non-stigmatized group can be obtained from **Supplementary Table 5**.

Additionally, we conducted χ^2 -tests and observed a higher prevalence of a current PTSD diagnosis four and 10 months after the end of treatment in stigmatized as opposed to non-stigmatized individuals (**Table 3**). However, it is important to note that stigmatized individuals already presented with higher



trauma load and a higher PTSD symptom severity before treatment (**Table 4**).

To account for a potential effect of the time since the worst traumatic event on our outcome variables we repeated all our analyses additionally including this variable. For none of the outcome measures (i.e., PTSD lifetime and current diagnosis, remission, and therapy response) did the inclusion of the variable time since the worst traumatic event improve model fit according to AIC ([41]; see also **Supplementary Table 6**). Furthermore, the results regarding the effects of traumatic load and stigmatization on all outcome measurements remained the same. Only minor changes with regard to the covariates age and sex were observed (**Supplementary Tables 7, 8**).



DISCUSSION

Impact of Stigma on Trauma-Related Mental Health

This study found a high prevalence of stigmatization in a sample of survivors of the LRA war in Northern Uganda. Similar to findings by Betancourt et al. (5), the main reasons for stigmatization in our sample were related to the individual's abduction by the LRA and the experiences made during the time in captivity, followed by HIV/AIDS and mental health problems. Even though the Ugandan government granted amnesty to the population of Northern Uganda (26), many former abductees face strong stigmatization by their families and communities. Considering the immense and long-lasting effects that the LRA war had on the Northern Ugandan community it is comprehensible that prejudice against people abducted by the LRA still exist. Even though the majority of the former LRA rebels were abducted forcefully, often as children, in the eyes of the community they represent a constant, unwanted reminder of this horrible time, the associated fear, anger and painful memories (25). Furthermore, society often holds a victim at least partially responsible for the experienced violence (49, 50). Additionally, a diagnosis of HIV/AIDS was a main reason for stigmatization. Fear of contamination [(51), for a review see (52)] and the lack of knowledge about disease transmission, development, and treatment options may contribute to the high prevalence of stigmatization among HIV positive individuals in this sample. It is further noteworthy that many survivors were stigmatized due to their mental health problems. Due to the lack of knowledge and superstition, the survivor's symptoms, e.g., flashbacks and dissociation, can be interpreted wrongly by the family and community. The belief in spirit possessions is highly prevalent in the Northern Ugandan culture, so that PTSD symptoms and the accompanying dysfunctionality may be misjudged (53, 54).

As previously shown, higher trauma load was associated with increased PTSD risk, and less spontaneous remission and therapy success [e.g., (19), Schneider et al., submitted]. However, we found that stigmatization is strongly associated with a higher prevalence of current and lifetime PTSD, a decreased likelihood of spontaneous remission and lower therapy success beyond the well-known effect of trauma load. In more detail, we observed strong main effects of stigmatization on lifetime and current PTSD. While the probability to suffer from PTSD increased with accumulating trauma load in both groups, stigmatized individuals had a higher PTSD prevalence across all levels of trauma exposure.

While the probability of spontaneous remission decreased in both groups with increasing trauma load, stigmatized individuals generally showed a reduced frequency of spontaneous remission. These results demonstrate the powerful influence that stigmatization has on mental health recovery. In addition, our analyses on treatment outcome point in a similar direction. While the treatment effect was similar in both groups, stigmatized individuals showed higher symptom scores before and after treatment. Accordingly, our results show that it is of utmost importance to address stigmatization in order to regain mental health.

Next to trauma load and stigmatization, gender was an important factor influencing PTSD symptom severity, with women indicating higher symptom scores than men. Furthermore, we found that the higher symptoms of women persisted throughout therapy, at the end of which women still presented with higher symptoms than men (55–57).

We also tested for a potential influence of the time interval between the worst traumatic experience and the interview on our results. However, the inclusion of this variable neither improved model fit, nor did it change the observed associations between stigmatization and all outcome measures. We can therefore conclude that our results are not biased by different time intervals since the worst traumatic event exposure.

Our results are in line with previous findings proposing general negative effects of stigmatization on mental health (4), as well as with studies showing that stigmatization has a strong impact on the severity of trauma-related symptoms, including PTSD (10, 58–61). However, it is important to note that the causality of the effects cannot be determined by cross-sectional studies. It is likely that both stigmatization and PTSD symptoms mutually maintain each other and should both be addressed in therapeutic interventions.

