IMPROVING MENTAL HEALTH FOR IMMIGRANT POPULATIONS

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PUBLISHED IN: Frontiers in Psychiatry and Frontiers in Public Health

frontiers Research Topics

frontiers

ISSN 1664-8714
ISBN 978-2-88971-903-7
DOI 10.3389/978-2-88971-903-7

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IMPROVING MENTAL HEALTH FOR IMMIGRANT POPULATIONS

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Citation: Alegria, M., Juang, L., Marks, A., Yip, T., eds. (2021). Improving Mental Health for Immigrant Populations. Lausanne: Frontiers Media SA.
doi: 10.3389/978-2-88971-903-7

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frontiers in Psychiatry

EDITORIAL
published: 28 October 2021
doi: 10.3389/fpsyt.2021.785137

Editorial: Improving Mental Health for Immigrant Populations

Margarita Alegría[1,2,3]*, *Tiffany Yip*[4], *Amy Marks*[5], *Linda Juang*[6], *Lauren Cohen*[1] and *Fernando Cuervo-Torello*[1]

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Keywords: immigrants, refugee, migrant, mental health, stress, psychological distress, children, adults

Editorial on the Research Topic

Improving Mental Health for Immigrant Populations

INTRODUCTION

According to the World Migration Report of 2020, there are 281 million international migrants, three times more than five decades ago (1). Despite extensive research on the mental health challenges and outcomes within the global immigrant community (2) the field continues to confront obstacles in providing timely and evidence-based mental health care. This Research Topic of Frontiers, "*Improving Mental Health for Immigrant Populations*," covers a wide range of topics while providing a deep dive into the differential risks of what immigrants (refugees and second and third generation children of immigrants) confront. It examines the macro and micro factors that contribute to immigrants' mental health. The Research Topic's contributions also describe new interventions or programs that offer evidence-based care for improving immigrants' mental health and identifies areas where more information is needed.

DIFFERENTIAL RISK OF IMMIGRANT POPULATIONS

There are significant differences between age groups and the development of mental health disorders. Cano and Takeuchi found that immigrants who arrived in the US between the ages of 0–11 were significantly more likely to meet criteria for a substance use disorder or a co-occurring disorder than those arriving as adults. Also of note, the prevalence of types of childhood adversity experienced by immigrants differed from those observed in the general US adult population. Findings from this study underscore the importance of early intervention with immigrant youth residing in the United States, and of the urgent need for integrated substance use treatment and mental health services for immigrants in the United States.

Not only are there risks associated with immigration for children but also for the mothers who leave their children behind. The review by Pineros-Leano et al. reported mixed findings of transnational mothers facing emotional difficulties when separating from their children. Differences in emotional difficulties were varied, ranging from being sad and hopeless to experiencing depression symptoms. Coping mechanisms, such as creating a reliable line of communication between mothers and children can aid in maintaining closeness and connectedness, and potentially serve to buffer the effects of transnational migration for immigrants' mental health. Understanding protective factors for

OPEN ACCESS

Edited and reviewed by:
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *28 September 2021*
Accepted: *06 October 2021*
Published: *28 October 2021*

Citation:
Alegría M, Yip T, Marks A, Juang L, Cohen L and Cuervo-Torello F (2021) Editorial: Improving Mental Health for Immigrant Populations. Front. Psychiatry 12:785137. doi: 10.3389/fpsyt.2021.785137

first-generation immigrants and risk factors for subsequent generations can provide valuable insight on how to improve transgenerational mental health for immigrant populations.

Suárez-Orozco and López Hernández investigate the differences in mental health risk of college-aged immigrants based on their documentation status. The researchers posited that differences in undocumented status could influence mental well-being through anxiety. Factors such as time of arrival, proximity to the host country, and documentation status should be considered to better understand differences in the presentation of mental health disorders among immigrant populations.

ADDRESSING IMMIGRANT MENTAL HEALTH AT BOTH THE MACRO AND MICRO LEVEL

Addressing immigrant mental health must be done on both macro (structural/systems) and micro (personal/interpersonal) levels. Research has suggested that culturally-tailored and trauma-informed mental health training for diverse stakeholders can reduce negative effects associated with immigration and improve the adaptation experience in the settlement country (3, 4). One study in the Research Topic examined the psychological effects of asylum interviews for asylum-seekers, which has a detrimental psychological impact on refugees. Vukčević Marković et al. observe that training programs targeted at practitioners and decision-makers can lead to a process of asylum determination that is more sensitive to the asylum-seekers' mental health. They underline how refugees' mental health is influenced by the refugee status application process when it functions as an additional source of stress for traumatized refugees fleeing their home countries. This work stresses the importance for not only legal aid but psychological support for those seeking asylum in European countries.

Similarly, Goreis et al. examine the association between perceived ethnic discrimination and stress among Russian immigrants in Germany, and how greater exposure to ethnic discrimination was associated with higher levels of stress. Their findings accentuate the need to increase opportunities for social support and reduce negative coping strategies (e.g., self-blame) to counteract negative effects of ethnic discrimination for Russian immigrants.

The Research Topic also identifies policies and systems and how the actors play a role in how we perceive "the other." Chwastek et al. find that teachers in Germany reported feeling insecure on how to best address refugee children's needs and that professional competence related to their perceptions of refugee children's behavior in school. Teachers with more negative stereotypes of refugee children and less self-efficacy also perceived them to be more difficult. This study shows the importance of pre-school teachers in cultivating effective classroom environments for newly arrived immigrant children and the need to target teacher biases that contribute to misperceptions of student behavior.

Assari et al. illustrate how systemic marginalization limits immigrant adults' capacity to benefit from resources (e.g., employment and neighborhood), thus curtailing anticipated benefits related to educational attainment. They evaluated the association between educational attainment and psychological distress, self-rated health (SRH), and chronic disease (CDs) of immigrant compared to native-born adults in the United States. Their results revealed that educational credentials are associated with lower odds of reporting psychological distress, poor self-rated health and decrease in chronic disease. However, having 16 or more years of education had a greater effect on health for native-born adults in the United States compared to immigrant adults. Assari et al.'s work underscores how we must go beyond increasing access to education to find solutions to promote equality in the benefits of educational attainment.

Also related to policy, Cratsley et al. provide a comprehensive policy and practice review on the Syrian refugee crisis, with an emphasis on forced migration and displacement and its effect on mental health. Their research shows that immigrating at a younger age is associated with a greater likelihood of developing detrimental mental health outcomes. The authors describe how the crisis has contributed to a worsening of mental health conditions and sparked new cases of PTSD due to exposure to violence and displacement. An important focus of this work is how the development of mental health conditions and level of distress can vary based on the destination country and available resources for refugees.

EVIDENCE-BASED CARE

The importance of evidence-based interventions and programs is also highlighted in this Research Topic. In Bacio et al.'s study, school was a crucial setting for implementing a multi-site program, Project Options, aimed at reducing alcohol use for Latinx youth in the United States. The intervention was successful in leading to changes in attitudes toward drinking, signaling the importance of school-based training in changing intentions and behaviors of those with more lifetime drinking experience. The study supports the Project Options intervention as a promising approach to addressing drinking behaviors among Latinx youth and the importance of adapting interventions to the school-specific cultural environment.

Physical activity can also increase the likelihood of better mental health outcomes for newly arrived refugees. Forss et al. found that refugees to Sweden who engaged in greater physical activity reported better sleep quality, lower stress, and more positive mental health and vitality. The findings support providing opportunities and dedicated spaces for newly arrived refugees to engage in physical activity. Another study by Trombka et al. detailed the testing of the Mindfulness Training for Primary Care (MTPC) program that was linguistically and culturally adapted for Portuguese-speakers in the United States. Results from their study support the effectiveness of MTPC in reducing depression and anxiety symptoms, suggesting that it is a feasible, acceptable, and culturally appropriate intervention for Portuguese immigrant populations.

This Research Topic is notable for addressing methodological challenges when assessing immigrant populations with

measures that have been mainly developed for English-speaking populations in the United States. Cruz-Gonzalez et al. examine the psychometric properties of items that comprise the measures of anxiety, depression and level of functioning used in the Positive Minds Strong Bodies intervention trial administered in four languages (English, Spanish Mandarin, and Cantonese). The results of the analyses indicate that the underlying theoretical constructs were conceptualized relatively the same across the four languages. However, there were some symptoms that displayed differential item functioning, emphasizing the need to perform measurement invariance tests when examining racial and ethnic disparities in mental health research.

GAPS IN THE LITERATURE

Overall, this Research Topic provides a rich and nuanced view of the importance of evaluating different dimensions of the immigrant experience to capture mechanisms that might impact immigrants' mental health. Our Research Topic also identifies gaps in knowledge to address to have a strong knowledge base for serving our immigrant populations. First, more longitudinal research focused on the protective features of the immigrant experience in the settlement country is lacking. Second, community-based approaches that are co-designed with the immigrant population would serve to pinpoint the areas identified by immigrants as having a priority in their lives. Thirdly, more information is essential on how to intervene with the social and healthcare systems that limit the prospects of immigrants to experience good mental health in the settlement country. This is an opportunity to ensure that immigrants not only adjust well but thrive in their new homelands.

AUTHOR CONTRIBUTIONS

MA, TY, AM, and LJ reviewed and selected the articles for inclusion in the Research Topic. MA, LC, and FC-T contributed to the initial drafting of the manuscript. TY, AM, and LJ reviewed the drafts of the manuscript and provided feedback. All authors contributed to the manuscript revision.

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

frontiers in Psychiatry

ORIGINAL RESEARCH
published: 15 September 2020
doi: 10.3389/fpsyt.2020.557148

What Mediates the Relationship Between Ethnic Discrimination and Stress? Coping Strategies and Perceived Social Support of Russian Immigrants in Germany

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OPEN ACCESS

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: 29 April 2020
Accepted: 13 August 2020
Published: 15 September 2020

Citation:
Goreis A, Asbrock F, Nater UM and Mewes R (2020) What Mediates the Relationship Between Ethnic Discrimination and Stress? Coping Strategies and Perceived Social Support of Russian Immigrants in Germany. Front. Psychiatry 11:557148. doi: 10.3389/fpsyt.2020.557148

Objective: Experiences of ethnic discrimination may constitute major stressors for ethnic minority groups. This study examined the associations between different forms of ethnic discrimination and levels of perceived stress in Russian immigrants living in Germany, taking into account potential moderating (in-group identification) and mediating (coping and social support) factors.

Methods: Russian immigrants (N = 308) were assessed using online questionnaires (e.g., perceived stress scale, behaviors from intergroup affect and stereotype treatment scale, and brief COPE). Three forms of ethnic discrimination were examined: active harm (e.g., open aggression), passive harm (e.g., paternalistic behavior), and everyday discrimination (e.g., receiving poor service). Moderation by in-group identification and mediation *via* coping and social support were tested.

Results: Passive harm was more prevalent than everyday discrimination and active harm. Passive harm and everyday discrimination were associated with higher perceived stress (rs = .22 and .18, ps <.01), and in-group identification did not moderate these associations (ps >.27). The coping strategy self-blame mediated the association between active harm and stress. Substance use and self-blame mediated the association between passive harm and stress, whereas venting, behavioral disengagement, denial, self-blame, and social support mediated the association between everyday discrimination and stress. A direct effect remained for passive harm and everyday discrimination.

Conclusion: The present study revealed that Russian immigrants encounter different forms of ethnic discrimination, and that this is associated with higher levels of stress. This association was partly explained by coping and social support, illustrating possibilities for interventions aimed at improving the use of adaptive coping strategies and promoting social support-seeking for Russian immigrants.

Keywords: ethnic discrimination, stress, Russian immigrants, coping, social support

INTRODUCTION

A growing body of research indicates that ethnic discrimination is associated with negative effects on both mental and physical health (1–3). Defined as unfair treatment that is attributed to a person's ethnicity (4), ethnic discrimination poses threats to the well-being of most racial and ethnic minority groups (5). In addition to the direct association between ethnic discrimination and health, ethnic discrimination also leads to increased levels of stress, thus indirectly contributing to an impairment in mental and physical health (2, 6–8).

Research on the link between ethnic discrimination and stress has focused on potential protective factors, such as in-group identification (9, 10), which may alleviate stress when experiencing acts of ethnic discrimination. Furthermore, investigations have examined the use of individual coping strategies and perceived social support following the experience of ethnic discrimination (11, 12). Individual coping and perceived social support refer to cognitions and behaviors used to mitigate the stressful effects of perceived ethnic discrimination (13–15).

Since the 1970s, there have been indications of an overall reduction in overt ethnic discrimination and a simultaneous rise in covert, subtle, and benevolent forms from studies conducted in North America (16–18) and Europe (19, 20). Covert forms of ethnic discrimination have also been investigated under the label ethnic/racial microaggressions (18). Those were defined as verbal, behavioral, or environmental offenses against members of ethnic minority groups (21). This shift over to more covert forms has been assumed to be largely due to changing social norms and legislative interventions (22, 23). It is therefore important to account for the difference between distinct forms of ethnic discrimination. Most studies, however, have examined the effects of overt forms, while subtle and covert ethnic discrimination has not been investigated as frequently. The few studies to have investigated subtle and covert forms of discrimination also seem to indicate detrimental effects on individuals (24, 25). The behaviors from intergroup and affects and stereotypes-map [BIAS map; (26)] is a theoretical model that differentiates four forms of discrimination which are based on fundamental dimensions of social perception of group membership [for a recent review, see (27, 28)]. Two of these forms have negative consequences for the group member: active harm, which describes interpersonal acts with the intention to hurt or cause harm, and passive harm, which is a demeaning or diminishing behavior, and includes ignoring or neglecting. The two other forms are facilitatory behaviors and are assumed to lead to—ostensibly—favorable outcomes for the outgroup (26). The aim of active facilitation is to explicitly assist or interact with a group in a benevolent way; and passive facilitation describes behavior in which cooperation and association with a group is merely tolerated in the service of other goals [for a comprehensive review, see (27)]. Additionally, everyday discrimination, e.g., in restaurants, governmental institutions, or while applying for a job or a loan, is equally important to consider, as it continues to happen frequently (29–31). Everyday discrimination has restricting effects on the participation in several domains of daily life and, moreover, on fundamental basic necessities such as access to housing or job markets [e.g., (32)].

In-group identification was postulated to be an important factor that potentially moderates the consequences of ethnic discrimination (10). Within the social identity theory framework, in-group identification has also been referred to as ethnic identity [e.g., (33)]; we will use these terms synonymously. According to the social identity theory, perceived group membership is an important part of an individual's self-concept (34), and high levels thereof can provide people with the resources to counteract the harm caused by discrimination. The rejection-identification model (35) depicts this buffering process as mediation and states that although perceived discrimination is negatively related to health, it may also enhance in-group identification, in turn having a positive effect on health (36). Most studies, however, investigated the moderating effect of in-group identification based on the model of McCoy and Major (37), in which the consequences of discrimination are determined by how strongly the individual identifies with the group. Indeed, in-group identification has been shown to buffer distress from ethnic discrimination (9, 38), but higher identification was also reported to increase stress and decrease well-being (39). It is therefore unclear whether high in-group identification protects the self-concept of the victim from the consequences of discriminatory acts [for a review, see (36)]. If membership of a certain group that suffers from discrimination is an important aspect of the self-concept, then acts of discrimination might also be more salient to oneself (40).

Individual coping refers to different cognitive or behavioral efforts that one uses to manage situations that are appraised to exceed, strain, or tax personal resources (41). According to the transactional model of stress and coping (41), and also the biopsychosocial model of racism as a stressor (11) and Harrell's (12) racism-related stress model, individual coping acts a mediator between stressful events (such as instances of ethnic discrimination) and stress responses. How people cope with instances of ethnic discrimination may have either positive or negative impacts on mental and physical health. For instance, in the context of ethnic discrimination, substance use can be seen as a maladaptive coping mechanism, as it may buffer short-term levels of stress but contributes to the detrimental effects discrimination has on health [e.g., (42)]. Venting one's anger after an experience of discrimination has been associated with higher levels of stress (14, 43) and may also act as a maladaptive coping strategy in this context. Similar maladaptive effects were found for behavioral disengagement (43) and acceptance (44). Furthermore, the tendency not to think about experienced incidents of discrimination, to deny them, or to avoid them (i.e., avoidance coping) was found to heighten their negative effects on distress and self-esteem (45–48) and on life satisfaction (49). In contrast, adaptive coping strategies, such as religious coping (50), were reported to reduce stress levels after experiences of discrimination. Problem-focused coping (i.e.,

personal and formal confrontation) was also associated with lower stress levels and fewer depressive symptoms [e.g., (51–54)].

The availability of interpersonal social support has been shown to be beneficial for well-being and psychological adjustment (55), particularly in immigrant populations (29, 44, 56–60). In the context of ethnic discrimination, social support might help people to cope with instances of ethnic discrimination, subsequently lowering distress (13, 36). Instances of ethnic discrimination are often discussed with family and friends after they have happened [e.g., (51, 61)], and a supportive social network may therefore be crucial in terms of adaptation to and reduction of the stress elicited by discrimination [for a review, see (13)]. However, the results are inconsistent, with one study reporting buffering effects of social support on the association between discrimination and psychological distress (62) and others only finding a buffering effect on depressive symptoms and not on distress (44, 58, 59). Overall, therefore, evidence for the buffering role of social support remains inconclusive [for a review, see (3)].

While some studies assessed how social support helps people to cope with stress in general (without focusing exclusively on ethnic discrimination), Clark (63) argued that social support must be measured in a stimulus-specific manner, i.e., by capturing coping that is specific to a certain stressor—in this case ethnic discrimination—in order to reveal a possible influence. This may explain the aforementioned discrepant findings regarding social support, as many studies did not include a stimulus-specific measurement of social support. A further important factor that has often been overlooked in previous research refers to how different forms of discrimination might have different effects on victims, and how this translates into efforts to cope with perceived ethnic discrimination.

Present Study

We set out to examine the association between perceived ethnic discrimination—considering in-group identification and coping—in a sample of Russian immigrants in Germany. Russian immigrants have received very little attention in this context. For instance, in a meta-analysis of the literature examining the relationship between reported racism and mental and physical health outcomes (1), only three out of the 333 included studies focused exclusively on Russian immigrants. Despite this, Russian immigrants make up considerably sized immigrant groups in the United States, Israel, Finland, Greece, and Cyprus (64). In Germany, they constitute the third-largest group of immigrants, with 1.8 million members [i.e., first- or second-generation; (65)]. A majority of these individuals have a German family background, as their German ancestors have settled all across Europe since medieval times (66). Since 1953, and markedly so following the dissolution of the USSR, ethnic Germans and their descendants have been permitted to repatriate to Germany and have been able to receive benefits such as financial support and automatic citizenship. However, Russian immigrants living in Germany have reported similar encounters of ethnic discrimination to other ethnic groups (67–69). Compared to Germans without migration background, Russian immigrants reported poorer health status (70), higher prevalence rates of cardiovascular diseases (71) or risk factors for cardiovascular diseases (72, 73), and higher rates of mental health problems (66, 74).

To our knowledge, no study to date has investigated the associations between different forms of ethnic discrimination and stress, as well as moderating and mediating factors in Russian immigrants. As such, it is unclear whether in-group identification buffers or heightens the perceived stress caused by instances of ethnic discrimination in this population. In the present study, we chose to investigate overt and covert discrimination by using two of the four behavioral tendencies of the BIAS map (i.e., active harm and passive harm), as in contrast to the facilitatory dimensions, these have negative consequences for individuals. Furthermore, we assessed ethnic discrimination in everyday settings. Everyday discrimination encompasses elements of exclusionary behaviors in daily life that may be perceived indirectly, without personal contact, intent, or demeaning nature (75), constituting a form of discrimination that may be distinct from active and passive harm. We chose to investigate this form of ethnic discrimination separately as it—reportedly—continues to happen frequently [e.g., (76)] and was previously found to be a distinct form of ethnic discrimination in a sample of Turkish immigrants in Germany (10). The study thus investigated the potential moderating influence of in-group identification on the relationship between three different forms of ethnic discrimination (active harm, passive harm, and everyday discrimination) and stress. Additionally, we investigated whether discrimination-specific coping and social support mediated the relationship between the different forms of ethnic discrimination and perceived stress (see **Figure 1** for an overview).

Our research hypotheses were as follows:

1. The relationship between different forms of ethnic discrimination and perceived stress is moderated by in-group identification.
2. The positive relationship between different forms of ethnic discrimination and perceived stress is mediated by discrimination-specific individual coping and social support. We assume that emotion-focused coping (e.g., venting and substance use) and avoidance coping (e.g., behavioral disengagement and denial) will be maladaptive (i.e., associated with higher perceived stress), whereas problem-focused coping, religious coping, and social support will be adaptive (i.e., associated with lower perceived stress).