Based on the social stress theory (62), which considers stress and resources to act as mediators between social structure and poor health outcomes, Link and Phelan (3) proposed that the exposure to constant negative experiences through stigmatization predominantly leads to negative health outcomes and social adjustment difficulties. Thus, stigmatization might diminish the individuals' access to resources and coping strategies (62). Based on this theory, one might assume the lack of resources due to the prevalent stigmatization and discrimination as a possible reason for the increased PTSD prevalence, the decreased rates of spontaneous remission and the lower therapy success found in this study.

TABLE 3 | Number of current PTSD cases and controls among the stigmatized and non-stigmatized group before therapy, four months after therapy and ten months after therapy.

	Current PTSD diagnosis	No current PTSD diagnosis	Statistics ^a
Before therapy (t1)			
<i>N</i> Stigmatization	166	0	n.a.
<i>N</i> No stigmatization	118	0	
Four months after therapy (t2)			
<i>N</i> Stigmatization	60	104	$\chi^2(1) = 5.97, p = 0.015$
<i>N</i> No stigmatization	26	91	
Ten months after therapy (t3)			
<i>N</i> Stigmatization	46	115	$\chi^2(1) = 8.52, p = 0.004$
<i>N</i> No stigmatization	15	100	

PTSD, Posttraumatic Stress Disorder.

^aChi²-test for categorical data.**TABLE 4 |** Comparison of demographic and clinical data of stigmatized and non-stigmatized individuals in the therapy group.

Variable	Stigmatized group (N = 166)	Non-stigmatized group (N = 118)	Statistics
N female (%)	97 (58.43)	63 (53.39)	Fisher's exact test: $p = 0.467^a$
Age t1	Mdn = 30, IQR = 11	Mdn = 32, IQR = 16.75	
Trauma load t1	M = 39.09; SD = 7.07	M = 34.54; SD = 6.93	$t = -5.41, p < 0.001^c$
PDS sum score t1	Mdn = 17, IQR = 7	Mdn = 14, IQR = 7	$U = 7540, p < 0.001^b$

Mdn, Median; IQR, Interquartile range; M, Mean; SD, Standard deviation; PDS, Posttraumatic Stress Diagnostic Scale.

^aFisher's exact test for count data.^bMann-Whitney U-test for continuous data, as model residuals were not normally distributed.^cStudent's t-test for continuous data with normally distributed model residuals.

Our results point out the importance of interventions which not only focus on individual PTSD treatment, but also include family-oriented approaches and community interventions to reduce stigmatization. In particular, the successful reintegration of former child soldiers appears to be highly dependent on family and community acceptance (8, 9). Therefore, awareness-raising interventions are required and should enhance the knowledge of the community about the traumatic character of the returnees' experiences in the LRA, the potentially resulting mental health impairments, and the negative impact of stigmatization.

Strengths and Limitations

A strength of this study is the exceptionally large sample used for investigations on PTSD risk, and spontaneous remission as well as the longitudinal design of the therapy analyses. Stigmatization was further investigated for many different outcomes, and trauma load was assessed and included in all analyses, as were other predisposing factors such as sex and age. All diagnostic interviews were standardized, and the therapy group received manualized treatment.

This study investigated stigmatization as a possible additional risk factor for psychopathology beyond the influence of cumulative trauma in rebel war survivors from Northern Uganda. However, given the unique research context, the limitation should be noted that no validated instrument to assess stigmatization has been available for the current context. Consequently, we were neither able to differentiate various forms of stigmatization, nor to assess and include whether

the participant was stigmatized by the community or family, which might be an important factor. A qualitative analysis of participants' responses indicated LRA-related stigmatization as the predominant cause of stigmatization-related social rejection. However, future studies might aim to develop psychometric measures that allow for the separate assessment of discrimination and stigmatization as well as stigmatization sub-forms, e.g., society and self/internalizing stigmatization (51), in conflict survivors. Finally, we have to note that stigmatization and traumatic event exposure were correlated, which makes it difficult to distinguish their specific effects on psychopathology.

Conclusions and Future Directions

In summary, this study provides strong evidence that the experience of stigmatization and discrimination combined with trauma load is associated with PTSD prevalence, the likelihood of spontaneous remission and therapy success. Therefore, it will be helpful to develop programs that sensitize the population regarding negative impacts of stigmatization, and to highlight the necessity to reduce stigmatization and discrimination in order to allow survivors to recover and reintegrate into the community. Furthermore, it is important to consider the handling of stigmatization experiences as an additional treatment target besides PTSD symptom reduction. Previous findings in the present sample showed that approximately 20% of the PTSD patients do not profit from trauma therapy to the extent that the diagnostic criteria of PTSD are no longer fulfilled (Schneider et al., submitted). Therefore, interventions targeting

stigmatization and including the family and community might lead to better therapy outcome and long-term therapy success.

DATA AVAILABILITY STATEMENT

The datasets analyzed in this manuscript are not publicly available due to data protection of participants as the datasets contain sensitive clinical information. Requests to access the data can be directed to iris.kolassa@uni-ulm.de.

AUTHOR CONTRIBUTIONS

SW and I-TK developed the study concept. AS, SW, and AP conducted the study setup and data collection under supervision of I-TK and TE. AS and DC performed the statistical data analysis and drafted the paper under supervision of SW. All authors critically revised and approved the final version of the manuscript for submission.

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Changes in Post-migration Living Difficulties Predict Treatment Outcome in Traumatized Refugees

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Background: Refugee mental health is affected by traumatic stressors as well as post-migration living difficulties (PMLD). However, their interaction and causal pathways are unclear, and so far, no distinct treatment recommendations regarding exile-related stressors exist.

Methods: In a 3-year follow-up study, PMLD and symptoms of post-traumatic stress (PTS), depression and anxiety were examined in a clinical sample of severely traumatized refugees and asylum seekers ($N = 71$).

Results: In regression analysis, reduction in PMLD predicted changes over time in depression/anxiety, but not in PTS. The opposite models with PMLD changes as outcome variable proved not significant for PTS, and significant, though less predictive, for depression/anxiety.

Conclusions: In addition to well-established trauma-focused interventions for the treatment of PTS, psychosocial interventions focusing on PMLD might contribute to a favorable treatment response in traumatized refugees, particularly with regard to depression and anxiety.

Keywords: refugees, asylum seekers, refugee mental health, posttraumatic stress disorder, psychosocial interventions, post-migration living difficulties, social integration

INTRODUCTION

There are currently over 65 million people displaced worldwide due to conflict, violence, and persecution (1). Refugees, asylum-seekers and other forcibly displaced populations typically report exposure to a high number of potentially traumatic events in their countries of origin and during displacement. These experiences are often prolonged, repeated, and interpersonal in nature and have a pervasive negative impact on mental health (2, 3). Accordingly, refugees have consistently been observed to present with high prevalence rates of trauma related mental health problems, particularly posttraumatic stress disorder (PTSD), depression, and anxiety (4–6).

In addition to past trauma, refugee mental health is also affected by difficulties arising *after* successful entry in a formally safe host country. Refugees usually face numerous daily challenges related to the post-migration environment, including those relating to lack of resources, family separation, social isolation, acculturation and discrimination, socioeconomic factors, and immigration and refugee policies. These displacement-related stressors have been shown to

negatively impact on mental health over and above the effects of traumatic experiences (5, 7–9). Moreover, mental health problems of refugees are not limited to affected individuals, but can have a devastating impact on their families (10, 11).

While mental health problems due to traumatic and exile-related stressors can have a substantial impact on the psychological wellbeing of refugees and their close ones, they also lead to functional impairment. Refugees are usually expected, or legally obliged, to rapidly participate in the host society, particularly regarding language proficiency and financial independence. The process of social integration, however, implies high functional requirements in terms of cognitive and interpersonal capabilities, which refugees with psychological impairments are often not able to meet. Preliminary evidence shows that psychological impairment in refugees is associated with high levels of post-migration living difficulties (PMLD), and with poor social and economic integration (12–14). Prompt and appropriate treatment of mental health problems in refugees is therefore not only an ethical, but also an economic concern in hosting societies in the sense that inadequate or unavailable treatment can lead to substantial long-term social costs. Accordingly, a recent study of severely traumatized refugees with severe trauma related disorders found treatment to be economically beneficial on family income level after 3 years (15).

While recent research suggests that mental health problems of refugees and asylum seekers are best captured by models integrating pre- and post-migration factors (16–18), their complex interaction and causal pathways remain largely unclear. Accordingly, the therapeutic field is spread between two opposing assumptions: exponents of trauma-focused interventions consider trauma exposure the critical causal factor. They argue that an improvement of PTSD symptoms will lead to an improvement in functionality and better adaption to impending challenges of resettlement and acculturation. In contrast, for advocates of multimodal interventions, the attribution of causality focuses primarily on the overall stressful social and material conditions, suggesting a range of psychosocial interventions for the purpose of general stabilization, which, in turn, would allow better management of traumatic stress symptoms (8, 17). Evidence to date points to trauma-focused interventions being the most efficacious in reducing PTSD symptoms amongst refugees. In contrast, there has been little rigorous research investigating other approaches such as psychosocial interventions, and other diagnostic groups such as depression and anxiety disorders (17, 19).