METHODS

Procedure

The questionnaires were administered online at two time points, between May and August 2012 and between January and May 2015. The participants of both sampling time points were independent from each other, i.e., the data is of cross-sectional nature. For the purpose of the current study, we merged the datasets from 2012 (N = 159) and 2015 (N = 149). The study was approved by the Committee for Ethics at the Department of Psychology, Philipps

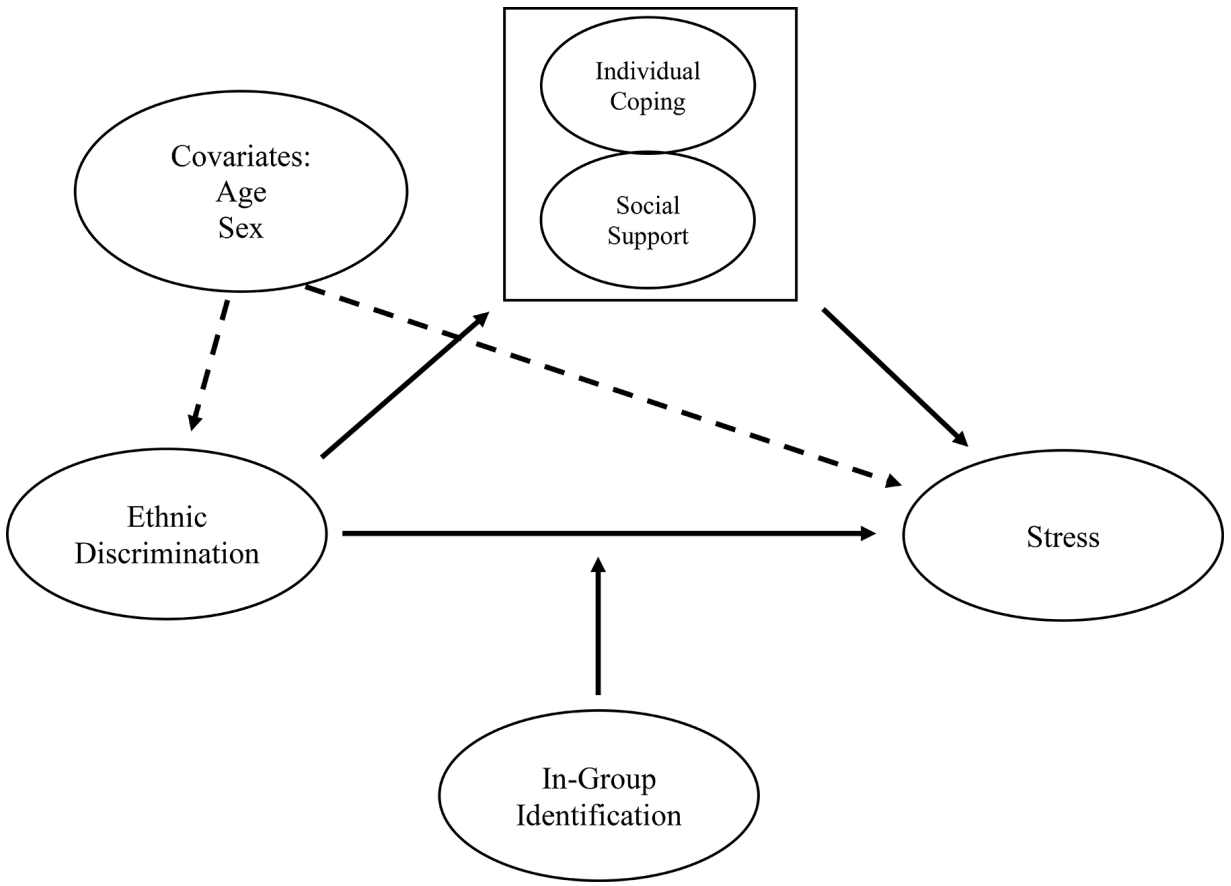

FIGURE 1 | Mediation and moderation models for predicting levels of stress by forms of ethnic discrimination *via* individual coping and social support (mediators), with the strength of in-group identification as a moderator.

University Marburg, Germany. Informed consent was obtained from all participants prior to their participation.

Participants were recruited *via* advertisements in supermarkets and institutions (e.g., authorities of local Russian-Orthodox and Jewish communities) in the Federal states of Hesse and North Rhine-Westphalia in Germany. Further recruitment occurred in social and professional networks, online communities, and mailing lists which span across Germany. To portray the population in detail as well as gain generalizable results, we included both first and second-generation immigrants who, in 2018, made up 79 and 21% of Russian immigrants living in Germany, respectively (65). The recruitment strategy did not differ between the two time points.

Participants

Our sample comprised 308 Russian immigrants (204 females; age $M = 31.8$, $SD = 10.6$, 18–77 years) who had been living in Germany for an average of 15.5 years ($SD = 7.3$); 9% ($n = 29$) were second-generation immigrants, i.e., born in Germany. Twenty-four percent of the participants had a university degree, and 15% percent did not possess any school-leaving qualifications. Fifty-nine percent were employed, while the remainder were enrolled in university or currently unemployed. Eighty-five percent were in a relationship or married. The participants of the second generation were younger (first generation: $M = 32.8$ years, second generation: 23.0 years, $p < .001$) and higher educated (university degree: first generation, 21%; second generation, 52%, $p < .001$) than the participants of the first generation.

Compared to the subsample from 2012, the subsample from 2015 was younger ($M = 27.5$ versus $M = 35.9$ years, respectively, $p < .001$), higher educated (46% versus 4% had a university degree, $p < .001$), and fewer people were employed (50% versus 68%, $p = .002$). Furthermore, fewer people were in a relationship or married in 2015 (42%) than in 2012 (73%, $p < .001$).

Measures

All questionnaires were translated into Russian using the forward-backward method by native speakers living in Germany, with the exception of the Perceived Stress Scale, which already existed in Russian (77). Consequently, all questionnaires were offered in Russian and in German.

First, participants provided information on their age, sex, education, and relationship status.

Two different questionnaires were used to measure discrimination. The BIAS-treatment scale [BIAS-TS; (78)] is a

measure assessing different forms of discrimination. It is based on the BIAS map (26) and detects four different kinds of harmful and facilitatory behavior that individuals may encounter: active harm (intention to hurt), passive harm (ignorance, undermining the social value), active facilitation (benefiting a group), and passive facilitation (instrumental collaboration to pursue one's own aims). We applied the BIAS-TS-Short Form with three items for each scale, and items were rated on a 7-point scale (1 = have never experienced this, 7 = often experience this). As the BIAS-TS had never been used in a sample of Russian immigrants, confirmatory factor analysis (CFA) was conducted using the lavaan package (79) for R version 3.6.0. The four factors (active harm, passive harm, active facilitation, and passive facilitation) were confirmed, with acceptable fit [$\chi^2(48) = 133.34$, $p < .001$; RMSEA = .076, CFI = .914, SRMR = .068]. This model with four latent factors fitted the data significantly better than a model with only a single latent factor [$\Delta\chi^2(6) = 388.38$, $p < .001$] or a two-factor active and passive model [$\Delta\chi^2(5) = 263.42$, $p < .001$]. Cronbach's alpha was .75 for active harm and .68 for passive harm (active and passive facilitation are not used in the current study, as facilitatory behaviors do not fit our definition of discrimination).

Everyday experiences of discrimination were measured by a combination of seven items from three different studies (10, 68, 80). The items were based on the Everyday Discrimination Scale (54) and measured discrimination in an everyday context. Specifically, we used the items assessing insults, not getting hired or promoted, receiving poorer service at restaurants/stores, and not being able to get apartments/houses for rent, which were shown to be meaningful for Russian immigrants in a study by Salentin (68). Furthermore, we included two items assessing inadequate care from a doctor and being treated worse than others in government institutions/agencies, as everyday discrimination was reported to happen frequently in these contexts by minority groups in Germany (81). Items were answered on 7-point scales (1 = have never experienced this, 7 = often experience this). Principal axis factor analysis revealed one factor with an eigenvalue of 3.34 and all items had factor loadings above .39 on this factor, explaining 47.64% of the variance. Cronbach's alpha for everyday discrimination was .81.

We conducted a principal axis factor analysis (with direct oblimin rotation) to ensure that the three forms of ethnic discrimination (i.e., active harm, passive harm, and everyday discrimination) were distinct factors. Sphericity ($\chi^2(78) = 1259.92$, $p < .001$) and size of the KMO (.80) were acceptable. Factor analysis revealed three factors with eigenvalues > 1, explaining 57% of the variance. The three factors consisted of 1) the three active harm items (loadings >.52), 2) the three passive harm items (loadings >.53), and 3) the seven everyday discrimination items (loadings >.49), respectively. No cross-loadings above .25 were found. These results thus confirmed the factorial distinctiveness of our three scales measuring ethnic discrimination.

The Perceived stress scale (PSS) by Cohen, Kamarck, and Mermelstein (82) measures perceived stress in the previous month. We used a short version of the scale with ten items (83). All items were rated on 5-point scales (1 = never, 5 = always). In the original version, participants are asked to report how often they felt a certain way (e.g., "In the last month, how often have you felt that you were unable to control the important things in your life?"). We extended the period to the last year in order to assess a period that is congruent with the BIAS-TS. Cronbach's alpha of the PSS lay at .88 in our study.

Participants completed four items measuring their identification with the group of Russians. These items were adapted from two studies (84, 85) and have been used previously in a Russian population (84). A typical item was: "To be a Russian is an important aspect of my person", with responses ranging from 1 (don't agree at all) to 7 (agree completely). Principal axis factor analysis revealed one factor with an eigenvalue of 3.06 and all items had factor loadings above .78 on this factor, explaining 76.42% of the variance. Cronbach's alpha was .90 for in-group identification.

To assess individual coping, we used the Brief COPE (86), which is the short form of the original COPE (87) and is based on the assumptions of the transactional model of stress (41). The Brief COPE contains 28 items and 14 scales. In the present study, we used the items of twelve scales (24 items); the scales Emotional Support and Instrumental Support were omitted as one can assume that the availability of social support—as measured with the ENRICHD Social Support Inventory in our study (see below)—can predict the seeking of social support (88–90). All items are rated on a 5-point scale (1 = never, 5 = always). We formulated the instructions to measure coping specifically after perceived experiences of discrimination, i.e., discrimination-specific individual coping [c.f., (8, 91)].

In order to generate scales, a principal axis factor analysis with direct oblimin rotation was conducted. Bartlett's test of sphericity [$\chi^2(276) = 3348.00$, $p < .001$] and size of the KMO (.79) were acceptable. Factor analysis revealed eight factors with eigenvalues of >1, explaining 72% of the variance. Due to low communalities or double factor loadings, items 7, 17, 19, and 24 were excluded from further analyses. The factor active coping found by Knoll, Rieckmann, and Schwarzer (92) was replicated (see factor 1 in **Table 1**). The other factors were named as follows: substance use (factor 2), venting (factor 3), humor and positive reframing (factor 4), behavioral disengagement (factor 5), religion (factor 6), denial (factor 7), and self-blame (factor 8). The pattern matrix and Cronbach's alpha of each subscale is depicted in **Table 1**.

We used the ENRICHD social support inventory [ESSI; (93)] to measure social support. In contrast to the six-item original version of the questionnaire, the German version includes only five items, without the item assessing instrumental support (94). As instrumental social support is important in the context of discrimination [e.g., (95)], we added an item measuring this aspect ("Is there someone available to you who can provide practical and concrete help with problems (e.g., take you to the doctor?") from the Swiss Household Panel (96). For all items, the instructions were specifically formulated to refer to discrimination, similar to the instructions of the Brief COPE. Participants rated the availability of social support on a 5-point scale (1 = never, 5 = always). Principal axis factor analysis revealed one factor with an eigenvalue of 3.83, and all items

TABLE 1 | Pattern matrix of the scales of the Brief COPE and Cronbach's alpha.

Item	Active coping	Substance use	Venting	Humor and positive reframing	Behavioral disengagement	Religion	Denial	Self-blame
(27) I've been thinking hard about what steps to take.	**.74**							
(14) I've been trying to come up with a strategy about what to do.	**.72**							
(7) I've been taking action to try to make the situation better.	.59				-40			
(2) I've been concentrating my efforts on doing something about the situation I'm in.	**.58**							
(1) I've been turning to work or other activities to take my mind off things.	**.54**							
(21) I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.	.37				.31			
(11) I've been using alcohol or other drugs to help me get through it.		**.98**						
(4) I've been using alcohol or other drugs to make myself feel better.		**.86**						
(23) I've been expressing my negative feelings.			**.84**					
(9) I've been saying things to let my unpleasant feelings escape.			**.60**					
(18) I've been making jokes about it				**.93**				
(30) I've been making fun of the situation.				**.55**				
(17) I've been looking for something good in what is happening.	.31			.37				
(22) I've been accepting the reality of the fact that it has happened.				**.33**				
(12) I've been trying to see it in a different light, to make it seem more positive.				**.32**				
(6) I've been giving up trying to deal with it.					**.66**			
(16) I've been giving up the attempt to cope.					**.56**			
(24) I've been trying to find comfort in my religion or spiritual beliefs.						**1.00**		
(29) I've been praying or meditating.						**.69**		
(8) I've been refusing to believe that it has happened.							**.80**	
(3) I've been saying to myself "this isn't real.".							**.63**	
(28) I've been blaming myself for things that happened.								**.80**
(13) I've been criticizing myself.								**.78**
(26) I've been learning to live with it.								
Cronbach's alpha	.79	.92	.79	.65	.65	.81	.67	.90

Principal axis factor analysis with oblimin rotation. Factor loadings <.30 are not indicated. Factor loadings in bold indicate that the item was used for the computation of the respective factor. Cronbach's alpha is calculated without items 7, 17, 19, and 24, which were excluded from further analysis.

had factor loadings above .64, explaining 63.94% of the variance. Cronbach's alpha was .91.

Data Analysis

Analyses were conducted using IBM SPSS 24. Moderation and mediation models were tested using the PROCESS plugin (version 2.16.3) for SPSS 24 (97). Three regression analyses were conducted, with the three forms of discrimination, in-group identification, and the respective discrimination x identification interaction term. Predictors and potential moderators were mean-centered (98). We tested three parallel multiple mediation models in which individual coping and social support were entered as mediators of the relationship between the three forms of discrimination (active harm, passive harm, and everyday discrimination) and perceived stress. Bias-corrected bootstrapping (99) was used to test the mediating effect of our proposed variables on the relations between the forms of discrimination and perceived stress. A series of steps were undertaken to test our models. First, the forms of discrimination were regressed onto our proposed mediators. Second, our mediators were entered into a regression predicting perceived stress, controlling for the predictor (i.e., the form of discrimination of each model). Third, the indirect effects of all the individual mediators were computed as a full model. We then retained relevant mediators (i.e., with a bootstrapped CI not including zero) and dropped the remaining non-relevant mediators for each model. A final model was subsequently computed including only relevant mediation paths. Total and direct effects were reported based on final models. For all analyses, a 95% confidence interval (CI) with 10,000 bootstrapping samples was used. The proportion of explained variance of the outcome in our final models (including the predictors and mediators simultaneously) is depicted with R^2 statistics. Following general convention (100), an R^2 of 0.02 was considered as a small, 0.13 a moderate, and 0.26 a large proportion of explained variance. Age and sex were included as covariates in all moderation and mediation models.

RESULTS

All bivariate correlations of the variables included in our models are depicted in **Table 2**. The age of participants showed a significant positive association with all three forms of perceived ethnic discrimination (rs = .13–.28), but not with perceived stress (r = -.08). Correlations between sex (coded as 1 = male, 2 = female) and active harm (r = -.18) were significant. Male

participants reported a higher frequency of active harm. In-group identification was positively—and significantly—associated with perceived stress (r = .15).

The participants from the first and second-generation did not differ regarding their scores of active harm, passive harm, or perceived stress (ps >.191). First-generation immigrants, however, reported a higher frequency of everyday discrimination (M = 2.04) than second-generation immigrants (M = 1.52, p = .001) and a higher score of in-group identification (M = 4.37 versus M = 3.59, p = .017). The subsample from 2015 had lower scores in all measurements of the three forms of ethnic discrimination (active harm: M = 1.22 versus M = 2.47; passive harm M = 2.32 versus M = 2.69; everyday discrimination: M = 1.77 versus M = 2.20, all ps <.013) than the sample assessed in 2012. Furthermore, the subsample from 2012 reported higher in-group identification (M = 4.51) than the subsample from 2015 (M = 4.08, p = .040). The two samples, however, did not differ regarding perceived stress (p = .847).

Moderation of the Relationship Between Discrimination and Stress with In-Group Identification as Moderator Variable

None of the three interaction terms were significant (active harm: b = 0.03, p = .22; passive harm b = 0.009, p = .58; everyday discrimination: b = -0.02, p = .27), indicating that in-group identification did not moderate the associations between the three forms of discrimination and perceived stress. To investigate whether the potential moderation may be influenced by the different generational statuses and sampling time points of our sample, we analyzed the models separately for first- and second-generation participants and the subsamples from 2012 and 2015. Again, in-group identification did not moderate the associations between any forms of discrimination and perceived stress (first generation: ps >.23, second generation: ps >.52, subsample from 2012: ps >.18, subsample from 2015: ps >.14). Consequently, in-group identification was not considered as a control variable in the further analyses.

Mediation of the Relationship Between Discrimination and Stress by Coping and Social Support

We tested three parallel multiple mediation models, one for each form of discrimination (active harm, passive harm, and everyday discrimination) with the eight different coping strategies and social support as mediators. See **Supplementary Table 1** for unstandardized coefficients and indirect effects, and **Table 3** for the total and direct effects of all three models.

For active harm, we only found an indirect effect on perceived stress through self-blame (see **Figure 2** for the final model). The total effect of active harm on stress was not significant (b = 0.11, p = .051), and the inclusion of self-blame as a mediator reduced it to a direct effect of b = 0.08 (p = .14). The final model explained a small proportion of the variance in perceived stress (R^2 = .12).

Passive harm showed an indirect effect on perceived stress through substance use and self-blame (see **Figure 3**), which

TABLE 2 | Bivariate correlations between model variables.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) Everyday discrimination	–															
(2) Active harm	.36***	–														
(3) Passive harm	.28***	.25***	–													
(4) Perceived stress	.18**	.08	.22***	–												
(5) In-group identification	.19***	.06	.19***	.15**	–											
(6) Active coping	.33***	.10	.28***	.20***	.21***	–										
(7) Substance use	.10	.10	.23***	.31***	.003	.18**	–									
(8) Venting	.18**	.09	.11	.22***	.08	.40***	.26***	–								
(9) Humor	.15**	.05	.12*	.10	.19**	.42***	.07	.27***	–							
(10) Behavioral disengagement	.16**	.03	.08	.27***	.17**	.24***	.14*	.19***	.31***	–						
(11) Religion	.17**	.22***	.17**	.06	.07	.18**	.23***	.10	.12*	.13*	–					
(12) Denial	.19**	.09	.15**	.05	.03	.39***	.22***	.36***	.26***	.23***	.21***	–				
(13) Self-blame	.20***	.10	.27***	.31***	.07	.47***	.25***	.25***	.24***	.36***	.30***	.29***	–			
(14) Social support	-.23***	-.07	-.12*	-.18**	.01	-.24***	.01	-.03	-.04	-.16**	.05	-.04	-.13*	–		
(15) Age	.27***	.13*	.15**	-.08	-.10	.14*	-.05	-.002	.06	.001	-.04	.09	.04	-.42***	–	
(16) Sex (1 = male, 2 = female)	-.09	-.18*	-.07	.14	.12	-.01	.03	.11	-.003	.14*	.03	.06	.06	.22***	-.14*	–
M	1.99	1.35	2.51	2.92	4.30	2.78	1.26	2.54	2.51	1.90	1.65	2.01	1.99	3.82	31.81	1.66
SD	1.09	0.71	1.30	0.68	1.86	0.84	0.61	0.93	0.71	0.81	0.87	0.89	0.96	0.94	10.64	0.47

*p <.05, **p <.01, ***p <.001.

TABLE 3 | Results from mediation analysis for the total and direct effects of all models.

Model	Total effect	*SE*	Direct effect	*SE*	*F* (*df*)	R^2
Model 1: Active harm *via* coping -> stress	0.11	0.06	0.08	0.05	10.75*** (4, 303)	.12
Model 2: Passive harm *via* Coping -> stress	0.13***	0.03	0.07*	0.02	13.85*** (5, 302)	.19
Model 3: Everyday discrimination *via* coping -> stress	0.14***	0.04	0.08*	0.04	10.56*** (8, 299)	.22

*p < .05, ***p < .001.

reduced the total effect of passive harm from $b = 0.13$ ($p < .001$) to a direct effect of $b = 0.07$ ($p = .020$). The variance explained by the final model ($R^2 = .19$) indicated a moderate effect size.

We found significant indirect effects of everyday discrimination on perceived stress through venting, behavioral disengagement, denial, self-blame, and social support (see **Figure 4** for the final model). The final model indicated that the inclusion of mediators reduced the total effect of everyday discrimination, with $b = 0.14$ ($p < .001$), to a direct effect of $b = 0.08$ ($p = .027$). The variance explained by the final model ($R^2 = .22$) indicated a moderate effect size.

DISCUSSION

Experiences of discrimination are associated with increased stress and reduced well-being. The present study aimed to investigate the associations between three different forms of ethnic discrimination (active harm, passive harm, and everyday discrimination) and perceived stress in a sample of Russian immigrants living in Germany. We explored the stress-buffering effect of in-group identification and the use of various discrimination-specific coping strategies (active coping, substance use, venting, humor and positive reframing, behavioral disengagement, religion, denial, and self-blame) as well as perceived social support.

Consistent with previous research (1, 2), the findings of the present study revealed that greater exposure to ethnic discrimination was related to higher levels of stress. Passive harm, a subtle and paternalistic form of ethnic discrimination, was reported most frequently in our sample of Russian immigrants, followed by everyday discrimination and active harm. This frequency distribution is similar to other studies which reported that the frequency of more subtle forms of discrimination has increased over time, whereas blatant forms have become less frequent [e.g., (16, 101)]. We found that

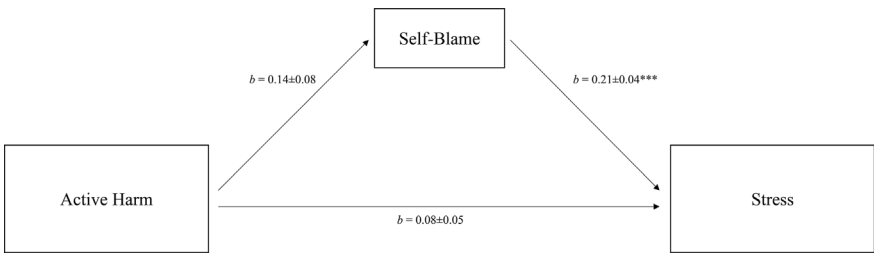

FIGURE 2 | Mediation of the relation between active harm and perceived stress *via* individual coping. Total effect: $b = 0.11$, $SE = 0.06$, $p = .051$. Control variables: age and sex. $R^2 = 0.12$. b = unstandardized coefficients ± SE. ***$p < .001$.