Given the absence of a systematic framework to guide informed treatment decisions, research is urgently needed to examine the temporal and causal relationship between exposure to traumatic events and post-migration stressors, mental health, and real-life outcomes such as education, employment, or social integration (20). In view of the growing public health dimension of mental disorders in refugees, predictors and treatment moderators should be investigated in order to identify individuals for which specific approaches are indicated or those who fail to benefit from best practice interventions. Understanding the direction of causality between changes in psychological symptoms and changes in post-migration stressors

would directly inform services tasked with supporting refugees in their host environment.

This study investigated the association between change in PTSD, depression and anxiety symptoms and change in post-migration stressors in a sample of refugees receiving treatment at a torture survivors' outpatient clinic. Participants were assessed at baseline and after a 3-year follow-up. To our knowledge, this is the first longitudinal study in a clinical sample of severely traumatized refugees to examine the relationship between PMLD and treatment trajectories. We hypothesized that participants would demonstrate reduced PTSD, depression and anxiety symptoms between baseline and follow-up assessment. We secondly hypothesized that improvements in PMLD scores between baseline and follow-up would relate to greater decreases in PTSD, depression and anxiety at follow-up. Finally, due to the exploratory character of the study and in consideration of a circular model, we had no hypothesis regarding the direction of causality between PMLD and psychiatric symptoms.

METHODS

Participants

The sample consisted of participants of an earlier, cross-sectional study ($N = 134$, for details s. 12) who were re-assessed after a projected follow-up time of 3 years. Participants were refugees and asylum-seekers from a variety of countries of origin. They were in treatment in two psychiatric outpatient units for victims of torture and war in Zurich or Bern, Switzerland. Treatment included a variety of manualized trauma-specific as well as non-manualized unspecific psychotherapeutic interventions and medication, depending on symptom profiles and subjective focus of distress, individually adapted to the patients' needs and capacity with regard to content and dosage. In addition to treatment, all participants were offered social counseling, which individually addressed respective PMLD including accommodation, legal, financial or language problems, among others. Patients aged 18 years or older and speaking one of the study languages (German, English, Turkish, Arabic, Farsi, or Tamil) were included in the study. Current psychotic symptoms, severe dissociative symptoms, and acute suicidality led to exclusion. At follow-up, $N = 44$ participants could not be contacted any more, and $N = 19$ refused to participate. Only completers of the follow-up assessment were included in this study, resulting in a sample size of $N = 71$. Data collection took place between 2012 and 2013 (T1), and between 2015 and 2016 (T2), respectively. The follow-up time was $M = 39.6$ ($SD = 4.6$) months.

Measures

All measures used in the study were translated and back-translated, if necessary, by accredited translators in accordance with gold-standard translation practices (21). Discrepancies were rectified jointly by the research team and independent bilingual individuals who were experienced in working with health-related questionnaires.

Exposure to traumatic events was indexed using a measure derived from combining the trauma event lists of the Harvard

Trauma Questionnaire [HTQ, (22)] and the Posttraumatic Diagnostic Scale [PDS, (23, 24)]. Overall trauma exposure was represented by a count of the number of traumatic event types (ranging from 0 to 23) experienced by each participant.

Symptoms of PTSD in the past month were measured using the PDS. The PDS contains 17 items assessing the occurrence of DSM-IV symptoms of PTSD in the previous four weeks on a 4-point Likert-scale (range 0–3). To account for the anticipated changes of the diagnostic criteria of PTSD in DSM-5 (25), which was not yet published at the beginning of the data collection, four additional items were added and one item was excluded, as it was no longer included in the DSM-5 diagnostic criteria. A comparison of DSM-IV and DSM-5 diagnostic criteria using part of this sample has been published elsewhere (26). We computed a total continuous score of PTSD symptoms (Range 0–60) and employed a DSM-5 based diagnostic algorithm to determine likely PTSD caseness. The scale has been used with numerous refugee groups [e.g., (27, 28)]. Cronbach's alpha at T1 in this study was 0.94.

Depression and anxiety in the past week were measured using the Hopkins Symptom Checklist HSCL-25 (29). This 25-item scale measuring psychological distress has been employed with a number of refugee groups [e.g., (30, 31)]. We computed subscale scores for anxiety and depression as well as a total continuous score (range 1–4). The validity of the often-used 1.75 cut-off criterion for clinically relevant anxiety and depression has been evaluated in relation to different populations around the world and found to be accurate (29, 32). Cronbach's alpha at T1 was 0.94.

Living difficulties were measured with the Post-Migration Living Difficulties Checklist (33, 34) adapted to the Swiss context (12). This 17-item scale (range = 0–68) examined the extent to which post-migration challenges had been a problem for the individual over the past 12 months. Items are rated on a five-point scale (0 = not a problem to 4 = very serious problem). Items scored at least 2 (“moderately serious problem”) were considered positive responses, yielding a total count of living difficulties. The PMLD scale has consistently been identified as a predictor of mental health among displaced populations (12, 31, 35).

Procedure

The study was approved by the Ethics Committees of the Cantons of Zurich and Bern. Written informed consent was obtained, with participants being informed they were free to withdraw from the study without influence on future treatment. Questionnaires were applied using a therapist-assisted computer-based assessment tool MAPSS [Multi-Adaptive Psychological Screening Software, (36)]. In MAPSS, self-report questionnaires are presented on an electronic tablet in both written and auditory form in the respondent's mother tongue. Assessments were supervised by a clinical psychologist or a masters-level student of clinical psychology. Participants were reimbursed CHF 40 (approx. USD 40) for participation.

Data Analysis

All statistical analyses were conducted using SPSS Version 25. Descriptive statistics are given in terms of means and standard deviations in continuous variables, and counts and percentages for categorical variables. Changes over time were calculated for all variables. Separate linear regression analyses (method: enter) were conducted for PTSD severity, depression/anxiety, and PMLD as outcome variables, respectively. Variables entered into the models included gender, trauma exposure, visa status (secure vs. insecure) and employment status (employed vs. unemployed) at T1, and change in PMLD between T1 and T2.

RESULTS

Sample Characteristics

Sample characteristics are described in **Table 1**. Participants were from a variety of countries of origin, including Turkey ($N = 42$, 59.2%, with $N = 34$, 47.9% being Kurdish), Iran ($N = 6$, 8.5%), Sri Lanka ($N = 6$, 8.5%), Iraq ($N = 4$, 5.6%), Bosnia ($N = 3$, 4.2%), and other countries ($N = 10$, 14.1%, e.g. Afghanistan, Somalia, etc.). The education level was rather high with 75% of the sample having at least a high school degree. Despite an average stay in Switzerland of 10 years at baseline, only

TABLE 1 | Sample characteristics ($N = 71$).

Variable	T1 <i>M (SD)/N (%)</i>	T2 <i>M (SD)/N (%)</i>
Age	44.55 (9.05)	47.96 (9.08)
Gender (male)	61 (85.9)	
Length of time in Switzerland	10.41 (6.70)	13.87 (7.11)
MARITAL STATUS:		
Single	14 (19.7)	12 (16.9)
In a relationship/married	49 (69.0)	45 (63.4)
Widowed/divorced	8 (11.3)	14 (19.7)
EDUCATION:		
Primary school not completed	7 (9.9)	7 (9.9)
Primary school completed	(15.5)	(15.5)
High school	29 (40.8)	29 (40.8)
Bachelor's degree or college	19 (26.8)	19 (26.8)
Postgraduate degree	5 (7.0)	5 (7.0)
EMPLOYMENT*:		
Full-time	8 (11.3)	9 (12.7)
Part-time	6 (8.5)	15 (21.1)
Unemployed	42 (59.2)	27 (38.0)
Retired/homemaker	14 (19.7)	20 (28.2)
VISA STATUS:		
Asylum seeker	11 (15.5)	1 (1.4)
Temporary visa	6 (8.5)	5 (7.0)
Permanent visa	16 (22.5)	18 (25.4)
Residency	28 (39.4)	32 (45.1)
Citizenship	10 (14.1)	15 (21.1)
PTE exposure (HTQ)	12.5 (4.3)	

PTE, potentially traumatic event types. *Employment $N = 70$.

$N = 14$ (19.7%) had a fulltime or part-time employment, and roughly one fourth still had an insecure visa status. Participants reported severe lifetime trauma exposure with an average of 12.5 ($SD = 4.3$) potentially traumatic event types (PTE) experienced. The most commonly reported PTE included torture (85.9%), enforced isolation from others, combat situations (78.9% each), and imprisonment (77.9%). The least commonly reported were sexual assault by a stranger (26.8%) and sexual contact when younger than 18 (14.1%).

A comparison on key variables between participants, who completed both time points versus those who completed Time 1 only, indicated significant differences exclusively regarding age and length of time in Switzerland, but not regarding symptoms scores, trauma exposure, and PMLD. Specifically, those who completed Time 2 were significantly older ($t = 3.08, p = 0.002$) and had lived in Switzerland for a longer time ($t = 2.65, p = 0.01$).