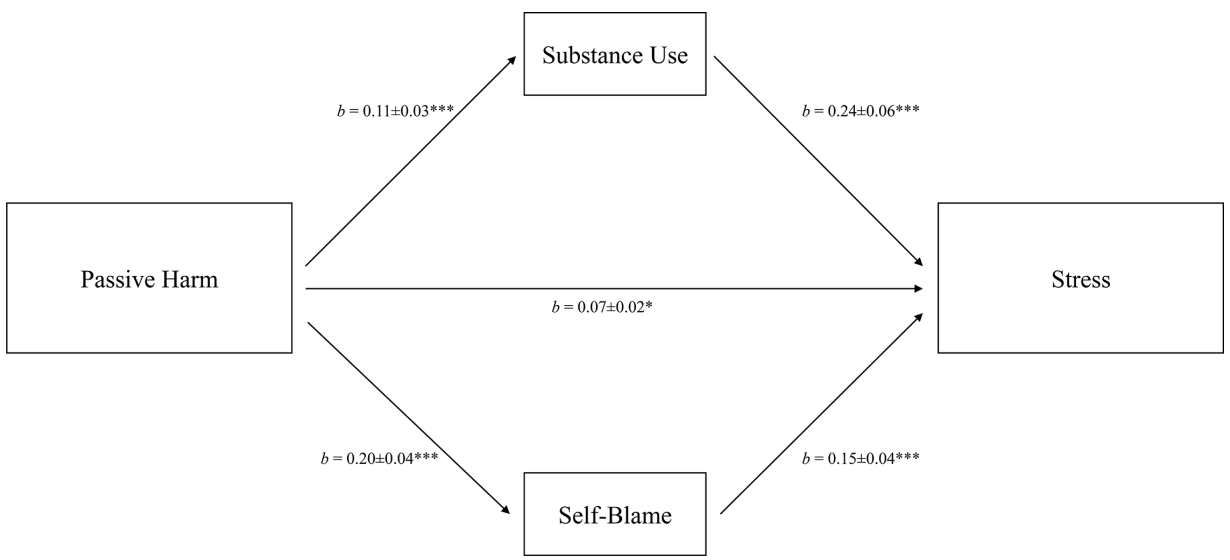

FIGURE 3 | Mediation of the relation between passive harm and perceived stress *via* individual coping. Total effect: $b = 0.13$, $SE = 0.03$, $p < .001$. Control variables: age and sex. $R^2 = 0.19$. b = unstandardized coefficients ± SE. ***$p < .001$.

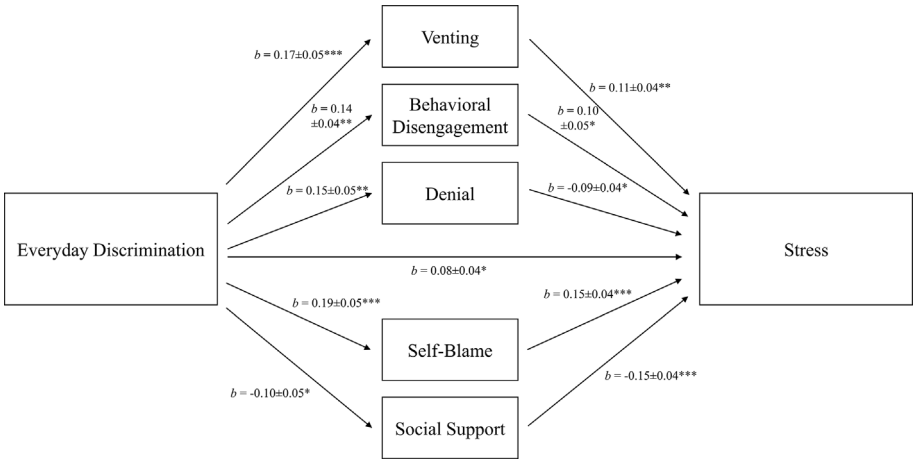

FIGURE 4 | Mediation of the relation between everyday discrimination and perceived stress *via* individual coping. Total effect: $b = 0.14$, $SE = 0.04$, $p < .001$. Control variables: age and sex. $R^2 = 0.22$. b = unstandardized coefficients ± SE. *$p < .05$, **$p < .01$, ***$p < .001$.

everyday discrimination was prevalent in our sample; this fits the notion that discrimination remains a pervasive factor in housing, education, employment, and health care (30, 102–104).

Active harm, which is characterized by a perception of blatant, overt ethnic discrimination, was not associated with perceived stress in the present study. Ong, Fuller-Rowell, and Burrow (105) found a positive association between the frequency of perceived discrimination and induced stress. Thus, the low frequency of blatant acts of discrimination found in the investigated sample may explain the lack of relationship with stress. Moreover, the prevalence of reported active harm in our subsample from 2015 was much lower than in the subsample from 2012. One could argue that this difference has influenced our results, as possible associations between active harm and stress in the subsample from 2012 could have been averaged out by merging the data with the subsample from 2015. However, separate correlation analyses (results not reported) for the subsamples from 2012 and 2015 showed no associations between active harm and stress. We can, therefore, preclude the possibility that this temporal variation affected the overall association between active harm and stress. Instances of passive and subtle ethnic discrimination—rather than overt forms—may be a preeminent factor leading to stress and in turn to stress-related disorders, as such instances may be ubiquitous, very easily dismissed by perpetrators, and more frequent.

In-group identification did not moderate the relationship between any form of discrimination and the level of stress in our sample. This is contrary to some studies reporting a relationship between in-group identification or ethnic identity and the perception of discrimination (106–110), which may in turn suggest a moderating effect of in-group identification on the relationship between discrimination and level of stress. Nonetheless—and in line with our results—one review found no buffering effect of in-group identification in 10 of 12 studies investigating coping with racism (13). Even though the ethnic identity of Russian immigrants participating in our study was relevant to them (as indicated by the high mean score on the in-group identification scale), it neither strengthened nor weakened the association between ethnic discrimination and perceived stress. Furthermore, a possible mediation of the association between ethnic discrimination and stress *via* in-group identification, as assumed by the rejection-identification model (35), can be precluded as an alternative explanation for our results. Contrary to the predictions of this model, in-group identification did not reduce stress, but was rather positively associated with stress in our sample of Russian immigrants. In-group identification is considered to collectively develop over time, through participation in social and cultural practices of one's group, and through social comparisons with both the in-group and the out-group (9). The history of Russian immigration to Germany is in part a relatively recent phenomenon (i.e., having occurred since the dissolution of the USSR). Furthermore, Russian immigrants in Germany are characterized by a heterogeneity of immigration backgrounds (i.e., differences in religious faith, mixed ethnic heritage, and country of origin). A mixed historical and experiential knowledge about the in-group could therefore explain the lack of a stress-buffering effect in the present study (111).

As described in the theoretically grounded models of coping as a mediator between experiences of ethnic discrimination and stress (11, 12), mediating effects of coping and/or social support were found between all three investigated forms of discrimination and perceived stress. In response to passive harm, Russian immigrants tended to use substances such as alcohol and engaged in self-blame. Similarly, self-blame was found after experiences of active harm. Following ethnic discrimination in everyday situations, multiple coping strategies were used (i.e., behavioral disengagement, self-blame, venting, denying, and social support). Social support was negatively associated with everyday discrimination, i.e., it was used to a lesser extent after perceiving this form of ethnic discrimination. The number of relevant coping strategies in the link between

everyday discrimination and stress was higher than for active harm (one strategy) and passive harm (two strategies). An explanation may be that the items assessing everyday discrimination were more concrete and more salient for our participants—when compared to the more general behaviors in the BIAS-TS. Moreover, we aimed to assess a wide range of discriminatory experiences with close proximity to everyday life. It may be due to the high salience and the proximity to everyday life—and maybe also to other stressful experiences in daily life—that a broader range of coping strategies was associated with the stress level in these situations. Possibly, everyday discrimination is less specific with regard to applied coping strategies than other forms of ethnic discrimination. The number of significant coping strategies in our assessment of active and passive harm was, however, similar to other studies that used the Brief COPE (43, 91). The effects of discrimination on stress in our sample occurred largely (passive harm, everyday discrimination) or entirely (active harm) through indirect effects, and these associations remained after holding age and sex constant. However, passive harm and everyday discrimination also showed direct associations with perceived stress beyond the influence of coping strategies.

Of the nine coping strategies investigated in this study, six were relevant mediators of the relationship between different forms of discrimination and stress. As hypothesized, emotion-focused strategies (i.e., venting, substance use, self-blame), as well as one avoidant strategy (behavioral disengagement), were maladaptive. Laypersons often assume venting to be a productive strategy to handle negative emotions (112). However, other studies also found that higher levels of venting after discriminatory experiences led to higher psychological distress (43, 91).Venting one's anger does not seem to help regulating negative emotions after ethnic discrimination, but rather seems to result in a prolongation of those negative emotions (113). Our findings also suggest that behavioral disengagement after discriminatory events did not lead to effective stress management, which is consistent with other findings in this context (43, 114). It is assumed that behavioral disengagement was an indicator of learned helplessness (115), which could mean that victims of discrimination "gave up" or withdrew from actively dealing with stressors.

Only two strategies were found to buffer against stress following experiences of ethnic discrimination: perceived social support and denial, and these strategies only exerted an effect in response to perceived everyday discrimination. Contrary our expectations, we did not find a mediation by problem-focused and religious coping. Furthermore, everyday discrimination was associated with lower social support, even though this form of coping buffered perceived stress. Prelow, Mosher, and Bowman (116) reported that the perceptions of social support decreased in African American college students affected by racial discrimination and that this reduction in social support partially accounted for the detrimental effects of discrimination on psychological adjustment. One study of Russian immigrants in Finland found that the availability of social support networks was related to better psychological well-being (117). Nevertheless, other studies found either no mediation [in African Americans, (91); in native Hawaiians, (43)] or even a worsening effect of social support on distress [in Filipino Americans, (45)]. The mediating role of denial and its negative association with stress in our sample was striking, as it is commonly assumed that this avoidant coping strategy is psychologically taxing and debilitating, requiring permanent effort to deny the experiences of ethnic discrimination (45, 118, 119). One study found that African Americans who constantly denied unfair treatment against them had elevated resting blood pressure (61), and denial was associated with increased stress in samples of Latinos (118, 120). However, positive aspects of avoidance coping have also been acknowledged: Avoidance coping may protect against the perception and the processing of distressing information (121), and, in its milder form, denial may overlap with positive thinking (122). Furthermore, avoidance coping was found to be used more frequently in racially stressful than nonracially stressful events (123), possibly explaining the stress-buffering effect found in our study.

Limitations

Our findings have to be considered in the light of potential limitations. Highly educated persons were overrepresented in our convenience sample (24% had a university degree compared to 11% in the population) and the mean age (32 years) was lower than the average age of Russian immigrants in Germany [41 years (65)], which may reduce the generalizability of our results. We recruited participants at two time points (i.e., 2012 and 2015) in order to extend our sample size and to attain results that are generalizable over time. This may be noted as a limitation, since the subsamples differed in sociodemographic variables. Furthermore, even though we could assume an indirect association between discrimination and levels of stress *via* coping and social support based on the theoretical background (11, 12, 41), this study was based on correlational data and did not allow for the examination of causal relationships. As mediation analysis does not permit claims regarding the direction of effects, it might be possible that the perceived stress of an individual was associated with the use of coping strategies and that this in turn affected the recall of discrimination experiences. Whereas the original PSS-10 assesses perceived stress during the last month (83), we aimed for concordance with the sampling frame of the BIAS-TS (1 year) and accordingly adapted the time frame of the PSS-10. While longer periods may be susceptible to recall bias in the appraisal of stressful events (124), the same limitation may account for the assessment of ethnic discrimination. In adapting the time frame of the PSS to the time frame of our main predictor measure (the BIAS-TS), we aimed to obtain the same conditions for these assessments and thus to avoid recall biases that only influence one variable and may unequally confound the reliability of the association. We decided against adapting the time frame of the BIAS-TS to only one month, as this may be a too short time frame to adequately assess ethnic discrimination. Moreover, research shows that even ethnic discrimination experienced a longer time back may have prolonged negative effects on health (125). Longitudinal studies investigating individual coping with discrimination on a long-term basis are needed to address these issues.

At the first page of the online assessment, participants could choose to fill in the questionnaires in either German or Russian, and the informed consent and all questionnaire where then presented in

the chosen language. Very unfortunately and due to technical reasons, we could not determine how many participants chose which language. Thus, we were unable to test for measurement invariance or comparability of the two language versions. However, ninety percent of our sample rated their German language skills as "very good" or "good", and the internal reliability (Cronbach's alpha) of our core questionnaires (the three forms of discrimination, perceived stress, and in-group identification) did not differ between the skill categories for German language. The categories and respective internal reliability scores were as follows: very good (n = 205): α = .63–89; good (n = 69): α = .65–.90; and moderate or not very proficient (n = 32): α = .74–.92. This data may partially refute this limitation, as we assume that most participants in the current study chose the German version of our instruments due to their high proficiency in the German language and the internal reliabilities of the instruments were comparable between different German language skills. Nevertheless, we cannot fully rule out limitations due to measurement variance, as we did not test it.

CONCLUSION

In sum, our findings add to the literature regarding negative effects of perceived ethnic discrimination on affected populations. The results suggest that different forms of perceived ethnic discrimination are indeed associated with stress. It should be recognized that Russian immigrants, an ethnic group that has been investigated relatively rarely, suffer from the impact of perceived ethnic discrimination, as we found evidence for the detrimental effects of subtle and everyday discrimination on the stress levels of Russian immigrants in Germany. The notion that different forms of ethnic discrimination may be experienced differently has not yet been extensively investigated. While the decline of blatant forms of ethnic discrimination may lead to the conclusion that discrimination of immigrants is of diminishing relevance, the present study underlines the harmful effects of more subtle forms of discrimination. Our study provides evidence for the possible effects of several maladaptive (substance use, venting, behavioral disengagement, self-blame) and adaptive (social support, denial) coping strategies following different forms of discrimination. Consequently, practitioners working with Russian immigrants affected by ethnic discrimination should encourage the seeking of social support and aim to reduce maladaptive coping strategies. Finally, we seek to raise institutional as well as public awareness of the consequences of discrimination against minority groups.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Committee for Ethics at the Department of Psychology, Philipps University Marburg, Germany. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

AG analyzed and interpreted the data and wrote the first draft of the manuscript. FA contributed to the design of the study, the interpretation of the data, and critically revised earlier versions of the manuscript. UN contributed to the interpretation of the data and critically revised earlier versions of the manuscript. RM was the principal investigator of the study, contributed to the design of the study, supervised data collection, helped with analyses and interpretation of the data, and was a major contributor in writing the manuscript. All authors contributed to the article and approved the submitted version.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2020.557148/full#supplementary-material

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

frontiers in Psychiatry

ORIGINAL RESEARCH
published: 09 November 2020
doi: 10.3389/fpsyt.2020.573410

Recent/Childhood Adversities and Mental Disorders Among US Immigrants

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Past research documents the heterogeneity in US immigrants, particularly in terms of racial and ethnic categories and specific ethnic subgroups. The present study builds on this research foundation by investigating heterogeneity in immigrants' experiences of adversity, both recent and during childhood, and associations with mental disorders. Data are drawn from 6,131 adult immigrants in the 2012–2013 National Epidemiologic Survey on Alcohol and Related Conditions-III. Prevalence estimates for mental disorders and adversities were calculated overall and by gender. Latent class analysis was utilized to characterize patterns of self-reported experiences of childhood and recent adversities, and multinomial logistic regression established the statistical association between latent class membership and past-year mental disorder outcomes (substance use disorder only, mood/anxiety/trauma disorder only, co-occurring disorder, or no mental disorder). Neglect was the most commonly-reported childhood adversity among immigrant men and women. Prevalence of meeting criteria for a substance use disorder only, or a mood/anxiety/trauma disorder only, varied between men and women, yet no gender differences were observed in prevalence of co-occurring disorders. For latent class analyses, a five-class solution was selected based on fit indices and parsimony. Approximately 10.0% of the sample was categorized in the latent class characterized by severe childhood adversities, while 57.5% was classified in the latent class with low probabilities of reported adversities. The relative risk of meeting criteria for a past-year substance use disorder only (compared to no substance use or mood/anxiety/trauma disorder) was more than three times as high for members of the class with severe childhood adversities (RRR, 3.26; 95% CI, 2.08–5.10), as well as the class with recent employment/financial adversities (RRR, 3.82; 95% CI, 2.36–6.19), compared to the class with low adversities. The relative risk of past-year co-occurring disorders (compared to no disorder) was more than 12 times as high for those in the severe childhood adversities class (RRR, 12.21; 95% CI, 7.06–21.10), compared to the class with low adversities. Findings underscore the importance of considering both recent and childhood adversities when assessing and providing services for US immigrant groups.

Keywords: immigrant, adverse childhood experiences, adversities, substance use, mental disorders, co-occurring disorders

OPEN ACCESS

Edited by:
Tiffany Yip,
Fordham University, United States

Reviewed by:
Katholiki Georgiades,
McMaster University, Canada
Yuri Jang,
University of Southern California, Los Angeles, United States

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *17 June 2020*
Accepted: *30 September 2020*
Published: *09 November 2020*

Citation:
Cano M and Takeuchi DT (2020) Recent/Childhood Adversities and Mental Disorders Among US Immigrants. Front. Psychiatry 11:573410. doi: 10.3389/fpsyt.2020.573410

INTRODUCTION

Mental disorders exact high societal, economic, and healthcare costs, contributing to lost productivity, disability, and mortality. Although many immigrant groups in the United States (US) evidence lower rates of mental disorders than the US-born (1–6), immigrants comprise a diverse population with varying levels of risk for mental disorders. Many US immigrants are disproportionately exposed to a variety of stressors with the potential to trigger or exacerbate maladaptive coping and psychopathology. As a means to more adequately address the mental health needs of immigrant populations in the US, a deeper understanding is needed of the intricacies in the relationship between various adversities and mental health outcomes, including substance use disorders, mood/anxiety/trauma disorders, and co-occurring conditions. Prior research has underscored the importance of considering both childhood adversities and more recent stressors and adversities when evaluating impacts on mental health (7). The present study, therefore, examines patterns in experiences of childhood and recent adversities among US immigrants, and the connection to mental health outcomes.

BACKGROUND

Heterogeneity of US Immigrant Populations

According to 2018 data, the US is home to ∼44.7 million immigrants (8). Beyond the demographic differences between US-born and foreign-born populations, substantial demographic variation is observed within immigrant populations based on a variety of factors. Differences based on region of origin—and specific country in each region—include educational attainment, income, poverty rate, and English proficiency (8, 9). The demographics of immigrant communities also vary based on period of entry to the US, as patterns in immigrant-sending countries shift over time (8).

The varying journeys, circumstances precipitating migration, and contexts of reception in the US add to the diversity of US immigrants, and each of these factors may influence both access to resources and vulnerability to negative outcomes. While many immigrants have immigration documentation, an estimated 23% of US immigrants lack authorization (10), precluding many opportunities for employment and health insurance and often leading to chronic fear of deportation (11). As immigrants live in the US, they balance the practices, values, identifications (12) and norms of their heritage country and local US community. An immigrant who arrived to the US as an infant may differ in many ways from an immigrant who arrived as an older adult; similarly, an immigrant who has lived in the US for a few years may have a very different experience from an immigrant who has resided in the US for decades.

Vulnerability to Mental Disorders Among US Immigrants

Although a body of research suggests lower rates of many substance use and psychiatric disorders among US immigrants compared to the US-born, risk is increased among US immigrants who have lived in the US for years (13–15). Moreover, some US immigrants are especially vulnerable to experiencing stressors, traumatic events, and adversities that increase susceptibility to psychopathology and negative coping. Many refugees, asylees, and asylum-seekers (16) have experienced a multitude of traumatic stressors (e.g., witnessing or experiencing risk of death or sexual/physical violence, war, or brutality), in the home countries they fled and as part of their journey to reach the US.

Immigrants may also face stressors related to discrimination or marginalization. The detrimental relationship between perceived discrimination and mental health has been documented among immigrants (17) and various racial/ethnic minority groups (18). Experiences or perceptions of discrimination may vary based on many factors, including education, age, race, heritage, length of time living in the United States, level of assimilation to the host culture, and characteristics of the area of settlement (19–23). Stressors may stem from observed or perceived discriminatory words or actions or from an internalization of one's status as a minority, "outsider," or "other" (24). Immigrants who are undocumented or have undocumented family members may face additional stressors, including fear of deportation and inability to access essential opportunities in employment, education, or healthcare (11). Immigrants with constrained opportunities and low socioeconomic status may also live with the daily stressors that accompany working in a demanding, low-paying job and/or living in a residentially-segregated neighborhood or an area with high poverty or crime and few economic opportunities (25).

Regardless of socioeconomic status, immigrants may also face stressors related to leaving their home, and often family and friends, behind. Immigrants must balance internal or external expectations regarding retaining the culture of their heritage and adapting to the culture of the host community (12). In addition to the variety of stressors or adversities connected to the motives for immigration, the experiences of immigration, and the conceptualization of immigrants in US society, immigrants may experience a variety of adversities and stressors common to all populations, including adverse childhood experiences and stressful life events such as unemployment, homelessness, divorce, or debt.

Adverse Childhood Experiences, Recent Stressors, and the Connection to Mental Health

Adverse childhood experiences vary in type and severity—including: abuse of various forms; neglect; exposure to tumultuous household conditions; and living with parents or caregivers with unaddressed mental health concerns (26). Compared to those without such experiences, adult individuals who retrospectively indicate having experienced several types of adversity during childhood may be at greater risk of several adverse health outcomes, including poor mental health (e.g., depressed mood, suicide attempts) and problem substance use (e.g., self-identification as problem drinker, past use of

illicit drugs, including intravenous use) (27). While a higher number of self-reported adversities seems to be associated with greater risk for various correlated negative outcomes among individuals across low, middle, and high-income countries (26), prior research has identified that experiencing four adversities represents a threshold at which increased risk of disease is notably salient (27).

Adverse childhood experiences have been associated with a collection of potential health outcomes, and these associations appear to vary in strength, yet not in direction. A recent meta-analysis reported that, for individuals with at least four adversities in childhood (compared to those with no adversities), the pooled odds ratios for risk of a given outcome were consistently >1 for every indicator of poor health examined (26), providing strong evidence of an association between adverse childhood experiences and poor health later on in life. Although weak for some physical health indicators, the relationship appears moderate between adverse childhood experiences and internalizing conditions (e.g., anxiety, low life satisfaction, depression) and strong for externalizing conditions (e.g., problematic alcohol use, problematic drug use) (26).

While childhood adversity may increase susceptibility to mental disorders, additional and compounding factors—particularly recent stress—may play a role in precipitating these disorders (28). The connection between stress and mental disorders may be at least partially determined by cognitive mechanisms. Individual differences in cognitive appraisal and coping explain considerable variation in emotion (29), and therefore a part of what is perceived as stressful is individually constructed (30). Comprising responses to changes in health, family/living situations, work, and finances within the past year (28), recent stress has been identified as a strong predictor of depressive and anxiety disorders (31). The number of stressful life events in the prior year has been associated with risk for major depression, anxiety disorders, and PTSD, yet these associations may vary in strength depending on the adversity that individuals experienced during childhood (32). Life events associated with recent stress are also associated with substance use disorders and play a critical role in supporting or hindering remission from these disorders (33).