Symptom Scores

Symptom scores at baseline and follow-up are shown in **Table 2**. Symptoms of PTSD and depression/anxiety were significantly lower at follow-up. While 93% of the participants reported clinically relevant depressive symptoms at T1, only 62% did so at T2. With regard to anxiety, 88.7% were above the cut-off at T1, and 53.5% were above cut-off at T2. At T1, 47.9% had a probable PTSD diagnosis according to DSM-5 criteria as compared to 45.1% at T2. Fourteen participants (19.7%) reported symptom levels compatible with a new probable diagnosis of PTSD.

Post-migration Living Difficulties

Frequencies of PMLD types at baseline and follow-up are shown in **Table 3**. More than half of PMLD types improved significantly along the treatment trajectory. Among the PMLD types with the most substantial improvement were issues related to visa status ("not being recognized as a refugee," "being fearful of being sent back to your country of origin in the future," "difficulties in interviews with immigration officials"). Frequently occurring PMLD types without improvement were mostly related to family members left back home ("worries about family back home," "being unable to return to your home country in an emergency," "separation from family").

Predicting Change in Symptom Levels Over Time

The results of the regression analysis for PTSD and depression/anxiety controlled for gender, trauma exposure,

visa status, education and changes over time in PMLD are shown in **Table 4**. Reduction in PMLD predicted changes over time in depression/anxiety as assessed with HSCL-25, accounting for 17.7% of the variance. The overall model was not associated with changes in PTSD, though the individual predictor was significant.

In order to examine directionality of findings, we analyzed the opposite models with PMLD changes as outcome variable, and change in PTSD and depression/anxiety as the predictor variables, which proved not to be significant [$F_{(5, 64)} = 1.300, p = 0.275$] for PTSD, but significant for depression/anxiety [$F_{(5, 64)} = 3.086, p = 0.015$], respectively, explaining 13.1% of the variance.

DISCUSSION

This 3-year longitudinal study investigated the association between changes in symptoms of PTSD, depression/anxiety and changes in post-migration living difficulties (PMLD) in a sample of severely traumatized refugees receiving treatment and social counseling in a specialized outpatient center.

Our hypothesis of generally lower symptom scores of PTSD and depression/anxiety at follow-up was fully supported by our findings. Along with mental health improvements, we found a significant reduction in more than half of the examined PMLD types as well as of the mean PMLD scores. Remarkably, while PTSD symptom scores on average improved under treatment, 14 participants (19.7%) who scored below the cut-off of probable PTSD diagnosis at baseline, exceeded this cut-off at follow-up. As all participants had a clinically established diagnosis of PTSD at the beginning of treatment (being a requirement for treatment uptake), it seems that after initially benefitting from therapy until the baseline assessment, some patients later experienced increased posttraumatic stress again. This finding has been described in other studies investigating refugees in the post-migration (37, 38). It can be hypothesized that, in our sample, additional traumatic experiences occurring during follow-up, and/or actualization of past traumatic experiences, e.g., due to political aggravation in the countries of origin, as was the case in Turkey, accounted for elevated PTS scores. Further longitudinal research is required to investigate this hypothesis.

The relationship between the observed improvements in PMLD and improvements in symptom scores was examined in various regression models with changes in PMLD, symptoms of depression/anxiety (as measured by the HSCL-25), and PTSD,

TABLE 2 | Symptom severity (M/ SD) of PTSD, depression and anxiety at T1 and T2.

	T1	T2	t (df)	p
PTSD (PDS total score)	34.52 (13.63)	29.62 (12.21)	2.99 (70)	0.005
Depression (HSCL depression subscale)	2.73 (0.59)	2.1 (0.63)	7.02 (70)	<0.001
Anxiety (HSCL anxiety subscale)	2.71 (0.70)	1.86 (0.50)	12.36 (70)	<0.001
HSCL_total	67.76 (14.87)	49.94 (11.67)	9.86 (70)	<0.001

PTSD, Post-traumatic stress disorder; HSCL-25, Hopkins Symptom Checklist. P -values are not controlled for multiple comparisons.

TABLE 3 | Post-migration Living Difficulties experienced as moderately serious, serious or very serious ($N = 71$).