Gender

Past literature documents gender differences in prevalence of specific adverse childhood experiences, as well as differences in the relationships between these experiences and mental health outcomes in adulthood (34, 35). Gender-related variation with respect to the prevalence, expression, and consequences of several mental disorders is well-documented (36). While prevalence of several substance use disorders is higher in men than women, prevalence of several mood disorders is higher among women than men (37). Moreover, some of these gender-related differences in prevalence or odds of mental disorders vary by nativity in certain population groups (38).

Among Immigrants

In US immigrant populations, the childhood adversities and stressful life events experienced may have occurred in the immigrant's country of origin or in the US, depending upon the age at time of immigration. According to data from the World Mental Health Surveys, encompassing 51,945 adults in 21 nations, the prevalence of childhood adversities varies between low/lower-middle income countries, high-middle income countries, and high-income countries (39). In a study utilizing data on a nationally-representative sample of US adults, immigrants evidenced higher relative risk of reporting experiencing childhood neglect, compared to the US-born, yet lower relative risk of reporting experiencing childhood physical/emotional abuse, domestic violence, or sexual abuse (40).

Co-occurring Disorders

Experiences of childhood trauma (41), and recent stress (42), are also associated with co-occurring disorders. While both substance use disorders and other mental disorders have implications for disability, lost productivity, social and economic costs, and mortality, the co-occurrence of a substance use disorder with another mental disorder is associated with more negative outcomes than one disorder alone. Co-occurring disorders, compared to one mental disorder only, are tied to factors such as social exclusion, homelessness, unemployment, and isolation (43), and are frequently interconnected with chronic health concerns and poverty (44). A vast body of literature has documented poor outcomes associated with co-occurring disorders (45, 46), including: poor employment, family, and social outcomes (47); aggressive or antisocial behavior, criminal history involvement, recidivism, and self-harm (48, 49); relapse of substance use (48) or dependence (50, 51); and unintentional overdose (52) or suicide (48, 49) in various populations.

An estimated 1.1% of immigrants, compared to 3.1% of the US-born, meet criteria for a past-year co-occurring substance use disorder and depressive or anxiety disorder (53). However, variation in the prevalence of co-occurring disorders has been documented between racial/ethnic groups (53, 54), and by age at time of immigration to the United States (55). Prevalence of co-occurring disorders also varies by gender. Hispanic immigrant women with co-occurring disorders have been identified as a concerning (albeit relatively small) subgroup with elevated risk factors and early onset of psychiatric disorders (56).

THE PRESENT STUDY

The present study aims to examine some of the heterogeneity in experiences of adversities (both recent and in childhood) and associated mental health outcomes in the diverse US adult immigrant population. A rich body of literature has examined mental health outcomes in US immigrants, using a variety of methods, including latent class analysis. The present study builds on this foundation by using latent class analysis to not only examine immigrants' experiences of childhood adversities (40) but also recent adversities, extending analyses of the interplay of recent and childhood adversities in specific populations [such as female veterans (57), or incarcerated adults (58)] to US immigrant populations. Finally, the study includes both

substance use disorders and psychiatric disorders, as well as co-occurring disorders. Co-occurring disorders have been studied in immigrant populations (53, 55, 56, 59), yet less frequently with the person-centered approach facilitated by latent class analysis. A person-centered approach such as latent class analysis affords the opportunity to examine subgroups based on patterns of experiences (60), rather than subgroups classified solely by social constructs such as race.

Although some US immigrants may experience a variety of stressors and adversities specific to their immigrant background (e.g., fear of deportation, experiences of fleeing war or persecution, experiences of living in refugee camps or immigrant detention facilities), the present study focuses on the childhood adversities and past-year adversities that are commonly identified as factors relevant in the development and course of psychiatric disorders in a variety of populations (26–28, 31). First, the present study examines the sociodemographic profile of US civilian non-institutionalized adult immigrants in 2012–2013. Second, the prevalence of various adversities, both in childhood and during the past year, are computed for immigrants overall and for males and females. Prevalence of mental health outcomes is assessed as the percentage of immigrants meeting criteria for a substance use disorder only, a mood/anxiety/trauma disorder only, or a co-occurring disorder. Next, latent class analysis is used to describe patterns in experiences of adversities in childhood and during the past year. Demographic variables are examined as predictors of latent class membership, and latent class membership is subsequently examined as a predictor of mental health outcomes.

METHODS

This study utilized data from the National Epidemiologic Survey on Alcohol and Related Conditions-III (NESARC-III, 2012–2013), a probability sample with a target population of the civilian, non-institutionalized US adult population living in the 50 states or District of Columbia. Participants in NESARC-III were selected via multistage probability sampling, with counties and census-defined blocks serving as primary and secondary sampling units, respectively. Eligible participants were ages 18 or older at the time of screening, not currently on active military duty. Details about the sample design in NESARC-III are available elsewhere (61).

Data were collected in person, using a "fully structured, computer-assisted diagnostic interview" designed to be administered by lay interviewers (62). Interviewers had a minimum of a high school diploma (or GED), and only certified bilingual interviewers administered the interviews in non-English languages. In addition to English, NESARC-III accommodated five languages: Spanish, Korean, Vietnamese, Cantonese, and Mandarin. Of the full sample in NESARC-III (36,309), about 7.3% of the interviews were conducted in a non-English language (61).

NESARC-III utilized the Alcohol Use Disorder and Associated Disabilities Interview Schedule-5 (AUDADIS-5), a diagnostic interview which aims to assess mental disorders, consistent with the fifth version of the Diagnostic and Statistical Manual of Mental Disorders (36). The procedural validity of assessing mental disorders with the AUDADIS-5 has been reported previously (62, 63). NESARC-III did not assess for all the mental disorders that are included in DSM-5, and mental disorders in NESARC-III are provided categorically (i.e., meets criteria for the disorder vs. does not meet criteria for the disorder).

In the present study, individuals identified as "immigrants" were those who responded "no" to the question: "Were you born in the United States?" NESARC-III categorized participants born in US territories as born outside the US. In the present study, data were excluded from: a) two individuals who indicated that they were not born in the US, yet (in a follow-up question) also indicated that the "United States" was their country of birth; b) 24 individuals who indicated that they were not born in the US, but had a response coded as "unknown" for country of birth. Of these 6,378 respondents, 247 individuals with missing data on any of the other variables utilized in the study (3.8% of the eligible sample) were excluded, yielding an analytic sample of 6,131 individuals.

Measures

Outcome Variable: Mental Outcome

The present study generated a composite variable labeled "mental outcome," including four mutually-exclusive options: (a) "*substance use only*:" met criteria for past-year drug/alcohol use disorder but no mood/anxiety/ trauma disorder; (b) "*mood/anxiety/trauma only*:" met criteria for past-year mood/anxiety/trauma disorder, but no drug/alcohol use disorder; (c) "*co-occurring:*" met criteria for both drug/alcohol use disorder and a mood/anxiety/trauma disorder in the past year; and (d) "*no mental disorder*:" neither drug/alcohol use disorder nor a mood/anxiety/trauma disorder in the past year. For "substance use," participants met DSM-5 criteria for alcohol or other substance (i.e., sedative, cannabis, prescription opioid, heroin, cocaine, stimulant [whether prescription or illicit], hallucinogen, inhalant/solvent, club drug, heroin, or other drug excluding nicotine) use disorder within the past year. For "mood/anxiety/trauma," participants met DSM-5 criteria for a mood (major depressive, dysthymia, bipolar I), anxiety (panic, specific phobia, agoraphobia, social anxiety, or generalized anxiety), or trauma (post-traumatic stress) disorder within the past year.

Immigration-Related Variables

Age at time of arrival to the US (0–11 years; 12–17 years; and 18 years and over) was computed by subtracting the number of years each participant reported living in the US from their chronological age. *Birth region* categorized participants' country of birth into: Europe and Central Asia; East Asia; South Asia; Southeast Asia and Pacific; Middle East and North Africa; Sub-Saharan Africa; Mexico; Central America; Caribbean; South America; and Canada. These categories were informed by the World Bank's classification (64), and by similarities in the ethnoracial and sociodemographic profiles of the sending countries. For example, rather than grouping Canada and Mexico into a common North America region, Canada and Mexico were

examined separately. **Supplementary Table A** provides a list of the countries included in each region.

Recent Adversity

Self-reported perceived ethnic discrimination

NESARC-III utilized a modified version of the Experiences of Discrimination (EOD) questionnaire (65) to assess experiences of discrimination due to race/ethnicity (formal scoring instructions for this modified questionnaire are not provided by NESARC-III). NESARC-III's modified questionnaire inquired about the frequency (never, almost never, sometimes, fairly often, and very often) of ethnic discrimination across six settings: (1) in obtaining healthcare/health insurance; (2) in treatment or care; (3) in public, on the street, in stores or restaurants; (4) obtaining a job or housing, admission to a school or vocational program, or in the courts or with police; (5) being called a racist name; (6) verbal or physical abuse or threats. Consistent with other studies (66–68), "never" responses were coded with zero, while any other response (including almost never, sometimes, fairly often, or very often) was coded with one. Finally, an overall dichotomous variable—*self-reported perceived ethnic discrimination*—was computed to indicate ethnic discrimination (yes vs. no) occurring at any frequency and setting in the past year (69).

Past-year stressors

An index with 16 life events and stressors was included in NESARC-III, and participants responded whether (yes vs. no) they experienced any of 16 plausible stressors during the prior 12 months. The stressor questions included in NESARC-III comprise an index rather than a scale that measures only one construct (results of principal component factor analysis in the present study's sample indicated that the 16 items were indicators of at least five different constructs). NESARC's index encompasses life changes and transitions (e.g., moving to another residence or changing jobs) as well as financial difficulties, relationship conflicts, and family loss. For the purposes of latent class analysis, selection of variables was guided by the research aims; therefore, only a subset of NESARC's stressors were included in the present study, considering that some of the items in NESARC's index referred to events which are relatively more common (e.g., "trouble with your boss or a coworker") or which are not inherently negative (e.g., "change jobs, job responsibilities or work hours"; or "have anyone new come to live with you"). Similar to prior studies (70, 71), the following items were included in the present study: (a) Were you fired or laid off from a job? (b) Were you unemployed and looking for a job for more than a month? (c) Have you had so much debt that you had no idea how you were going to repay it? (d) Have you declared bankruptcy? (e) Did you get separated or divorced or break off a steady relationship? (f) Have you at any time been homeless? (g) Did you have serious trouble with the police or the law? These items represent measures related to employment/financial instability, relationship instability, residential instability, and legal instability.

Childhood Adversity

NESARC-III utilized a retrospective measure of adversity during childhood, reportedly modified from two standardized instruments (34), the 70-item Childhood Trauma Questionnaire (a valid and reliable retrospective measure of child abuse and neglect) (72) and the Conflict Tactics Scales (a valid and reliable measure of reasoning, verbal aggression, and violence within the family) (73). Questions in NESARC-III's measure are also relatively similar to those appearing in Kaiser Permanente's landmark Adverse Childhood Experiences (ACE) Study (27).

NESARC-III included 29 questions covering maltreatment by parents or caregivers before the age of 18 years, family support, domestic violence, and household members with alcohol, drug, mental health, or legal-related issues. To examine associations with psychiatric disorders, prior research utilizing NESARC-III's measure has selected a varying number of adverse experiences, for example ten experiences (74) or 19 experiences (34). Scoring has also varied, with some studies treating items as polytomous (34) or dichotomous indicators (74).

Considering categories of abuse and household dysfunction in the ACE Study (27), as well as the role of neglect in childhood maltreatment (75), the following nine indicators of childhood adversity (presented by category) were included in the present study; these items were dichotomized, consistent with recommendations in the original Conflict Tactics Scales (73). The full list of questions is available in **Appendix A**:

a. Neglect: before age 18, respondent was made to do age-inappropriate chores, did not receive essential supplies (e.g., clothes), was not fed, or was not taken to receive needed medical treatment; or before age 10, respondent was left alone or unsupervised.
b. Threatened abuse: before age 18, respondent's parents/caregivers threatened to hit or throw something or physically injure the respondent.
c. Verbal abuse: before age 18, respondent was sworn at, insulted, or told hurtful things by parents/caregivers.
d. Physical abuse: before age 18, respondent's parents/caregivers pushed, shoved, slapped or hit respondent, or hit respondent so hard that marks or bruises were left.
e. Sexual abuse: before age 18, respondent was touched, fondled, made to touch someone else's body sexually without consent or understanding, or respondent experienced sexual intercourse (completed or attempted) without consent or understanding.
f. Exposure to intimate partner violence (IPV): before age 18, respondent's female caregiver was pushed, shoved, kicked, bitten or hit, repeatedly hit, or threatened at knife or gunpoint by a husband or boyfriend.
g. Alcohol or drug misuse in the family: before age 18, respondent lived with parent or other adult household member with drug use or problematic alcohol use.
h. Legal or criminal problems in the family: before age 18, respondent's parent or other adult household member served time in jail or prison.
i. Mental health problems in the family: before age 18, respondent's parent or other adult household member was

treated/hospitalized for mental illness, attempted suicide, or died by suicide.

Sociodemographic Variables

Consistent with other major epidemiologic studies on the topic (62, 76), the following sociodemographic variables were included in the present study: *gender* (male/female); *age* category (18–29, 30–44, 45–64, and 65 years or over); *race/ethnicity* (Non-Hispanic White, Non-Hispanic Black, Non-Hispanic American Indian/Alaska Native, Non-Hispanic Asian, and Hispanic); *educational attainment* (less than high school, high school or GED [General Education Diploma], some college, and Bachelor's degree or higher); *family income* (0–19,999, 20,000–34,999, 35,000–69,999, and 70,000 or higher, representing the total, combined family income in US dollars within the past year, including income from social service programs); and *marital status* (married or cohabitating; widowed, divorced, or separated; and never married).

Statistical Analysis

All analyses were computed with Stata/MP 16.0. Descriptive analyses examined frequencies (with unweighted data) and relative frequencies (with weighted data) of sociodemographic characteristics, past-year mental disorders, past-year adversities, and childhood adversities. For percentages and prevalence estimates, 95% confidence intervals (CIs) were computed. Prevalence of past-year mental disorders, past-year adversities, and childhood adversities were stratified by gender, due to documented differences in the experience and expression of distress between men and women (37).

Latent class analysis (LCA) was used as an exploratory approach to characterize patterns in respondents' recent and childhood adversities. The seven past-year adversities and the nine types of childhood adversity were modeled as dichotomous, manifest indicators of the latent-class solutions in a binomial model with the logit link function. For class enumeration, several LCA models were fitted via maximum likelihood (without specifying tolerance for the scaled gradient) and compared with goodness-of-fit statistics in unweighted data.

The set of fit indices used to decide the optimal number of classes included the Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC), and the Bayes Factor, with greater emphasis on the BIC, "the most commonly used and trusted fit index for model comparison" [(77); p. 445]. Because more than one solution was initially supported, solutions were compared and contrasted with each other, considering parsimony and interpretability. The final class solution was estimated with the *svy* suite of commands to accommodate the complex design in NESARC-III.

Posterior probabilities (78) were computed to: (a) classify respondents into the latent class for which they had the highest probability of membership, given their pattern of responses; and (b) estimate respondents' probability of endorsing a manifest past-year adversity or childhood adversity item, conditional on class membership, class by class. Both a table and a figure with these posterior probabilities were created to accommodate reader preferences, and a matrix table was created to depict average posterior probabilities for the most likely class membership.

Relative frequencies of demographic characteristics were presented for each latent class. As a heuristic method (78), class membership (based on posterior probabilities) was regressed on the sociodemographic characteristics in order to estimate relative probabilities of membership in a given class (conditional on a reference class) for each characteristic (i.e., gender, age, country/region of birth, age at time of arrival to the US, educational attainment, family income, and marital status). Lastly, the variable mental disorder was regressed as an outcome in a model including class membership as a predictor and the sociodemographic characteristics as covariates; predicted probabilities (with marginal effects at the mean) were computed and plotted for each mental disorder outcome. Estimated coefficients and 95% CIs were presented as relative-risk ratios. Because of shared variance and increased collinearity with region of birth, the variable "race" was not included in multivariate analyses that included "birth region."

RESULTS

Table 1 presents the sociodemographic characteristics of the sample, as well as the weighted estimates. Nearly half of the immigrants (48.0%; weighted data) were of Hispanic ethnicity, with Mexico accounting for the country of birth of more than a quarter of immigrants. The majority (68.8%) of immigrants had arrived in the US as adults, and most (67.2%) were married or cohabitating.

As presented in **Table 2**, among adult US immigrants, past-year mood/anxiety/trauma disorders alone were more prevalent than substance use disorders alone. However, among adult immigrant men, substance use disorders alone were most prevalent. The prevalence of substance use disorders alone was nearly three times as high in men, compared to women, while the prevalence of mood/anxiety/trauma disorders alone was more than two times as high in women compared to men.

The most common past-year adversity among adult immigrants was ethnic discrimination (37.9%), distantly followed by stressors related to unemployment (13.9%) or debt (9.3%). The prevalence of most past-year adversities was relatively similar in men and women, with the exception of "serious trouble with police/the law," more commonly reported in men. Neglect, threatened abuse, and physical abuse were the most frequently reported childhood adversities (35.2%, 29.8%, and 27.9%, respectively). The most prominent gender difference in childhood adversities was observed with respect to sexual abuse, with 10.0% of women reporting childhood sexual abuse, compared to 5.3% of men. Childhood neglect, threatened abuse, and physical abuse were significantly, yet modestly, higher among men than women.

For the latent classes based on recent and childhood adversities, a five-class solution was selected according to fit indices (available in **Table 3**), interpretability, and parsimony. The Bayesian Information Criteria (BIC) is considered a

TABLE 1 | Sociodemographic characteristics of adult immigrants in the 2012–2013 National Epidemiologic Survey on Alcohol and Related Conditions-III ($n = 6{,}131$).

Characteristic	Total[a]	Percentage[b] (95% CI)
Sex		
Male	2,763	49.2 (47.7–50.6)
Female	3,368	50.8 (49.4–52.3)
Age, years		
18–29	1,183	18.7 (17.3–20.2)
30–44	2,249	34.3 (32.8–35.8)
45–64	1,994	34.2 (32.4–36.0)
≥65	705	12.8 (11.7–14.1)
Race		
NH White	882	18.8 (17.1–20.7)
NH Black	531	6.6 (5.73–7.56)
NH American Indian	11	0.2 (0.08–0.32)
NH Asian	1,261	26.5 (23.7–29.5)
Hispanic	3,446	48.0 (44.7–51.3)
Region/country of birth		
Europe and Central Asia	493	9.6 (8.2–11.3)
East Asia	285	6.5 (5.4–7.9)
South Asia	502	10.5 (8.9–12.3)
Southeast Asia and Pacific	591	12.9 (11.6–14.3)
Middle East and North Africa	164	3.1 (2.5–3.9)
Sub-Saharan Africa	225	2.9 (2.3–3.7)
Mexico	1,963	26.0 (22.9–29.4)
Central America	537	7.2 (6.4–8.2)
Caribbean	854	12.5 (10.8–14.4)
South America	422	6.8 (5.8–7.9)
Canada	95	2.0 (1.5–2.5)
Age at time of immigration, years		
0–11	1,122	18.6 (17.2–20.0)
12–17	803	12.6 (11.6–13.6)
≥18	4,206	68.8 (67.2–70.4)
Educational attainment		
Less than high school	1,791	26.4 (24.3–28.6)
High school or GED	1,418	21.2 (20.0–22.5)
Some college	1,384	23.1 (21.6–24.7)
≥Bachelor's degree	1,538	29.3 (27.3–31.3)
Family income, $		
0–19,999	1,719	23.4 (22.0–24.9)
20,000–34,999	1,582	22.9 (21.5–24.4)
35,000–69,999	1,580	26.8 (25.3–28.4)
≥70,000	1,250	26.8 (25.1–28.6)
Marital status		
Married/cohabitating	3,702	67.2 (65.6–68.6)
Widowed, divorced, or separated	1,170	14.6 (13.5–15.6)
Never married	1,259	18.3 (16.8–19.9)

[a] *Unweighted results.*
[b] *Weighted results.*
CI, confidence interval; NH, Non-Hispanic; GED, General Education Diploma.

preferred fit index and recommends the model with the lowest BIC value or with a lessening decrease in BIC value for each additional class (77). The average latent class probabilities for the most likely class membership, for the five-class solution utilized in the present study, are presented in **Table 4**. As depicted in **Table 4**, for the selected five-class solution, all average posterior probabilities of assignment for each corresponding latent class exceeded the recommended cut-off point of 0.70 (79).

Table 5 and **Figure 1** present posterior probabilities for class membership, past-year adversities, and childhood adversities for the selected five-class solution. The class with the largest membership (57.5%), Class 1, "low adversities," was characterized by the lowest recent and childhood adversities. Less than 5% (4.2%) of respondents were classified into class 2, "recent employment/financial adversities," with the highest levels (compared to any other class) of recent adversities (except ethnic discrimination), including job loss, unemployment, debt, legal/criminal issues, relationship issues, and homelessness. Class 3, "elevated childhood neglect/exposure to violence/substance misuse," was characterized by above-average childhood neglect, exposure to intimate partner violence, sexual abuse, and family alcohol/drug misuse. Threatened abuse and physical abuse were prominent adversities in class 4, "childhood physical/psychological abuse." Finally, class 5, "severe childhood adversities," was distinguished by the highest levels of every type of childhood adversity. Membership in class 5 was also associated with the highest probability (0.73) of reporting past-year ethnic discrimination. Approximately 10% of adult immigrants were predicted to fall under latent class 5.

Table 6 presents weighted relative frequencies of demographic characteristics by latent class. Although gender distributions were relatively comparable between classes, males were slightly overrepresented in class 2 ("recent employment/financial adversities") and class 4 ("childhood physical/psychological abuse"). Class 4 was also the class with the highest proportion of individuals with a bachelor's degree or higher and reported annual family income of $70,000 or higher; immigrants from South Asia and Southeast Asia/Pacific were relatively overrepresented in this class. Nearly three of four individuals categorized in class 1 ("low adversities) had immigrated as an adult, compared to less than three in five individuals categorized in class 5 ("severe childhood adversities").