PMLD type	n (%)		p^d
	T1	T2	
Mean	10.03 (4.3)	7.79 (3.63)	<0.001 ^e
Loneliness, boredom or isolation	61 (85.9)	52 (73.2)	0.022
Worries about family back home	61 (85.9)	58 (81.7)	0.453
Being unable to return to your home country in an emergency ^a	53 (75.7)	52 (73.2)	1.000
Difficulty learning German	54 (76.1)	43 (60.6)	0.013
Separation from family	54 (76.1)	50 (70.4)	0.289
Difficulties with employment ^b	45 (65.2)	34 (47.9)	0.017
Communication difficulties	47 (66.2)	36 (50.7)	0.007
Being fearful of being sent back to your country of origin in the future	46 (64.8)	14 (19.7)	<0.001
Difficulties obtaining financial assistance ^a	39 (54.9)	31 (43.7)	0.012
Difficulties obtaining appropriate accommodation	40 (56.3)	33 (46.5)	0.143
Not enough money to buy food, pay the rent or buy necessary clothes ^b	39 (54.9)	37 (52.1)	0.804
Discrimination ^a	36 (50.7)	30 (42.3)	0.146
Worries about not getting access to treatment for health problems	38 (53.5)	29 (40.8)	0.022
Difficulties in interviews with immigration officials	27 (38.0)	14 (19.7)	0.007
Not being recognized as a refugee	28 (39.4)	6 (8.5)	<0.001
Conflicts with social workers/other authorities	25 (35.2)	21 (29.6)	0.344
Ethnic conflicts ^c	19 (26.8)	13 (18.3)	0.109

^a $n = 70$.^b $n = 69$.^c $n = 68$.^dMcNemar's test.^et-test.**TABLE 4 |** Summary of the multiple regression analyses ($N = 71$).

Outcome variable	Independent variable	B	SEB	β	T	P	F	p	R ²	Adjusted R ²
PTSD score change							1.52	1.00	0.11	0.037
	Gender	1.63	4.96	0.04	0.33	0.743				
	Employment	-1.47	4.26	-0.04	-0.34	0.732				
	Trauma exp.	0.51	0.40	0.15	1.25	0.214				
	Visa status	-2.38	3.95	0.07	-0.60	0.549				
	PMLD change	1.49	0.64	0.28	2.32	0.023				
HSCL-25 score change							3.97	0.003	0.237	0.177
	Gender	7.93	4.89	0.18	1.62	0.110				
	Employment	3.72	4.21	0.09	0.88	0.381				
	Trauma exp.	0.79	0.39	0.22	1.98	0.052				
	Visa status	-0.80	3.89	-0.02	-0.20	0.838				
	PMLD change	2.38	0.63	0.41	3.76	<0.001				

HSCL-25, Hopkins Symptom Checklist; PTSD, Post-traumatic stress disorder; PMLD, Post-migration living difficulties.

respectively, as outcome variables. The best predictive model was that with depression/anxiety as outcome and PMLD changes as independent variable (17.7% of variance explained, $p \leq 0.001$), while the models with changes in PTSD and PMLD as either outcome or independent variable proved not significant. These findings connect to earlier studies showing that, in general, trauma-related factors seem to explain more variance in rates of PTSD, while post-migration or displacement-related stressors

appear to particularly influence rates of mood and anxiety disorders, over and above the effects of past trauma [for overview s. (7, 8)]. In addition to the existing cross-sectional evidence, our longitudinal data suggest that, in a treatment-seeking sample of severely traumatized refugees and asylum seekers in the post-migration, improvements in PMLD predict a favorable treatment trajectory with regard to depression and anxiety, and could therefore be valuable targets of therapeutic interventions. This

finding, though preliminary in nature and in need of replication, contributes to several fields of discussion and potentially has substantial implications:

A first implication appears with regard to explanatory models and causality. There is solid evidence that refugee mental health is related to both pre-migration, traumatic as well as post-migration stressors (7, 17). The scientific discourse on how these aspects are causally related, however, is prototypically divided between two opposing models (8, 39, 40): The war-exposure model on the one hand focuses on traumatic experiences and consecutive PTSD. Post-migration living difficulties are at least partly considered a consequence of trauma-related psychological impairment and supposed to be manageable after symptoms have improved. Accordingly, trauma-focused interventions within a cognitive-behavioral framework are considered first-line approaches. On the other hand, representatives of multimodal or psychosocial interventions primarily target general sources of distress, particularly exile-related stressors, with the objective of secondary psychological stabilization.

While the direction of causality is clear regarding traumatic experiences and trauma-related disorders, it is much less clear with PMLD and psychiatric symptoms: post-migration stressors could promote mental disorders such as depression and anxiety, and the latter could lead to functional impairment and, therefore, to PMLD. The findings in our sample now suggest that PMLD have a permissive or even causal role regarding the development of depression and anxiety in traumatized refugees, rather than vice versa. From a clinical perspective, this makes sense as many of the most distressing PMLD, such as insecure visa status, separation from family members, or restrictive asylum policies, are unswayable for affected persons, even if psychological impairment is successfully treated. However, while changes in PMLD were predictive for changes in depression/anxiety, the inverse model was statistically significant as well, though less predictive. The assumption of a unidirectional model seems therefore less conclusive than a circular model with PMLD contributing to mental health problems, and, to a minor degree, vice versa.

A second implication touches the question of how refugee mental health should best be addressed in the context of service provision. While the effectiveness of trauma-focused interventions with regard to symptoms of PTSD is well documented, this applies only to a minor degree to other psychiatric disorders such as depression and anxiety disorders, and (so far) not to psychosocial interventions (17). Our findings provide preliminary support that addressing PMLD via psychosocial interventions within a multimodal framework, including trauma-focused approaches, could enhance treatment response with regard to depression and anxiety and, therefore, justify the delivery of respective treatment options. Remarkably, in our sample, not all PMLD types were equally amenable to change. Most significant improvements were found in stressors related to visa status. Unfortunately, this issue is entirely out of reach for therapeutic as well as psychosocial interventions. On the other hand, no significant improvement at all could be achieved with regard to stressors related to separation from family members in participants' home countries. Therefore, the

most promising targets of psychosocial interventions seem to be those post-migration stressors related to social integration such as language and employment.

A third important implication relates to immigration policies and social integration. In many high-income countries, the barriers for asylum seekers are high in order to avoid pull-factors. Many aspects of daily life of asylum seekers such as long asylum procedures, placement in camps, restrictive access to labor market, or prohibition of family reunion are intentionally harshened by the authorities. In contrast, after obtaining a residency permit, refugees are usually expected to rapidly engage in the host societies, particularly regarding language proficiency and financial independence. An earlier, cross-sectional study on partly the same sample found a high correlation between psychological impairment and integration difficulties (12). In addition, our longitudinal findings suggest that host societies could facilitate successful social integration of mentally ill asylum seekers and refugees by complementing timely and appropriate treatment with psychosocial interventions targeting PMLD. This is in line with a recent study of severely traumatized refugees which found multimodal treatment including social counseling to foster economic integration on family income level (15). Conversely, restrictive policies aiming at establishing stressful living conditions for refugees and asylum seekers might fuel PMLD and consecutive mental health problems, with negative consequences for social integration.

This study has a number of limitations. First, the sample size was small. This may have reduced our statistical power in uncovering relationships between variables. Second, participants were examined in different stages of therapy, rather than in proper pre-post-assessments, which may limit the comparability of trajectories. Due to the clinical character of the sample, our findings are not generalizable to subclinical refugee populations. Third, though we used transculturally validated measures whenever available, participants were from numerous cultural backgrounds, and thus, it was not possible to use measures validated with each cultural group. Yet, the use of a tablet-based therapist-assisted assessment tool allowed participants to be assessed in their respective mother tongues independently of their level of education. Finally, self-report measures were implemented instead of clinician-administered diagnostic interviews and an objective index of PMLD. It may be the case that those participants with high symptom scores were more likely to perceive objective stressors as more stressful.

CONCLUSIONS

This study provides preliminary evidence for the causal role of PMLD with regard to mental health problems of refugees and asylum seekers. Our findings support an ecological model of refugee mental health, which suggests that both pre-migration and post-migration stressors contribute to mental health outcomes (16). In addition to well-established trauma-focused interventions for the treatment of PTSD, our data suggest that psychosocial interventions focusing on PMLD might be able to contribute to a favorable treatment response, particularly

with regard to depression and anxiety, and may therefore be a legitimate and valuable add-on in a multimodal treatment approach. Future research should examine (a) what PMLD topics are causing the most distress and impairment, (b) what topics are amenable to therapeutic interventions, and (c) what interventions are the most effective ones in order to achieve the greatest relief. Policy makers should recognize the role of daily stressors in contributing to psychological distress and their negative impact on social integration. It may be in the interest of host societies to support aid agencies, caseworkers or settlement service providers in addition to psychological treatment.

In addition, psychosocial interventions may be of particular interest in view of the fact that the highest share of displaced persons in need of support are not located in high-income countries, but in conflict, post-conflict or neighboring countries without access to (appropriate mental) health services. Non-medical approaches such as accessing social support and problem management, provided by helpers without health-professional background, are urgently needed (41). The required task-shifting from highly-qualified specialists to less specialized workers with fewer qualifications may be more likely to succeed

with interventions addressing daily stressors than specific diagnoses (42).

AUTHOR CONTRIBUTIONS

MS was involved in the conception of the study, in the interpretation of the data and the drafting of the manuscript. NM was involved in the conception and design of the study, the acquisition, analysis and interpretation of the data, and the drafting of the manuscript. PM was involved in the analysis and interpretation of the data, and the drafting and revision of the manuscript. US, RB, and AN designed the study and contributed to the manuscript. All authors read and approved the final manuscript.

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