Weighted results of the regression of latent class membership on demographic characteristics are presented in **Table 7**. The probability of membership in the class with the most recent employment/financial adversities (class 2), relative to class 1 ("low adversities"), was lower for females (compared to males) and ages 65 and older (compared to ages 18–29) but higher for individuals from Sub-Saharan Africa or the Caribbean (compared to Europe/Central Asia), individuals who immigrated to the US as children (compared to as adults), and those with family incomes below $70,000 per year. The probability of membership in the class with most childhood adversities (class 5), relative to class 1, was higher for immigrants born in Mexico, Central America, or Canada (compared to Europe/Central Asia), higher for individuals who immigrated as children (compared to as adults), and higher for individuals in the lowest (compared to the highest) annual family income bracket. Relative probabilities of membership in latent classes 2–5, characterized by various childhood or recent adversities (compared to membership

TABLE 2 | Prevalence of select past-year mental disorders, recent adversities, and childhood adversities among adult immigrants in the 2012–2013 National Epidemiologic Survey on Alcohol and Related Conditions-III ($n = 6,131$).

Characteristic	Total[a]	Prevalence[b] (95% CI)		
		All	Men	Women
Past-year mental disorder				
Substance use only	368	5.9 (5.3–6.7)	8.9 (7.8–10.2)	3.1 (2.4–3.9)
Mood/anxiety/trauma only	787	11.8 (10.9–12.7)	7.5 (6.5–8.6)	16.0 (14.6–17.4)
Co-occurring	164	2.7 (2.2–3.3)	3.1 (2.4–4.0)	2.3 (1.7–3.0)
Recent adversity				
Ethnic discrimination	2,429	37.9 (36.2–39.7)	39.4 (37.0–41.9)	36.5 (34.5–38.6)
Getting fired or laid off	324	4.8 (4.3–5.3)	5.5 (4.7–6.4)	4.1 (3.4–4.9)
Unemployed, seeking work for ≥1 month	943	13.9 (12.9–15.0)	14.0 (12.6–15.5)	13.9 (12.4–15.5)
Separated, divorced	340	4.1 (3.7–4.6)	3.9 (3.2–4.6)	4.4 (3.7–5.2)
Declared bankruptcy or had so much debt	658	9.3 (8.6–10.1)	9.2 (8.1–10.5)	9.4 (8.4–10.4)
Serious trouble with police, the law	56	0.8 (0.6–1.1)	1.3 (0.9–1.9)	0.3 (0.2–0.6)
Homelessness	69	1.0 (0.8–1.3)	1.1 (0.7–1.6)	0.9 (0.6–1.3)
Childhood adversity				
Neglect	2,211	35.2 (33.6–36.9)	38.8 (36.6–41.0)	31.8 (29.8–34.0)
Threatened abuse	1,869	29.8 (28.2–31.5)	32.4 (30.4–34.5)	27.3 (25.2–29.5)
Verbal abuse	1,497	23.7 (22.3–25.2)	25.2 (23.3–27.2)	22.2 (20.5–24.1)
Physical abuse	1,736	27.9 (26.3–29.4)	30.3 (28.1–32.5)	25.5 (23.6–27.6)
Sexual abuse	524	7.7 (6.9–8.5)	5.3 (4.3–6.3)	10.0 (8.9–11.3)
Exposure to intimate partner violence	997	15.0 (13.9–16.1)	14.5 (13.0–16.2)	15.4 (13.9–17.1)
Alcohol or drug misuse in family	947	13.9 (12.9–14.9)	13.7 (12.3–15.2)	14.1 (12.7–15.5)
Legal or criminal problems in family	209	2.9 (2.4–3.3)	3.1 (2.4–3.9)	2.6 (2.1–3.3)
Mental health problems in family	167	2.5 (2.1–2.9)	2.2 (1.6–2.9)	2.8 (2.2–3.4)

[a] *Unweighted results.*
[b] *Weighted results.*
CI, confidence interval.

TABLE 3 | Fit statistics used to evaluate ten latent class model solutions, based on recent and childhood adversity indicators, for adult immigrants in the 2012–2013 National Epidemiologic Survey on Alcohol and Related Conditions-III ($n = 6,131$).

k	−2LL	AIC	BIC	BF
1	71570.02	71602.03	71709.57	0.00E+00
2	62342.00	62408.00	62629.79	1.2089E−114
3	61669.12	61769.13	62105.18	9.041E−109
4	61023.30	61157.30	61607.62	9.3621E−49
5	60662.58	60828.58	61386.44	1.61E+10
6	60552.60	60754.60	61433.44	1.02954E−19
7	60316.92	60552.91	61346.00	6.94E+57
8	60443.74	60711.74	61612.37	2.98188E−30
9	60150.80	60454.79	61476.40	1.45E+22
10	60113.30	60449.30	61578.45	-

*k = number of latent classes; −2LL, (−2) * (log-likelihood); AIC, Akaike Information Criterion; BIC, Bayesian Information Criterion; BF, Bayes Factor (77).*

TABLE 4 | Average latent class probability of assignment for most likely latent class membership, for the selected five class solution, for adult immigrants in the 2012–2013 National Epidemiologic Survey on Alcohol and Related Conditions-III ($n = 6,131$).

	Class 1	Class 2	Class 3	Class 4	Class 5
Class 1	**0.88**	0.08	0.16	0.02	0.00
Class 2	0.02	**0.83**	0.02	0.01	0.01
Class 3	0.09	0.05	**0.72**	0.06	0.01
Class 4	0.02	0.02	0.09	**0.82**	0.14
Class 5	0.00	0.01	0.01	0.10	**0.85**

Figures in bold, across the diagonal, represent the average posterior probability for classification in the given class, for observations classified in the corresponding class. For example, the average posterior probability of membership in Class 1 is 0.88 for all observations classified into Class 1.

in class 1, with low childhood or recent adversities), were higher for individuals who immigrated to the US as children, especially young children, compared to those who immigrated as adults.

Table 8 presents weighted results of multinomial logistic regression predicting mental disorder outcomes from sociodemographic characteristics and latent class membership. Adjusted for latent class membership, the relative probability of meeting criteria for a substance use disorder only (compared to no substance use or mood/anxiety/trauma disorder) was higher for individuals who immigrated as children aged

TABLE 5 | Posterior probabilities for the selected five class solution, based on recent and childhood adversity indicators for adult immigrants in the 2012–2013 National Epidemiologic Survey on Alcohol and Related Conditions-III ($n = 6{,}131$).

	LC1	LC2	LC3	LC4	LC5	Overall
Class membership probabilities, %	**57.5**	**4.2**	**10.5**	**17.9**	**10.0**	**100.0**
Recent adversity, %						
Ethnic discrimination	28.4	48.7	42.6	43.5	73.4	37.9
Getting fired or laid off	1.4	61.2	0.0	0.8	12.5	4.8
Unemployed, seeking work for ≥1 month	8.2	99.7	8.8	7.7	27.7	13.9
Separated, divorced	1.8	13.4	8.9	3.5	9.8	4.1
Bankruptcy/ overwhelming debt	3.1	39.0	20.6	6.0	26.5	9.3
Serious trouble with police/the law	0.0	8.2	1.7	1.0	0.9	0.8
Homelessness	0.0	7.4	3.3	0.0	3.3	1.0
Childhood adversity, %						
Neglect	16.3	25.2	51.7	59.3	87.8	35.2
Threatened abuse	2.2	22.6	7.1	95.2	98.7	29.8
Verbal abuse	1.6	9.8	24.6	60.6	90.1	23.7
Physical abuse	4.6	11.6	16.8	75.3	95.0	27.9
Sexual abuse	0.8	2.6	19.3	5.4	41.3	7.7
Exposure to intimate partner violence	0.0	3.0	36.6	17.2	78.9	15.0
Alcohol or drug misuse in family	4.1	8.4	36.0	13.7	49.8	13.9
Legal or criminal problems in family	0.0	0.6	10.4	1.3	15.0	2.9
Mental health problems in family	0.5	1.5	6.5	1.5	11.5	2.5

Class membership probabilities represent the probability of membership in a latent class. Posterior probabilities for recent and childhood adversity indicators signify the probability of a particular response given membership in that latent class (e.g., the probability of reporting neglect during childhood, given membership in LC1, is 16.3%). As a visual aid, each cell is shaded based on percentage, with darker colors approaching 100%. The "overall" column is provided as a frame of reference for comparison. LC1, low adversities; LC2, recent employment/financial adversities; LC3, elevated childhood neglect/exposure to violence/substance misuse; LC4, childhood physical/psychological abuse; LC5, severe childhood adversities.

0–11 (compared to those who immigrated as adults) and lower for females (compared to males), for older age groups (compared to those 18–29), and for immigrants born in East Asia, Middle East/North Africa, Sub-Saharan Africa, Mexico, Central America, the Caribbean, or South America (compared to Europe/Central Asia). The relative probability of meeting criteria for a mood/anxiety/trauma disorder only (compared to no substance use or mood/anxiety/trauma disorder) was lower for immigrants from East Asia or Southeast Asia/ Pacific (compared to Europe/Central Asia) and higher for females (compared to males), individuals aged 45–64 (compared to 18–29), and widowed/divorced/separated (compared to married) individuals. The relative probability of meeting criteria for both a substance use disorder and a mood/anxiety/trauma disorder (compared to no disorder) was higher for individuals who had immigrated as children aged 0–11 (compared to as adults) and lower for individuals aged 45–64 and 65+ (compared to 18–29) and immigrants from Mexico (compared to Europe/Central Asia).

Results (**Table 8**) indicated that the relative probabilities of meeting criteria for a substance use disorder only, mood/anxiety/trauma disorder only, or a co-occurring disorder were elevated for all of the latent classes with recent or childhood adversities (classes 2–5), compared to latent class 1 with "low adversities." Compared to class 1, relative probabilities of meeting criteria for a substance use disorder only (compared to no disorder) were comparable between the class with "recent employment/financial adversities" (class 2; RRR, 3.82; 95% CI, 2.36–6.19) and the class with the "severe childhood adversities" (class 5; RRR, 3.26; 95% CI, 2.08–5.10). However, the class with "severe childhood adversities" (class 5; relative to class 1) had the most notably elevated probabilities of a mood/anxiety/trauma disorder only or a co-occurring disorder, compared to no disorder. That is, for class 5, the relative probability of meeting criteria for a mood/anxiety/trauma disorder only (compared to no disorder) was more than five times as high compared to class 1, and the relative probability of a co-occurring disorder (compared to no disorder) was more than 12 times as high compared to class 1.

Figure 2 depicts predicted probabilities of the four mutually-exclusive mental health outcomes (no mental disorder, substance use disorder only, mood/anxiety/trauma disorder only, or co-occurring disorder) by latent class membership, adjusting for all other variables in the model. For latent class 1 ("low adversities"), the predicted probability of "no mental disorder" was 0.90 (95% CI, 0.89–0.91); probabilities in classes 2–4 were significantly lower than for class 1, yet higher than for class 5 ("severe childhood adversity," 0.62 [95% CI, 0.58–0.67]). The predicted probability of meeting criteria for a "mood/anxiety/trauma disorder only" was lowest in class 1, higher in classes 2–4, and even higher in class 5 (0.27 [95% CI, 0.23–0.30]). Finally, for co-occurring disorders, predicted probabilities in class 5 ("severe childhood adversities") were significantly higher than for class 1 ("low adversities") or class 4 ("childhood physical/psychological abuse"), yet did not significantly differ from class 2 ("recent employment/financial adversities") or 3 ("elevated childhood neglect/exposure to violence/substance misuse").

DISCUSSION

The present study investigated some of the heterogeneity of US immigrants and their experiences of adversity, both during childhood and within the past year. Examining the interplay between childhood and more recent adversities is key to a better understanding of immigrants' needs, not only because of the potential compounded effects of childhood adversity and recent adversity, but also because those currently dealing with particular types of adversity may cope differently based on adversities experienced through the life course.

Childhood Adversity

The present study found that neglect was the most-commonly reported type of childhood adversity among US immigrant adults, followed by threatened abuse (i.e., threats of violence or harm) and physical abuse. Experiences categorized as neglect may include experiences which respondents perceive as evidencing a lack of care or attention from caregivers, as well as situations in which parents were unable to provide a level of care primarily due to poverty or lack of resources. The ascribed meanings behind these different causes of neglect may

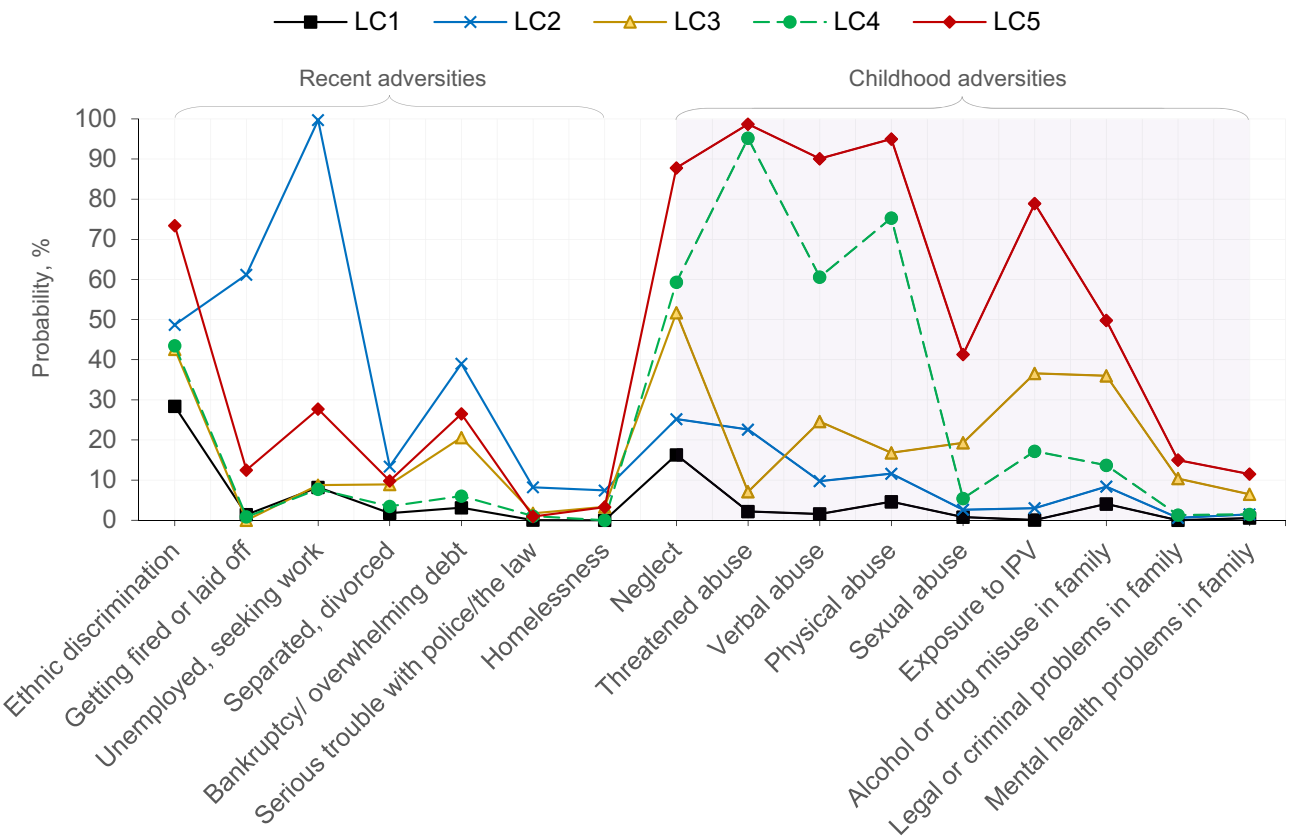

FIGURE 1 | Conditional item probabilities for the selected five-class solution based on recent and childhood adversities for adult immigrants in the 2012–2013 National Epidemiologic Survey on Alcohol and Related Conditions-III ($n = 6{,}131$). Each marker represents the probability of endorsing an item, given membership in a particular class (e.g., the probability of "Unemployed, seeking work" is 99.7%, given membership in LC2). LC1, low adversities; LC2, recent employment/financial adversities; LC3, elevated childhood neglect/exposure to violence/substance misuse; LC4, childhood physical/psychological abuse; LC5, severe childhood adversities; IPV, intimate partner violence.

be important to consider; it is possible that in low-resource settings such as the countries of origin of some immigrants, or in circumstances of disadvantage and marginalization experienced by some immigrant families in the US, child-rearing norms and access to resources can impact care and result in conditions considered evidence of neglect (40). In a study of the general US adult population, neglect was the most commonly-reported type of childhood adversity, followed by physical abuse (80).

Prevalence of several types of childhood adversities in immigrants in the present study differed from the prevalence estimates documented in US adults overall, consistent with patterns in past research (40). For example, 30.3% of immigrant men and 25.5% of immigrant women in the present study reported experiencing childhood physical abuse, compared to 18.4% of men and 17.5% of women in the general US adult population [from 2011–2014 data (81)]. Conversely, lower proportions of immigrants in the present study reported alcohol or substance misuse or mental health problems in their family during childhood, compared to the general US adult population (81). Overall, the childhood adversities retrospectively reported by immigrants in the present study do not closely mirror the adversities reported by the general US adult population. These differences may be explained by a multitude of factors, including, in some cases, patterns in immigrants' countries of origin. The prevalence of childhood physical abuse is highest in high-middle income countries and lowest in high income countries, while the prevalence of childhood sexual abuse is highest in high income countries (39).

Perceived Ethnic Discrimination

Of all the adversities examined in the present study (including the seven recent adversities and nine childhood adversities), past-year perceived ethnic discrimination was the adversity with the highest prevalence among US immigrant adults. Past-year perceived ethnic discrimination was reported by 37.9% of immigrant adults, with relatively similar rates in men and women. It is notable that perceived ethnic discrimination was a relatively prominent feature in all the latent classes formed based on adversities, even in the class that was characterized by very low probabilities of other recent or childhood adversities. It is also notable that the latent class with the highest probability of recent adversities (e.g., unemployment, being fired/laid off) was not the class with highest probability of perceived ethnic

TABLE 6 | Relative frequencies of demographic characteristics for each latent class, for adult immigrants in the 2012–2013 National Epidemiologic Survey on Alcohol and Related Conditions-III ($n = 6,131$).

Characteristic	Class 1: Low adversities	Class 2: Recent employment/ financial adversities	Class 3: Elevated childhood neglect/exposure to violence/substance misuse	Class 4: Childhood physical/psychological abuse	Class 5: Severe childhood adversities
Sex					
Male	47.1	55.5	47.6	55.8	48.4
Female	52.9	44.5	52.4	44.2	51.6
Age, years					
18–29	18.8	23.3	19.9	17.8	16.2
30–44	31.5	37.1	37.9	36.9	40.3
45–64	33.5	37.3	31.8	35.2	37.7
≥65	16.1	2.3	10.4	10.1	5.8
Region/country of birth					
Europe and Central Asia	11.5	10.2	6.5	7.9	5.1
East Asia	7.3	6.6	3.2	7.3	3.9
South Asia	10.7	6.4	9.8	12.2	8.5
Southeast Asia and Pacific	12.8	6.4	12.2	16.3	10.3
Middle East and North Africa	3.3	1.7	2.4	3.4	3.1
Sub-Saharan Africa	2.5	5.4	4.2	3.3	2.4
Mexico	24.8	29.0	31.8	21.2	34.6
Central America	6.3	8.2	9.3	7.5	9.5
Caribbean	12.4	18.2	13.1	11.1	12.9
South America	6.8	7.6	6.0	7.4	5.7
Canada	1.7	0.4	1.5	2.4	4.0
Age at time of arrival, years					
0–11	14.5	19.1	21.5	25.7	26.1
12–17	11.7	16.6	14.1	11.9	15.6
≥18	73.8	64.3	64.3	62.4	58.2
Educational attainment					
Less than high school	26.8	28.3	29.9	20.8	29.7
High school or GED	21.6	27.0	22.8	18.4	19.9
Some college	21.7	22.7	23.5	24.8	27.5
≥Bachelor's degree	29.8	22.0	23.8	36.0	22.9
Family income, $					
0–19,999	23.4	36.2	25.1	18.2	25.4
20,000–34,999	23.2	25.6	24.1	19.4	25.0
35,000–69,999	25.5	27.0	28.5	29.4	28.3
≥70,000	27.9	11.2	22.3	33.0	21.2
Marital status					
Married	68.4	62.4	61.2	68.9	64.8
Widowed, divorced, or separated	13.8	15.0	19.4	12.6	17.1
Never married	17.8	22.6	19.4	18.5	18.1

Weighted results from latent class analysis for the selected five class solution, based on recent and childhood adversity indicators. GED, general education diploma.

discrimination; instead, the highest probability of perceived ethnic discrimination was observed in the class characterized by severe childhood adversities, which was also the class with the highest relative risk of co-occurring disorders (compared to no mental disorder).

A large body of research has documented the association between racism or discrimination and poor mental health outcomes (18, 82). Self-reported perceived ethnic discrimination may rely on numerous factors, including exposure to discriminatory acts, cognitive attributions regarding whether experiences reflect ethnic discrimination, recall, and willingness to report these experiences when questioned. Individuals who experienced adversity in childhood are at greater risk for developing mental disorders (26), and those with mental disorders may be prone to greater exposure to certain situations (e.g., seeking mental health services or other supportive services) in which discrimination may be experienced. It is also possible that experiencing childhood adversities contributes to changes

TABLE 7 | Results of multinomial logistic regression predicting class membership (relative to Class 1, "low adversities") from sociodemographic characteristics, for adult immigrants in the 2012–2013 National Epidemiologic Survey on Alcohol and Related Conditions-III ($n = 6{,}131$).

Characteristic	Class 2: Recent employment/financial adversities RRR (95% CI)	Class 3: Elevated childhood neglect/exposure to violence/substance misuse RRR (95% CI)	Class 4: Childhood physical/psychological abuse RRR (95% CI)	Class 5: Severe childhood adversities RRR (95% CI)
Sex (male, ref.)				
Female	**0.71* (0.53–0.94)**	0.95 (0.77–1.18)	**0.71*** (0.59–0.84)**	0.93 (0.74–1.16)
Age (18–29, ref.)				
30–44	1.33 (0.90–1.96)	1.30 (0.94–1.80)	**1.41* (1.09–1.82)**	**1.94*** (1.45–2.59)**
45–64	1.35 (0.92–2.00)	1.06 (0.74–1.53)	1.33 (0.98–1.79)	**1.93*** (1.36–2.75)**
≥65	**0.15*** (0.06–0.35)**	0.68 (0.43–1.05)	0.84 (0.59–1.19)	**0.57* (0.34–0.94)**
Region/country (Europe and Central Asia, ref.)				
East Asia	1.69 (0.80–3.55)	0.64 (0.38–1.07)	**0.62* (0.41–0.94)**	0.64 (0.39–1.07)
South Asia	2.04 (0.88–4.73)	0.53 (0.28–1.01)	0.78 (0.49–1.24)	0.82 (0.46–1.47)
Southeast Asia and Pacific	1.12 (0.53–2.40)	1.00 (0.62–1.61)	0.94 (0.64–1.39)	1.02 (0.59–1.77)
Middle East and North Africa	0.83 (0.31–2.18)	0.80 (0.43–1.47)	0.83 (0.47–1.47)	1.23 (0.55–2.76)
Sub-Saharan Africa	**3.54** (1.54–8.11)**	**1.82* (1.05–3.16)**	1.16 (0.74–1.81)	1.30 (0.67–2.54)
Mexico	1.51 (0.82–2.76)	1.27 (0.87–1.86)	0.82 (0.59–1.13)	**1.68* (1.13–2.49)**
Central America	1.82 (0.85–3.88)	1.49 (0.96–2.31)	1.13 (0.77–1.66)	**1.88* (1.16–3.05)**
Caribbean	**2.28* (1.22–4.28)**	1.09 (0.73–1.61)	0.82 (0.56–1.21)	1.29 (0.87–1.91)
South America	1.86 (0.91–3.82)	0.94 (0.58–1.52)	0.94 (0.60–1.46)	1.08 (0.68–1.72)
Canada	0.49 (0.06–4.19)	0.95 (0.39–2.32)	1.24 (0.63–2.46)	**3.12** (1.60–6.10)**
Age at time of arrival (≥18, ref)				
0–11	**1.78** (1.28–2.47)**	**1.72*** (1.33–2.24)**	**2.07*** (1.64–2.62)**	**2.56*** (1.99–3.28)**
12–17	**1.55* (1.08–2.23)**	1.25 (0.95–1.63)	1.23 (0.93–1.63)	**1.64** (1.23–2.17)**
Educational attainment (≥Bachelor's degree, ref.)				
Less than high school	0.84 (0.51–1.38)	1.04 (0.73–1.47)	**0.72* (0.54–0.96)**	0.92 (0.66–1.28)
High school or GED	1.01 (0.59–1.76)	0.99 (0.71–1.38)	**0.71* (0.54–0.95)**	0.82 (0.61–1.11)
Some college	0.96 (0.60–1.52)	1.02 (0.76–1.37)	0.85 (0.65–1.13)	1.14 (0.83–1.57)
Family income, $ (≥70,000, ref)				
0–19,999	**4.82*** (2.83–8.19)**	1.17 (0.82–1.69)	0.92 (0.67–1.25)	**1.58* (1.10–2.28)**
20,000–34,999	**3.21*** (1.77–5.82)**	1.13 (0.81–1.58)	0.94 (0.71–1.26)	1.45 (1.00–2.09)
35,000–69,999	**2.80** (1.58–4.94)**	1.23 (0.91–1.66)	1.14 (0.86–1.50)	1.38 (0.99–1.92)
Marital status (married, ref.)				
Widowed, divorced, or separated	1.27 (0.89–1.81)	**1.71*** (1.33–2.19)**	1.09 (0.85–1.39)	**1.41** (1.10–1.80)**
Never married	0.93 (0.62–1.40)	1.06 (0.82–1.37)	1.00 (0.80–1.25)	0.99 (0.78–1.25)

Weighted results. Abbreviations. RRR, relative risk ratio; ref., reference category; GED, general education diploma. As a visual aid, all statistically significant results, for which p is <0.05, are bolded.

$^*p < 0.05$. $^{**}p < 0.01$. $^{***}p < 0.001$.

in psychopathology, stress sensitization (83, 84), and cognitive attributions (85) that increase the likelihood of attributing negative interactions or events to discrimination. Finally, it is possible that individuals with mental health concerns are more likely to interpret past events as abusive (7), and this pattern may possibly apply both to childhood experiences reported as abuse and recent experiences reported as ethnic discrimination.

Age at Time of Immigration

Consistent with prior research on the importance of age at time of immigration to the US, the present study highlighted age at time of arrival as a risk factor for poor outcomes. Specifically, risk of meeting criteria for a substance use disorder only or a co-occurring disorder (relative to no disorder) was significantly higher for those who immigrated to the US at ages 0–11, compared to those who immigrated as adults (after controlling for latent class membership and sociodemographic characteristics). Prior research has reported an association between age at the time of immigration to the US and psychiatric disorders, in many (3, 14), yet not all (86) immigrant groups. Individuals who migrate at younger ages are (understandably so) less involved in the decision to migrate (compared to those who migrate at older ages) (14), yet are expected to cope, from an early age, with a multitude of tasks that stem from the process of migration (e.g., ability to reconcile life in two or more cultures) (87). Cumulative adversities (including childhood adversities and recent stressors, among others) are said to reduce gray matter in parts of the brain responsible for regulating cognition,

TABLE 8 | Results of multinomial logistic regression predicting mental disorders (relative to "no mental disorder") from sociodemographic characteristics and latent class membership for adult immigrants in the 2012–2013 National Epidemiologic Survey on Alcohol and Related Conditions-III ($n = 6,131$).

Characteristic	Substance use only RRR (95% CI)	Mood/anxiety/trauma only RRR (95% CI)	Co-occurring RRR (95% CI)
Sex (male, ref.)			
Female	**0.37*** (0.27–0.49)**	**2.25*** (1.89–2.68)**	0.72 (0.51–1.02)
Age (18–29, ref.)			
30–44	**0.69* (0.49–0.97)**	1.12 (0.85–1.49)	0.68 (0.40–1.15)
45–64	**0.54** (0.35–0.83)**	**1.35* (1.01–1.80)**	**0.35** (0.19–0.66)**
≥65	**0.16*** (0.07–0.38)**	1.04 (0.66–1.64)	**0.08*** (0.02–0.27)**
Region/country (Europe and Central Asia, ref.)			
East Asia	**0.51* (0.27–0.97)**	**0.65* (0.43–0.98)**	0.70 (0.30–1.64)
South Asia	0.51 (0.19–1.40)	0.66 (0.39–1.12)	0.30 (0.06–1.47)
Southeast Asia and Pacific	0.60 (0.33–1.11)	**0.62* (0.40–0.96)**	0.77 (0.31–1.91)
Middle East and North Africa	**0.27** (0.11–0.66)**	1.06 (0.60–1.86)	1.30 (0.47–3.57)
Sub-Saharan Africa	**0.41* (0.19–0.90)**	0.62 (0.35–1.09)	0.37 (0.13–1.05)
Mexico	**0.51** (0.31–0.84)**	0.78 (0.57–1.06)	**0.31** (0.14–0.67)**
Central America	**0.40** (0.22–0.74)**	0.91 (0.60–1.38)	0.71 (0.29–1.79)
Caribbean	**0.37** (0.21–0.65)**	0.85 (0.59–1.23)	1.04 (0.47–2.28)
South America	**0.51* (0.28–0.92)**	1.09 (0.71–1.67)	1.37 (0.53–3.55)
Canada	0.77 (0.28–2.07)	1.22 (0.59–2.54)	2.38 (0.94–6.00)
Age at time of arrival (≥18, ref.)			
0–11	**2.13*** (1.48–3.06)**	1.23 (0.97–1.56)	**2.63*** (1.85–3.73)**
12–17	1.17 (0.76–1.78)	1.15 (0.84–1.56)	0.75 (0.38–1.48)
Educational attainment (≥Bachelor's degree, ref.)			
Less than high school	1.29 (0.77–2.16)	1.27 (0.91–1.77)	1.57 (0.57–4.37)
High school or GED	1.32 (0.82–2.13)	0.90 (0.64–1.27)	1.32 (0.64–2.72)
Some college	1.00 (0.67–1.51)	1.11 (0.80–1.52)	1.30 (0.74–2.26)
Family income, $ (≥70,000, ref.)			
0–19,999	0.80 (0.48–1.32)	1.30 (0.90–1.89)	1.38 (0.58–3.30)
20,000–34,999	1.04 (0.59–1.83)	1.02 (0.72–1.44)	1.02 (0.46–2.25)
35,000–69,999	1.07 (0.67–1.73)	1.17 (0.84–1.63)	1.29 (0.65–2.56)
Marital status (married, ref.)			
Widowed, divorced, or separated	1.31 (0.86–2.00)	**1.30* (1.01–1.66)**	1.49 (0.85–2.60)
Never married	**1.96*** (1.43–2.68)**	1.09 (0.84–1.42)	1.57 (0.95–2.59)
Latent Class Membership (Class 1, ref.)			
Class 2: Recent employment/ financial adversities	**3.82*** (2.36–6.19)**	**2.50*** (1.73–3.61)**	**5.58*** (2.63–11.81)**
Class 3: Elevated childhood neglect/ exposure to violence/ substance misuse	**2.61*** (1.77–3.86)**	**2.47*** (1.84–3.32)**	**7.11*** (3.76–13.44)**
Class 4: Childhood physical/ psychological abuse	**2.54*** (1.77–3.64)**	**2.51*** (1.88–3.34)**	**4.27*** (2.39–7.66)**
Class 5: Severe childhood adversities	**3.26*** (2.08–5.10)**	**5.69*** (4.44–7.30)**	**12.21*** (7.06–21.10)**

Weighted results. RRR, relative risk ratio; ref., reference category; GED, general education diploma; Class 1: "Low adversities." As a visual aid, all statistically significant results, for which p is <0.05, are bolded.
$^{*}p < 0.05$. $^{**}p < 0.01$. $^{***}p < 0.001$.

emotion, and behavior, ultimately increasing vulnerability to several psychiatric disorders (88).

Compared to those who immigrated as adults, immigrants who had arrived as children (especially ages 0–11) evidenced higher risk of membership in the latent classes characterized by adversities (relative to membership in the latent class characterized by few childhood or past-year adversities). These differences may be partially explained by the plethora of stressors that are particularly relevant to immigrant youths. Prior to migration, immigrant, refugee, or asylee youths may encounter direct and indirect exposure to interpersonal, institutional, or targeted violence (89), as well as family separation (90). At the time of arrival to the host country, other factors affecting youths, tied to immigration policies, may include separation from parents and increased risk for abuse and exploitation (89). Youths may also encounter a host of issues related not only to adapting/integrating to the host country, but also to the aftermath of exposure to earlier stressors, including internalized distress, particularly among refugee minors (90).

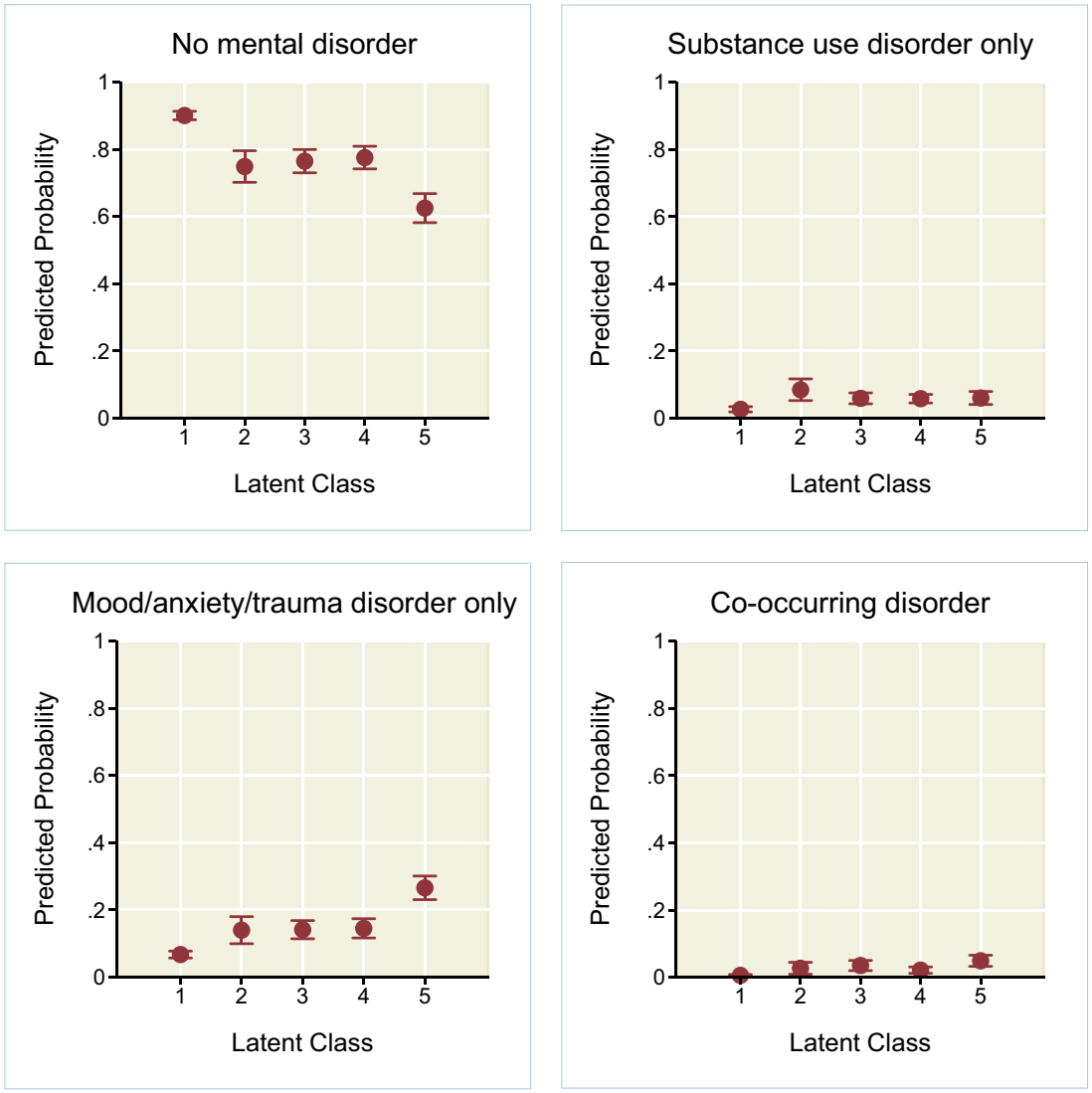

FIGURE 2 | Predicted probabilities (with 95% confidence intervals) of no mental disorder, substance use disorder only, mood/anxiety/trauma disorder only, or co-occurring disorder, by latent class membership for adult immigrants in the 2012–2013 National Epidemiologic Survey on Alcohol and Related Conditions-III (n = 6,131). Weighted results of multinomial logistic regression, adjusting for gender, age, country/region of birth, age at time of arrival, educational attainment, family income, and marital status. LC1, low adversities; LC2, recent employment/financial adversities; LC3, elevated childhood neglect/exposure to violence/substance misuse; LC4, childhood physical/psychological abuse; LC5, severe childhood adversities.

Substance Use Disorders, Mood/Anxiety/Trauma Disorders, or Co-occurring Disorders

In the present study, the highest risk ratio for the outcome of substance use disorder only (relative to no disorder) was observed in the latent class characterized by recent employment/financial adversities (compared to the class with few recent or childhood adversities). Problematic use of substances can stem from coping responses to stressors, and stressors can hinder remission from drug addiction (33). In a systematic review of risk factors for relapse among individuals with alcohol use disorder, life events involving trauma and stress were identified as factors associated with elevated rates of relapse (50). At the same time, dealing with a mental disorder may also contribute to the formation of particular stressors (or complication of those already existing), by interfering with functional impairment, often observed across various mental disorders. Behaviors surrounding drug seeking, drug use, or addiction can increase individuals' risk of witnessing or experiencing traumatic stressors (e.g., violence, overdose death) (91), or generate stressors in the form of interpersonal conflict, legal consequences, or employment or financial instability.

For the outcomes of mood/anxiety/trauma disorder only or co-occurring disorders (relative to no disorder), the highest risk ratios were observed for the class characterized by severe childhood adversities. The link between adverse childhood experiences and mental disorders or co-occurring disorders has been well-documented (26, 41, 92). Prior research has found that individuals with mental disorders and a history of adverse childhood experiences (compared to those with mental disorders but no history of adverse childhood experiences) may have earlier onset of symptoms, greater severity of symptoms, worse treatment outcomes, and higher risk for comorbidity (93). In the present study, membership in the class with severe childhood adversities (relative to the class with low past-year adversities or childhood adversities) was associated with a twelve-fold elevated risk of meeting criteria for a co-occurring disorder (relative to no disorder). Co-occurring disorders have been tied to a variety of risk factors, negative outcomes, and concerns for diagnosis and treatment success (45–49, 51, 52).

Gender Differences

The present study found that the percentage of immigrant adults with co-occurring disorders did not significantly vary by gender; however, other gender differences in mental disorders were identified. The percentage of immigrant adults who met criteria for a substance use disorder only (in the past year) was nearly three times as high among men, compared to women. Conversely, the percentage of immigrant adults who met criteria for a mood/anxiety/trauma disorder only (in the past year) was more than twice as high among women, compared to men. These findings are consistent with prior research documenting gender differences in substance use disorders vs. mood/anxiety disorders (37). The role of sex hormones on cognition and behavior has been identified as a factor representing increased risk of depressive, anxiety, and trauma-related disorders in women compared to men (94). Psychological (e.g., higher tendency toward rumination), interpersonal (e.g., higher rates of violence victimization), and societal factors (e.g., gender discrimination), may also explain the higher prevalence of depression in women, compared to men (94). A multifactorial explanation also exists for gender differences in substance use disorders. Metabolic (in the case of alcohol) and other biological factors explain differences in the effects of substances between men and women (95), potentially also explaining individuals' propensity toward substance use. Beyond biology, social and cultural factors, such as gender-defined roles, influence differential access to substances between men and women (95) and different levels of acceptance of substance use in men and women.

LIMITATIONS

The present study has several limitations. First, the cross-sectional study data confine the results to associations and preclude assertions of temporal precedence. The retrospective nature of the study introduces recall biases, especially relevant for measures of adversities in childhood. A recent meta-analysis documented low agreement between prospective and retrospective reports of childhood maltreatment, concluding that retrospective measures cannot be considered comparable to prospective measures (96); therefore, findings of the present study cannot be generalized to adversities documented via prospective measures. The negative alterations in cognition observed in some mental disorders (36, 85) may influence the degree of perception and report of childhood adversity. The self-report measures utilized also raise concerns of biases, especially for measures related to substance use or other sensitive topics. The mental health outcomes in the study were not assessed by mental health professionals but were determined based on structured interviews administered by lay workers. Although interviewers were available for several languages, not all languages were accommodated in NESARC-III. While NESARC-III oversampled racial/ethnic minority groups, the survey targeted the general population rather than the immigrant population specifically, and it is unclear to what extent subsets of the immigrant population (such as undocumented immigrants or refugees) were represented in NESARC-III's sample.

The questions, and scoring, related to adverse childhood experiences have varied across past studies, and the conceptualization of adverse childhood experiences and cut-off points for the frequency or number of these experiences has also varied in prior research. These considerations hamper direct comparisons between the present study's findings and past results on adverse childhood experiences. The adversities included in the present study do not represent a comprehensive list of adversities; in particular, adversities specifically relevant to immigration experiences (e.g., displacement; war; deportation threats) are not measured in NESARC-III. Moreover, NESARC-III does not provide information on the reasons for immigration or the immigration status of respondents (e.g., refugee, employment visa, undocumented). Thus, an examination of immigration-specific stressors or circumstances of immigration was outside the scope of the present study.

Small numbers of immigrants with mental disorders and immigrant subgroups limited the analyses' statistical power. Since the time of data collection (2012–2013), numerous policy changes have impacted US immigrants (e.g., changes in immigration laws, restrictions on immigrants from certain countries, shifts in access to social programs, increases in anti-immigrant rhetoric, implementation of family separation practices). In light of these changes, the recent adversities and stressors faced by US immigrants may be potentially higher than estimated in this study.

IMPLICATIONS AND CONCLUSION

Results of the present study highlight some of the heterogeneity in experiences of childhood and recent adversity among US immigrant adults. Findings of the study have implications at clinical, institutional, and policy levels. While demographic characteristics such as nativity, age at the time of immigration, or country of origin constitute critical elements of immigrant health, results of the present study underscore the relevance of childhood and recent adversities (including ethnic/racial discrimination) for screening and intervention. Among service providers, a

clearer understanding of immigrants' experiences of adversities may be beneficial for the client-provider relationship. At the same time, the association of age at time of immigration with various experiences of childhood adversities and mental health outcomes highlights the importance of early intervention with immigrant youths living in the US.

At the social services or healthcare systems level, findings regarding co-occurring disorders support the need for integrated treatment networks of addiction and mental health services (97) for US immigrants. The highly elevated risk of co-occurring disorders for immigrants in the latent class characterized by severe childhood adversities suggests that services for immigrants with co-occurring disorders should consider and address the childhood adversities that some immigrants may have experienced. Considering that co-occurring disorders are often associated with the most problematic functional and treatment outcomes, and that immigrants face many barriers to receiving mental health services, specialized services represent an often-unmet need. Finally, at the policy level, the study's findings underscore the need for local, state, and national policies that expand access to mental health services for immigrants. Attending to the mental health needs of immigrants is vital to the health and stability of US society overall.

DATA AVAILABILITY STATEMENT

The data analyzed in this study is subject to the following licenses/restrictions: Limited access dataset is provided by the NIAAA. Requests to access these datasets should be directed to NIAAA-NESARC-III@mail.nih.gov.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by University of Texas at San Antonio IRB. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

DT conceptualized the study and provided feedback in drafting of the manuscript. MC was responsible for data analyses and drafting of the manuscript. Both authors approved the final manuscript.

ACKNOWLEDGMENTS

This manuscript was prepared using a limited access dataset obtained from the National Institute on Alcohol Abuse and Alcoholism and does not reflect the opinions or views of NIAAA or the U.S. Government. The authors would like to thank the National Institute on Alcohol Abuse and Alcoholism for access to and use of the dataset.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2020.573410/full#supplementary-material

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

frontiers in Psychiatry

ORIGINAL RESEARCH
published: 13 November 2020
doi: 10.3389/fpsyt.2020.568167

"Waking Up Every Day With the Worry": A Mixed-Methods Study of Anxiety in Undocumented Latinx College Students

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To date, little research has taken a mixed-methods strategy to consider the ways in which living "in the shadows" without recognized legal status may affect mental health. In this study, we took this approach, to examine how legal status, as well as stressors (deportation worries, financial concerns) and potentially protective factors (faculty support, peer support), affect anxiety levels of undocumented Latinx undergraduates from colleges across California. We surveyed 486 participants including both standardized measures as well as open-ended responses. We found that rates of self-reported anxiety between undocumented females were 4 times that of the norm population and that of male undocumented students were 7 times higher as measured by the GAD-7 in the moderate and severe ranges. Our predictive models suggested that participants' rates of anxiety were in large part related to worries about financing their education and their daily living expenses as well as detainment and deportation; having an institutional agent such as a professor whom they can turn to for support served to buffer the effects of anxiety. Qualitative findings triangulated the quantitative findings and provided further insights into the experience of living with the stresses of social exclusion and liminal status.

Keywords: latinx, undocumented, college students, anxiety, social support, social belonging

OPEN ACCESS

Edited by:
Amy Marks,
Suffolk University, United States

Reviewed by:
Susana M. Muñoz,
Colorado State University, United States
Aurora Chang,
Loyola University Chicago, United States

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *31 May 2020*
Accepted: *13 October 2020*
Published: *13 November 2020*

Citation:
Suárez-Orozco C and López Hernández G (2020) "Waking Up Every Day With the Worry": A Mixed-Methods Study of Anxiety in Undocumented Latinx College Students. Front. Psychiatry 11:568167. doi: 10.3389/fpsyt.2020.568167

INTRODUCTION

Despite substantial challenges including poverty, xenophobia, and difficult work and living conditions faced by immigrants, research emerging at the end of the last century pointed to an "immigrant paradox" (1), suggesting that the first-generation typically experienced better overall physical and mental health than later immigrant generations (2–4). Subsequent research began to unpack nuances in the immigrant paradox pattern depending upon different developmental outcomes (5) and origins including ethnic and national origin differences (2), refugee (6), as well as documentation status (7). Over the past decade, research has suggested that when compared to other racial/ethnic groups, Latinx youth demonstrate high rates of both depression and anxiety (7). Documentation status appears to be a factor that may be contributing to varying patterns in mental health outcomes (8, 9).

Due to the vulnerabilities of undocumented individuals, however, few large-scale studies consider the impacts of legal status on mental health outcomes. An exception to this generalization

is regards to a body of scholarship with undocumented college students who currently constitute an estimated quarter of a million students in the United States (10). While this growing and rich body of work has qualitatively explored the experience of both stress and resilience among these students (11, 12), there have been few studies to date, that have attempted to gauge potential rates of anxiety amongst them [(13), for an exception].

The aim of this study is to use a mixed-methods approach to not only identify the prevalence of anxiety in undocumented Latinx undergraduate students but to also provide insight into their lived experiences around coping with this issue. It also seeks to explore how several stressors (e.g., financial concerns, legal status) and potentially protective factors (e.g., peer support, faculty support) may contribute to anxiety levels.

Conceptual Framework

We draw up an integrative model for the adaptation of immigrant-origin youth (14) that combines ecological (15) and risk and resilience frameworks (16). As immigrant families enter host societies, political, economic, and social factors within the contexts of reception (17) influence short-term adaptation as well as long-term developmental pathways for new immigrants and their children. These contexts of reception in which immigrant-origin children and youth settle present both resources and risks with significant implications for shaping developmental tasks, and psychological adjustment (14).

An ecological perspective suggests that interrelated contexts of development within which youth are embedded shape opportunities and have important implications for a number of developmental outcomes (14, 15). The decades-long context of a political stalemate around comprehensive immigration reform and legalizing DREAMers (18), an ever-intensifying deportation machinery (19, 20), and xenophobic public media messages (21) set the stage for the macrosystemic ecological context in which undocumented students face their college experience (14, 22). This macrosytemic context has shaped societal attitudes toward immigrants, resources, and the opportunity structure for students (14) and has implications for a host of outcomes including educational trajectories and psychological wellbeing (23). While recognizing the extraordinary resilience of undocumented youth, the stressors they are facing at this macrosystemic level place them at heightened psychological risk (12, 14, 23, 24).

At a more microsystemic level, optimally, educational settings can "bridge cultural distance" (25) serving as "sites of possibilities" (26) supporting credentialing, language acquisition, and life-long learning. Supportive relationships with peers and teachers serve a particularly important buffering function. These relationships are often integral to promoting academic motivation, supporting feelings of belongingness, and navigating the narrow educational pipeline for first-generation to college students living in unauthorized families (27).

Literature Review

Anxiety disorders are one of the most common mental health disorders with ∼29% of U.S. adults having one or more diagnosable anxiety disorders (28). The rates for immigrant Latinx adults who receive this diagnosis, on the other hand, are estimated to be roughly 15% (2). The lower rates of anxiety and mental health issues for immigrant Latinx give an indication that they may be faring better overall when compared to U.S. born Latinx; on the other hand, these rates may be in part a result of under-utilization of services and cultural and linguistic limitations of measures (21, 29). These studies, however, did not distinguish the differences in legal status among the groups under investigation.

A study of 281 first-generation Latinx youth ages 12–19, found that they face multiple challenges that include poor socioeconomic resources, the risk of behavioral problems, and low educational attainment (7) and that nearly 29% reported symptoms of anxiety. Others have found that Latinx students are more likely to suffer from mental health issues and lack access to mental health care than non-Latinx Whites and African Americans (30–32). Potochnick and Perreira (7) postulate that legal status had a significant effect on anxiety and other mental health issues for first-generation Latinx.

Generalized Anxiety Disorder

Generalized Anxiety Disorder (GAD) is characterized by chronic excessive worrying about differing events and activities for at least 6 months (DSM-V). This worry is often difficult to control. Some have posited that this disorder is linked to uncontrollable and unpredictable aversive events although generally not traumatic or as severe as those events causing Post-Traumatic Stress Disorder (28). Additionally, people suffering from GAD are especially concerned about not being able to predict the future (28). Undocumented individuals may be prone to developing this anxiety disorder as they often feel unsure of the future due to their legal status (9, 33). As such, worrying about deportation and detainment of themselves or loved ones, financial issues, a general uncertainty may place these youths at risk of developing excessive worries that could lead to this anxiety disorder (34).

Gender, Immigration, and Anxiety

It is well established that women typically report higher rates of anxiety than men (31 vs. 19%) of anxiety (35–39). Similarly, research suggests immigration impacts women differently than it does men and can be attributed to a number of contradictions between the home and host cultures (8). In particular, appropriate gender role behavior seems to be stronger for women who may be seen as "keepers of the culture" by attempting to uphold homeland traditions, language, and strong ethnic identity which can be used as a defense against the identity loss that may be experienced through the process of adjusting to a new culture (40, 41). This pressure for women to preserve the culture, as well as managing the conflicting messages received from the home country and family, and putting the needs of the family before their own can lead to maladjustment of immigrant Latinx women (39, 42).

Latinos, on the other hand, tend to report less anxiety than Latinas (35). Like Latinas, Latinos also have to contend with the traditional gender roles ascribed to them and often are seen as the protectors as well as the financial providers of the family (43). Males may cope in a differing way from women, acting in

more self-reliant ways that fit with the social and cultural notion that males are expected to solve problems rather than seek help (44, 45). Role changes may occur as they adjust to the new culture, specifically if they leave home to attend college thereby finding themselves less able to provide for their family which can cause substantial stress as they try to negotiate their new roles (44).

Undocumented College Students in Higher Education

Undocumented students face multiple challenges which often include being the first in their family to attend college, living in a home with mixed-status family members, as well as little financial help that leads many to report a feeling of stress, anxiety, and other psychological symptoms (22). Many of these undocumented students, however, often do not experience the full limitations of their status until the later years of adolescence as they are preparing to apply for college or begin to think about their future after high school (8, 46). Not only do undocumented students face the transition into adulthood, but they also face a transition into "illegality" (46). Undocumented students' legal status may have less impact during their childhood as they are guaranteed an education Plyer vs. Doe in K-12 institutions, but it becomes a defining feature in late adolescence and into adulthood as they realize the limitations of their status and are unable to fully participate in the college experience (46).

Indeed, various studies have captured the difficulties undocumented students experience as they navigate higher education [e.g., (8, 22, 47, 48)], with college affordability (9), discrimination (49, 50), and a lack of safe spaces (47). Similarly, other studies have illustrated the chronic fear of deportation (11), uncertainty about their futures and constraints of working, studying and commuting (8, 22), which appear to be contributing factors to negatively impact undocumented student's psychological wellbeing [e.g., (8, 13)]. However, few studies, have explored how these factors are linked to impacting their anxiety rates using a mixed-methods strategy.

Notably, scholars argue the importance of creating safe spaces, where undocumented students can find support and resources, to alleviate the risk associated with an undocumented status in college campuses [e.g., (22)]. Studies revealed that the fear of any negative reaction from peers or institutional agents (e.g., faculty, staff), such as exposing their legal status, tends to create constricted social networks for undocumented students (12, 22). Similarly, scholars have argued that a lack of support from institutional agents and dealing with microaggressions (e.g., insensitive comments about their legal status (49) may make these students apprehensive about seeking help from peers or professors (8, 22). This is important as research has noted that little social support and fewer close relationships are linked to lower mental health (51). Undocumented students, at the same time, have reported college success by drawing on their resiliency, which they attribute to learning from their institutional and community mentors (12, 52). Thus, if undocumented colleges students are unable to access a larger social network due to their legal status, they may be at a higher risk of experiencing anxiety.

Additionally, in most states, there are policies and institutional practices that may limit access and success to higher education for undocumented students with limited financial resources to help enroll and pay their tuition (10, 49). Nonetheless, eligible undocumented students are granted a 2-year work-permit and relief from deportation when Deferred Action for Childhood Arrivals (DACA) was passed on June 15, 2012, by the Obama administration. Scholars have noted that DACA helps alleviate some of the challenges of being undocumented, which help improve their educational journey (53). While many of these students have reported educational benefits (e.g., being eligible for jobs and internships) to DACA, scholars argue that these "short-term" benefits do not provide a pathway to citizenship, which Gonzales et al. (8) suggest would help address college affordability and vulnerability to enactments of xenophobic policies (8, 54). Indeed, the Trump administration has continually undermined DACA demonstrating the vulnerability of this short-term solution (55, 56).

In addition, young adulthood is an age of particular vulnerability for mental health challenges as nearly three-quarters of lifetime psychiatric disorders emerge in adolescence and early adulthood (57). College campuses across the country are seeing an increase in serious psychological issues such as depression, suicidal ideation, and alcohol abuse (31, 58). In an annual report by the Center for Collegiate Mental Health (59), over half of students indicated a current concern related to anxiety. Untreated mental illness is a growing concern for campuses across the country with significant implications for academic success, productivity, substance use, and social relationships (60).

Today, with the recent intensification of explicitly anti-immigrant federal policies (55) as well as post-election anti-immigration climate (56) these issues are of pressing concern (61). Emerging qualitative data has documented that "politically difficult times" have increased reported anxiety and fear from undocumented students [(62), p. 273]. Similarly, other studies have noted that political awareness about anti-immigrant sentiment during the 2016 elections caused Latinx youth to feel anxious, fearful, disgusted, and angry. To date, however, we know little about the undocumented students' potential rates of symptoms as these students are often invisible either because they are fearful or because they are overlooked (10).

Aims

The aim of this research is to fill the gap in the literature by examining the presence of anxiety among Latinx undocumented undergraduates in a sample of California college campuses. One aim of this study was to uncover how undocumented Latinx undergraduates' legal status may influence their levels of anxiety. It also sought to examine how stressors (financial concerns, deportation worries) and potential protective factors (peer support, faculty support) influence their anxiety. Lastly, it sought to shed light on these students' experiences. An embedded mixed-methods research design (63) was conducted in which the primary strand of research was quantitative

(consisting of forced-choice survey questions) with select open-ended qualitative questions embedded into the survey in order to provide some phenomenological insights in the undocumented student experiences. Our research questions consisted of:

Quantitative. 1- What are the self-reported levels of anxiety among undocumented Latinx undergraduates in California? Is there a gender difference in the moderate and severe ranges? 2- How do stressors (e.g., fear of deportation, financial concerns) and potentially protective factors (e.g., peer support, instructor support) impact the level of reported anxiety of undocumented Latinx undergraduates?

Qualitative. 1- How do undocumented Latinx undergraduates describe their stress in relation to being undocumented college students? 2- In what ways might these stresses and challenges contribute to anxiety?

We hypothesized that undocumented Latinx undergraduates would report high levels of anxiety in comparison to the norm group. We also anticipated that women would report higher levels of anxiety than men. Additionally, we expected that the unique stressors (financial concerns and fear of deportation,) would increase anxiety, while social supports (peer and instructor) would reduce reported levels of anxiety.

METHODS

Data Collection Strategy

Due to their stigmatization and invisibility, undocumented Latinx undergraduates are an especially "hard-to-reach" population (64). Thus, novel strategies were employed to reach the survey sample. The *[BLINDED] Project* was initiated in response using innovative strategies to gain access to this population (10). Our research team, consisting of three diverse Principal Investigators and a team of diverse graduate students. We partnered with 10 community organizations working locally and nationally with undocumented students and the community as well as an Undocumented Student Advisory Board, and a Faculty Expert Advisory Board. We collaborated on the design and piloting of the survey with our advisory team. The primary recruitment method for the project was through a web portal and a strong, multi-platform social media campaign (e.g., Facebook, Twitter, Instagram) that specifically focused on providing information about undocumented issues as well as providing them the opportunity to have their voices heard by participating in the study. Two months before the project was launched, a website was designed, providing resources and information for undocumented students. We let potential participants know that we wanted to hear from them about their experience. The advisory members worked with our research team on an active social media campaign to widely send out information about the survey across the undocumented community and college resource networks. We also recruited through the use of flyers, attending Deferred Action for Childhood Arrival (DACA) college events, and word-of-mouth. Data was collected from January through July of 2014.

To qualify, participants had to meet the following eligibility criteria: 1- Be between 18 and 30 years of age, 2- Identify as an undocumented, DREAMer, or DACAmented college student, and 3- Have been enrolled as an undergraduate student in the college in the past year. In addition, due to the vulnerability of the population, participants were assured anonymity; consent for participation was a simple checkmark before starting the survey. Approximately 85% of the surveys were collected via Qualtrics; the remaining surveys were collected through paper and pencil surveys and entered into SPSS. Once the participant completed the survey, if they wished to receive a $20 gift card, they were prompted to send us an email to receive the card. A data control protocol was implemented in order to reduce the number of mischievous survey data (65) (e.g., 80% of survey complete; language in synch with country of origin) and each survey was checked by a group of research team members. Once the survey was deemed valid each participant received the gift card in return for her or his participation. The data was then transferred from Qualtrics to SPSS and all identifiable data including email and IP address was deleted from our server. This project was approved by the Internal Review Board (IRB#13-001614).

Participants

The overall [BLINDED project name] sample consisted of 909 diverse participants from 34 states; approximately half of the sample came from California. California has the largest population of undocumented immigrants in the nation with a current estimate of between 74,000 undocumented immigrants enrolled in college (66). Further, it affords undocumented college students benefits, such as the Development, Relief, and Education for Alien Minors (DREAM) Act (which was a policy in California before the DACA[1] program was implemented) which allows undocumented students who meet certain criteria to apply for and receive private scholarships, state-funded financial aid, university grants, community college waivers and Cal Grants that are not accessible in other states. As such, for this article, we restricted our sample to a sub-sample of 486 self-identified undocumented (including DACA, expired work or student visas or under review) Latinx undergraduates from California.

Females constituted 54% of the sample. Participant's ages ranged from 18 to 30 years of age with a mean of 21.60 ($SD = 2.69$). Participants came from a variety of Latin American countries, with the largest percentages coming from Mexico (84.1%), Guatemala (3.0%), Peru (2.6%), El Salvador (2.2%), and Colombia (1.8%). Age of entry into the U.S. ranged from 0 (birth to 11 months) to 16 years of age ($M = 6.22$, $SD = 4.34$). Forty five percent of participants attended a 2-year public community college or university, 48.8% attended a 4-year public college while 3.8% attended a private university. Roughly 62.7% of participants identified themselves as DACAmented students with temporary protected status of deportation. The majority (95%) of the sample

[1]Deferred Action for Childhood Arrivals 2012. To be eligible for DACA, individuals are required to: (1) be between the ages of 15 and 30 as of June 15, 2012, (2) have come to the U.S. before the age of 16, (3) have spent at least five continuous years in the U.S., (4) be attending high school or have a high school diploma (or equivalent) or a veteran of the U.S. armed forces or Coast Guard, and (5) have not been convicted of a felony or significant misdemeanor, and do not pose a threat to public safety or national security. DACA grants temporary relief from deportation, allows for a drivers' license to be issued and provides work authorization for a period of 2 years, subject to renewal.

had a total household income of $49,999 or less with the largest percentage (28.1%) having a total household income between $20,000 and $29,999 per year.

Measures

Quantitative

Financial concern

A brief version of the financial concerns scale was used [see (67), for original categories] to capture undocumented college students' concerns, for example, with financing education, expenses relating to textbooks and supplies, as well as medical/dental expenses. The 6 items were rated on a 5-point Likert-style scale (1 = not at all concerned to 5 = extremely concerned). The mean for all items was computed and higher scores indicated greater financial concerns for each domain. Internal reliability for this sample is $\alpha = 0.83$.

Concerns with deportation

Two separate items were used to assess the level of worry participants felt about deportation/detainment. The questions included were "How often are you worried that you might be detained or deported?" and "How often are you worried that your family members or friends might be detained or deported?" Responses were rated on a 4-point Likert-style scale (0 = never to 3 = most of the time). A mean or sum was not created as each item was used to assess the worries separately.

Peer support

Peer support concerning legal status was assessed using 4 items on a 5-point Likert-style scale (1 = strongly disagree to 5 = strongly agree). Sample items included, "I feel safe sharing my legal status with my friends" and "My friends support me around my legal status." The mean of all items was calculated with higher scores indicating greater levels of positive relationships with peers. Internal reliability for this sample is $\alpha = 0.80$.

Institutional agent support

Different patterns of positive relationships and support from instructors and staff on campus regarding participants' undocumented status were captured using the 9-item Instructor Relationships scale (22), rated on a 5-point Likert-style scale, (1 = strongly disagree to 5 = strongly agree). A sample item included, "There are [instructors/staff] I can approach if I have a personal problem." The mean was calculated with higher scores indicating greater levels of positive relationships with instructors and staff on campus. Internal reliability for this sample is $\alpha = 0.92$.

Generalized anxiety

The 7-item Generalized Anxiety Scale (GAD-7) (68) was used to assess self-reports of generalized anxiety disorder. In a norm sample (N = 2,982) consisting of 80% White, 8% African American, and 9% Latinx meeting diagnostic GAD criteria for 6 months, construct and criterion validity of this measure was established comparing self-report GAD to "independent mental health professionals' diagnoses, functional status measures, disability days, and health care use" (p. 1092) demonstrating good reliability and validity (68). Participants provided responses to the prompt, "Over the last 2 weeks, how often have you been bothered by the following problems?" with sample items such as "Trouble relaxing" or "Not being able to stop or control worrying." Answer choices were rated on a 4-point Likert-style scale (0 = not at all to 3 = nearly every day). The raw scores on the 7 items are summed with a score ranging from 0 to 21 to assess the severity of symptoms with 0-4 = minimum levels of anxiety; 5-9 = mild levels of anxiety, 10-14 = moderate levels of anxiety, and 15-21 = severe levels of anxiety. A cut-off score of 10 or greater has been established to demonstrate the highest sensitivity (89%) and specificity (82%) (68). The use of the scale has been found to be valid and suitable for use with Latinx in the U.S. who speak both English and Spanish (69). Internal reliability for this sample is $\alpha = 0.91$.

Qualitative

As part of the survey, 3 open-ended qualitative questions were included in the survey. One asked about how their college experience had changed since receiving DACA status; another asked about the challenges of undocumented status and the last asked for what advice they would offer colleges to better serve undocumented students. For this contribution, we analyzed responses to the questions "Being an undocumented student can be stressful. What are the biggest challenges you face as an undocumented student?" Ninety-six percent of participants provided a written response that ranged in length from a minimum of 5 words to multiple paragraphs.

Researcher Positionality

The research team for this project was made up of a diverse group of first- or second-generation immigrants, many but not all of whom are Latinx; some of the members of the research team were DACAmented or undocumented or from mixed-status families (22). The senior author is a first-generation immigrant who has done extensive research, training, and advocacy work in the immigrant and undocumented community. The second author is also a first-generation immigrant who was previously undocumented herself and is part of a mixed-status family.

Analysis

Quantitative

To examine our first research question frequencies were used on forced-choice survey items from the measures listed above. To examine whether there were differences between men and women in their reported levels of anxiety, we employed an independent samples t-test. To examine how stressors and potentially protective factors predict anxiety, we conducted a four-step hierarchical multiple regression, using a sequential approach. Correlations were first run on all variables of interest (see **Table 1** for correlations). The first step of the regression included gender and age as control variables. In the second step, worries related to family or self-deportations or detainment was entered. In the third step, concerns about finances were entered into the model. In the final step, undocumented peer support and instructor support were entered.

TABLE 1 | Means and correlations of variables ($N = 486$).

	1	2	3	4	5	6	7	8
1. Gender	—							
2. Age	−0.049							
3. Fam deportation	0.160**	−0.065						
4. Self-deportation	0.108*	−0.04	0.421**					
5. Financial concerns	0.106*	−0.065	0.156**	0.194**				
6. Undoc peer support	0.196**	−0.089	0.165**	0.028	0.152**			
7. Instructor support	0.149**	0.041	0.246**	0.042	0.127**	0.435**		
8. Anxiety	0.059	−0.144**	0.168**	0.150**	0.294**	−0.043	−0.066	
Mean	21.52	1.74	1.34	3.15	3.68	3.69	7.21	7.65
SD	2.69	1.04	0.96	0.98	0.91	0.81	5.42	4.35

Gender variable coded as 0 = Male, 1 = Female.
$^*p < 0.05$, $^{**}p < 0.01$.

Qualitative

We employed both inductive and deductive approaches toward our qualitative analyses. We began, inductively by reading through all the responses to determine what codes emerged from the data (70). That initial inductive coding yielded ∼20 codes.

To achieve interrater reliability, two researchers individually read and coded a random subsample of 98 (20%) responses. We coded using a binary coding scheme for each theme with 0- code not present and 1- for code present. We then calculated the interrater reliability using Cohen's kappa. After initial coding, the two coders met twice to discuss, revise, and come to a consensus before final coding. Final coding kappa ranged from 0.81 to 0.97 on coding themes and categories meeting criteria for almost perfect agreement (71).

After coding was completed, codes were later collapsed into themes that aligned with deductive categories consistent with our quantitative model (e.g., financial concerns, deportation concerns, and social supports, and anxiety). In addition, moving beyond our predictive model, we also present the most prevalent themes that emerged in order to further shed light on the lived experience of undocumented college students (see **Table 3** below for code definitions).

RESULTS

Quantitative Findings

Reported Generalized Anxiety

Descriptive analyses revealed that 32% of the sample met the cutoff criteria (10 points or greater) and, as such, were self-reporting symptoms of generalized anxiety disorder at the moderate to severe level as indicated by the GAD-7.

Gendered Findings

Turning to gender patterns, we found that 28% of males and 35% of females met the cutoff criteria of 10. These numbers are striking when compared to the norming sample, in which 4% of males and 9% of females met the criteria for generalized anxiety disorder (68). Thus, the rates of GAD in this undocumented college sample is 7 times higher for males and nearly 4 times higher for females than that of a general population sample.

Independent samples *t*-tests comparing gender differences ratings of self-reported anxiety using the GAD-7 cutoff of 10 points or greater (indicating moderate to severe levels of anxiety) showed a significant difference between Latina ($M = 14.61$, $SD = 3.70$) and Latino ($M = 12.41$, $SD = 2.91$); $t_{(119)} = -2.98$, $p < 0.05$ undocumented students. Thus, as with other populations, undocumented Latinas appear to suffer higher levels of generalized anxiety than their male counterparts.

Stressors and Social Support Predicts Anxiety

The multivariate regression was then conducted to test the effects of stressors and social supports on symptoms of anxiety. Each step of the regression analyses resulted in an increase in R^2. In the first step of the regression, age was a significant predictor for anxiety symptoms explaining 2% of the variance. The older the participant the lower their anxiety levels. In the second step, age and worries about family deportation significantly predicted anxiety explaining 5% of the variance. In the third step, age, concerns about self and family deportation with the additional financial concerns together significantly predicted levels of anxiety explaining 12% of the variance. In the final model, age, worries about family deportation or detainment, financial concerns, and instructor support together significantly predicted 14% of the variance in reported levels of anxiety $R^2\ \Delta = 0.02$, F change $(2, 469) = 5.32$, $p < 0.05$. This suggests that while family and friend deportations predicted anxiety, worrying about finances was still the leading contribution to anxiety. On the other hand, having a supportive institutional agent contributed to reduced reported anxiety levels (see **Table 2** for regression results).

Qualitative Findings

The responses emerging from the open-ended questions served to capture the lived experience of the anxieties undocumented college students live on a daily basis. Participants highlight the challenges they faced as well as their own accounts of how their status directly impacts their everyday experiences contributing to uncertainty and anxiety (see **Table 3** for percent of codes).

TABLE 2 | Hierarchical regression analyses of stressors and potentially protective factors on anxiety.

Predictor variables	β	Beta	SE B
Step 1			
Age	−0.284**	−0.141	0.091
Gender	0.571	0.052	0.494
F	5.67**		
R2	0.023		
Step 2			
Age	−0.264**	−0.131	0.09
Gender	0.264	0.024	0.494
Fam Deportation	1.734*	0.116	0.743
Self-Deportation	1.226*	0.093	0.65
F	6.70***		
R2	0.054**		
Step 3			
Age	−0.237**	−0.118	0.087
Gender	0.052	0.005	0.479
Fam Deportation	1.434*	0.096	0.72
Self-Deportation	0.709	0.054	0.635
Financial Concerns	0.469***	0.26	0.08
F	12.57***		
R2	0.12***		
Step 4	1		
Age	−0.236**	−0.117	0.088
Gender	0.315	0.029	0.484
Fam Deportation	2.055**	0.138	0.738
Self-Deportation	0.493	0.037	0.633
Financial Concerns	0.496***	0.275	0.08
Peer Support	−0.071	−0.07	0.051
Instructor Support	−0.087*	−0.104	0.042
F	10.67***		
R2	0.14**		

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

TABLE 3 | Deductive and inductive codes, definitions and percentages ($N = 486$).

Code	Definition	*n* (%)
Financial	Concerns about finances, including funding tuition and daily living expenses for themselves and family	277 (57)
Deportation/Detainment	Concerns/fear about self or loved ones being deported/detained	31 (6)
Peer Support/Lack of	Mention of the importance of friends and lack of friendships/social support from peers	14 (3)
Institutional Agent Support/Lack of	Mention of the importance of professors or staff on campus and lack of social support from them	11 (2)
Anxiety	Feelings of anxiety and worry	69 (14)
Social Belonging/Exclusion	Mentions the importance of belongingness and their concern the role UndocuStatus has in social exclusion or marginalization	43 (9)
Hopelessness	Refers to feeling hopeless/discouraged	8 (2)
Uncertainty	Concerns about future; lack of control; inability to plan	13 (3)

Percentages are based on how many times a code was present. Participants may have mentioned multiple things within their answer and each section was coded separately and according to the appropriate code.

The Experience of Anxiety as an Undocumented Student

Participants in this study revealed the numerous ways their undocumented status negatively impacted their psychological wellbeing. Various responses captured how these students were grappling with "staying mentally, physically, emotionally healthy." [Female, 26, 2-year public community college] More specifically, many of these students reported feeling "stress, depression, anxiety, feeling[s] of alienation." [Female, 22, 4-year public institution] Many reported disruptions to their sleeping patterns, enjoyment in life, and thoughts about their future. As one student explained: "My stress as [a] student is that I can't sleep for the worries. I have my confidence goes down." [Female, 23, 4-year public].

Many responses were specifically centered around student's difficulties focusing in school due to the anxieties related to their legal status. For example, a participant reported: "Waking up every day with the worry I have, and going to school and not being able to focus in class and this has affected my grades so badly." [Male, 22, 2-year public community college] Others, similarly, described the stress of not having control over their lives, as noted by a 20-year old male attending a 2-year public community college: "When stress breaks in, I cannot do math anymore, even though I am a math lover…because of [the] possibility of being detained."

The undocumented students in our study compared themselves to their documented peers: "We can't enjoy life because we might be in trouble and get deported. It's hard for a 19-year-old to not enjoy life while I see all my classmates having fun and they can concentrate afterward on schoolwork." [Male, 19, 2-year public] Many articulated the multitude of stressors they juggled related to their legal status, including financial burden, deportation fears, and their sense of social exclusion.

Financial Concerns

The participant's qualitative responses were consistent with quantitative analyses—concerns about money was the most pressing challenge they reported (56% of respondents spontaneously brought issues related to financial pressures). A majority of responses were centered around participant's concerns for the lack of financial aid they are eligible for and the limits of their status in acquiring funding for their college tuition. One student explained: "Financial struggles are the greatest cause of my stress. I am constantly worried that I won't be able to pay to continue my education. I'm afraid of being stuck just because I can't get the financial aid I need." [Female, 19, 2-year public community college] Similarly, another revealed the difficulties of finding financial assistance: "Some of the biggest changes I face as an undocumented would be applying for scholarships because most scholarships require citizenship." [Female, 19, 4-year public] Notably, all of these participants lived in California with

inclusive policies such as the California Dream Act; nonetheless, many came from high poverty homes with pressing financial concerns. As one student stated:

> My state has the CA DREAM Act available to me. It has helped take away many financial burdens off my family's and my back. Before that, it was a big struggle to go to school because my parents were shouldering most of the cost for my school in addition to paying rent, utilities, and so on. [Female, 20, 4-year public].

These responses demonstrate that these students were not only worried about financing their education, and of not being a burden on their parent's finances; they also worried about contributing to their family's expenses and income. A 24-year old student attending a 2-year public community college described this concern: "I provide for my younger siblings' school supplies and clothes. I'm no longer their sister, I've become a second mom and when money is not enough, I have to place my school costs, including textbooks, as a second priority."

As a result, it was not surprising that nearly three-quarters of participants worked full-time or multiple jobs in low-wage menial positions that exacted a toll on their school productivity, engagement, and psychological wellbeing (10).

> [I worked] full time and attend school part-time since part-time tuition as all I was able to afford.… money has always been an issue. I attended community college first and then transferred out to a 4-year university, throughout this time I always had to depend on public transportation since I did not own a car. My body was always tired and felt heavy, I was mentally drained and suffered from depression. [Female, 27, 4-year public].

Despite attaining college status, just like their parents, undocumented students reported wage exploitation: "One of the challenges that…[I] face is the ability to pay for school. Finding a job is even more difficult. Having to raise a family on minimum wages almost seems impossible and sometimes doesn't seem worth it]." [Male, 20, 2-year public community college].

Notwithstanding multiple obstacles, these highly resilient students described how these impediments also served as motivation to help them succeed in spite of the odds. The participants' responses provide insights into their determination:

> Financially one has to work two jobs due to our family needs … That constant concern of helping your family and at the same time going to school is an obstacle, but the appreciation for our obstacles moves us forward to succeed. [Female, 23, 4-year public].

Deportation Worries

Another worry that participants vividly articulated was their concerns around deportation or detainment. Notably, in the California sample, concerns around detention was reported less frequently than in the nationwide sample, a probable reflection of these states' UndocuFriendly policies (10). For some, this fear was present on a sustained basis. As a student explained: "I fear being deported, I am living in fear every day I go to school and go to work." [Male, 18, 2-year public] Another wrote about their worries of not knowing who to trust: "Confiding with other people about my legal status. I don't because I fear if they ever get mad at me they could report me to border patrol." [Male, 28, 4-year public] Not surprisingly, these fears place undocumented students in a heightened state of alert: "I fear every day being pulled over by the police only to show no license and have to deal with the humiliation and legal ramification." [Male, 22, 4-year public].

We should note, that this data was collected prior to the 2016 election. At that time, interestingly, for students who were able to secure DACA, reports of worries about deportation of themselves plummeted; concurrently, however, the worries about deportation of close family members and loved ones went up (10). In a concise but telling response to the open-ended question about the greatest challenge of being an undocumented student, a respondent said: "[the biggest worry is] my family being separated because of our legal status." [Female, 23, 4-year public] Another, worried about, "receiving the phone call that nobody wants to receive, informing you that a family has been deported." [Male, 18, 4-year public] Some responses reflected practical concerns like: "I fear of my mother being deported, forcing me to leave school and take care of my siblings." [Male, 21, 4-year public] These fears are not simply imagined as noted in this quote: "I constantly worry... [and now] both my parents have an order of deportation." [Male, 20, 2-year public community college].

These quotes revealed the poignant, aching daily uncertainty that would have clear implications for generalized anxiety.

Potential Social Support/UndocuAllies

Undocumented Latinx, like many others, turn to social support as a form of coping (52). They often sought peers with a shared identity as a way to build a network to help them overcome the many emotional, academic, and social challenges they faced (72, 73).

Peer supports (and their limits)

The responses shed light on the role of peer supports that the quantitative findings were less sensitive in revealing. While some participants noted that their friends are the "only people that [they] can turn to" [Male, 20, 2-year public] others disclosed that they had difficulty finding support from undocumented peers, who "they can relate to." [Male, 26, 2-year public community college] One student explained why this may be the case: "We are too afraid to "come out of the shadows" I believe that if we all gathered the courage to come out and stick together we could get more help." [Female, 25, 2-year public community college].

Other students deliberately avoided developing a relationship with peers as they felt frightened and vulnerable by exposing themselves due to their legal status. As one student explained, [it is a challenge] "making friends because I fear they won't accept me for being here illegally in this country." [Female, 21, 4-year public].

Even when undocumented students had friends to confide in, some noted that their peers struggled to understand

the true limits of being undocumented. As one student eloquently explained:

> A challenge is not being able to talk to someone, a peer to be more specific, that understands my situation. Most of my friends are there for me, but since none of my close friends are undocumented, if anything in the subject comes up, they are not sure how to react and often my feelings go unacknowledged. [Female, 20, 2-year public].

Instructor supports (and their limits)

The quantitative findings suggest, that having an adult (instructor or staff) member in the college community helped served to attenuate undocumented student self-reported anxiety. The qualitative responses, however, reveal that despite the great need for supportive institutional agents (12, 72) undocumented students were wary of seeking such help and disclosing their status because professors did not always understand their needs. Indeed, student responses to the open-ended prompts revealed few examples of instructor support.

Instead, several examples of vulnerability in the classroom and on campus emerged in the responses, as noted by a student: "I don't know who I can look up too." [Male, 19, 2-year public community college] Many expressed concerns around to whom they could disclose or seek support. As a participant explained: "It is sometimes difficult to share your immigration status and people don't understand you, especially if those people are professors." [Female, 23, 4-year public].

> Another shared a similar sentiment of having difficulties connecting with instructors:
> While my college tries to be supportive, there exist institutional barriers that prevent me from doing well academically. I'm a math major which historically, is not an area of study that Latinos, People of color go into. It is difficult to find support and professors that understand what it's like to be Undocumented. [Female, 18, 4-year private].

Several students reported that it was disheartening when professors assume that all students in the classroom are documented during discussions, inadvertently making their undocumented students uncomfortable when talking about immigration issues, as revealed here:

> I face challenges from professors sometimes. In my sociology course, my professor singled me out because of my Mexican decent and asked for my take on deporting illegal immigrants to Mexico vs. keeping them here and watching our economy 'crumble.' It was extremely stressful. [Female, 20, 2-year public].

Others talked about the shame they felt around their undocumented status, blocking them from seeking out help: "It feels shameful asking for help because I don't feel 'worthy' of receiving it." This sense of stigmatization served as an impediment in their ability to open up and foster much needed supportive relationships. As this student went on to explain:

> The biggest challenge I face as an undocumented student is dealing with the stigma and preconceived notions people have of the undocumented community. I feel as if there are very few people I can turn to and confide in regarding my status. [Male, 23, 2-year public].

As such, many of our participants seemed to have difficulty finding guidance from faculty mentors to maneuver the anxieties of being undocumented.

Seeking (But Failing to Find) a Place to Belong

Many of the participants spoke about their disconnection from their peers, college campuses, and American society more broadly. Many responses reflected that these undocumented college students felt "rejected," "isolated" and simply did "not fit in."

For some of our participants, this seemed to be linked to their inability to relate to their documented peers. For example, a female 18-year-old attending a 4-year public institution stated that her "biggest issue is being accepted by other documented peers." Notably, undocumented students recognized that their inability to participate in "normal" societal milestones, such as the typical college experience, impacted their sense of belonging to American society, which has been noted by previous scholars (8, 74). For example, "being excluded from like studying abroad" [Male, 21, 4-year public], or not "finding internships to expand my abilities in my [field]" [Male, 22, 2-year community college] made them feel, unlike an "average student." A male 22-year old attending a 2-year public community college student poignantly spoke to this point:

> "The biggest stress factor is that I am basically American, I lived all my life here, I go to school here, work here but I'm not a citizen.…[and I am] challenged in everything I do as a college student."

Other students noted that Americans attitudes toward immigrants negatively impacted their sense of belonging in the U.S. As a 20-year-old male attending a 4-year private institution, reported, he perceived that "having people look at me as if I don't belong here [in the U.S]" was a primary influence to his stress.

Above all, the reminder that they can neither legally be here in the U.S nor become active members of society served to foster anxiety, frustration, uncertainty, and a sense of hopelessness among these participants. Some for example, feared their goals would never be achieved. Several spoke to concerns about whether their sacrifices were worth their efforts. As a female 25-year old attending a 4-year public institution explained, "[I] fear that earning a degree is a waste of time without obtaining legal status in this country." Another student described this similar sentiment saying he "Sometimes fe[lt] like giving up because I think to myself, why get an education if I may not be able to work in this country legally?" [Male, 25, 4-year public].

Other responses captured their frustration about the uncertainty about their future.

> Knowing that no matter how good I do on school, I might not be able to go to graduate school or have a job. I do not even qualify for DACA. Thus, after graduating I do not know what I am going to do. [Male, 19, 4-year public].

These statements (and many more like them) made by our participants, serve to show how these students are experiencing "worrying on a daily basis" and how this constant state of alert may be contributing to their elevated levels of anxiety.

DISCUSSION

An estimated quarter of a million undocumented college students attend our institutions of higher learning (22). These students face a highly stressful macrosystemic social context in which they face threats of deportation of themselves and their loved ones (11, 75) limited resources (54) liminality (76), and social disparagement and exclusion (74, 77). Previous rich qualitative studies have detailed both these students many challenges (11, 46, 52) as well as their resiliencies (73, 78) but, to date, given their relative invisibility across campuses and the hard to reach nature of this population, there is a limited survey data or sense of what might be the level or nature of some of their mental health challenges. Given the great stresses and uncertainties of life with which they must contend, it would be expected that they would report higher than average rates of anxiety. This study sought to provide insight into self-reported rates of anxiety in this population in comparison to a standardized norm population. We also hoped to provide a lens into the ways in which undocumented students described their challenges both to triangulate what we expected but also to reveal what we might have missed.

Not surprisingly, given the stresses, juggling acts, uncertainties, and liminality (33) these students described, nearly one-third of study participants reported moderate to severe levels of anxiety using a standardized measure to assess self-reports of generalized anxiety disorder. We found that 28% of Latinos and 35% of Latinas self-reported anxiety in the moderate to severe range above the cut-off score of 10; this rate is somewhat higher than findings conducted with a first-generation non-college Latinx population (7). The rates of self-reported anxiety for undocumented Latina students were 4 times that of the norm population; that of undocumented Latino students was 7 times higher as measured by the GAD-7 (68) in the moderate and severe ranges. We used a standardized and well-respected scale that has been established to be valid for use with Latinx in the U.S. (69) with a robust norming sample and a cut-off score of 10 with high sensitivity and specificity and as such can be quite confident that the self-reported anxiety levels are alarmingly high. While not a randomized sample (impossible to collect given the nature of this population) a contribution of this study is that we were able to collect a large sample of this hard to reach population across multiple campuses, providing some perspective on the issue. Further, the open-ended responses gave insight, succinctly stated in the quote of our title, describing what it is like to be an undocumented Latinx student: "waking up every day with the worry." In particular, ongoing anxiety fuels served to contribute to anxiety (28).

The gendered finding was both predictable and surprising. Consistent with an array of other populations, when comparing males to females, in the range above the recommended cut off score of 10 (moderate to high self-reported anxiety), Latinas in this sample reported higher levels than Latinos (7, 38, 39, 79, 80). On the other hand, in comparison to the norm sample, Latinx reported a stunning anxiety rate 7 times higher than the norm group. Undocumented males and females, however, reported general similar rates of anxiety to one another. This is likely linked to the unique characteristics of the undocumented population. Specifically, undocumented Latinos are more likely to be the targets of detainment and deportation (81), which is likely to contribute to their heightened anxiety. As such, undocumented males appear to be at significantly higher risk than males in the general population for anxiety.

The quantitative findings revealed that several factors contribute to self-reported anxiety. Interestingly, age played a significant role; the older the student, the lower the reports of experiencing anxiety symptoms. Perhaps the transition to adulthood for these students (82) along with the transition from the relatively protected status, offered by Plyer vs. Doe in K-12 schools exposed and created unsupported spaces of higher education (46), is particularly stressful in the initial years. Responses to the open-ended question shed light on the compromised aspirations that some of these young people struggled with as to make sense of their futures. These responses also provided a sense of the frustrations of being cut-off from the "typical" on-campus college student experience, which often compromised their belongingness (8, 74).

The quantitative findings revealed that financial concerns were the single greatest contribution to levels of anxiety. This finding was echoed in the qualitative findings where the majority of participants reported that their ability to pay for college with limited (if any) financial aid benefits. Even in the California context, with the California Dream Act which provides for some tuition relief for in-state tuition, many juggled long hours of work while trying to concurrently focus on their studies, adding to their stress (8, 10, 22). This left undocumented Latinx students vulnerable and concerned with regards to being able to pay for tuition as well as daily living expenses for themselves and often for their families as well. The qualitative analyses, additionally, revealed the ways in which these financial worries translated into a life of constant juggling of roles of work and studying. Students expressed not only a constant fear of not meeting the gapping financial needs (to pay for school and life) but also of dropping balls in meeting their academic responsibilities.

Further, the quantitative findings showed that concerns with deportation contributed to negative symptomatology. Interestingly, concerns with the deportation or detainment of family and friends explained even more of the variance than did concerns about their own detainment or deportation though that too contributed. Previous analyses have found that counterintuitively students with DACAmented status report higher rates of anxiety than their fully undocumented peers (22). While they may feel more secure about their own protections from deportation, they worry about having exposed their undocumented family members by providing extensive

residential and other personal information to immigration authorities in order to secure their own DACAmentation. They also reported bearing extra financial responsibilities as they sometimes were the only family member able to legally secure work (10). The qualitative findings shed light on the poignancy and the lived reality of these concerns. For some, there were practical worries of potentially assuming responsibility for siblings if a parent were deported. For others, the gnawing anxiety was around never knowing what might happen at any given moment.

In the quantitative analysis, we considered the potential for social supports from both peers and instructors to attenuate anxiety. We found that peer support failed to play a role in predicting the anxiety outcome; only a reported positive relationship with instructors had a positive effect on the anxiety outcome. The qualitative analyses provided some insights to help interpret these findings. While a few participants spoke of the importance of peers, anxiety around revealing status, shame, and feeling misunderstood, all served to interfere with reaching out to peers and making friends. As such, the limited social peer network upon which to drew their support, seemed to contribute to a sense of disconnection.

Notably, qualitative responses demonstrated that many undocumented students reported feeling like they did not belong (and in some cases were actively excluded) both from their college campus as well as to American society. Specifically, students reported that their inability to participate as an "average" college student and have access to a network of peers made them feel not included. This can be particularly concerning as these student's campus belonging has been established to be vital for an array of outcomes including academic self-efficacy, intrinsic motivation, as well as sense of social acceptance (83).

Participants also frequently expressed around feeling excluded from American society. And yet, "the need to belong is a powerful, fundamental, and extremely pervasive" social motivation (84) and human need (85). Humans are a social species who long to belong across a variety of domains including kinship groups, schools, places of work, as well as of course, in the nation-state (86). For members of stigmatized groups, however, a sense of social belonging is routinely compromised and at-risk (87) and is linked to its converse—social exclusion (86, 88, 89). We would argue, multiple forms of social exclusion, restrict not only access to resources but also can have negative implications for psychological wellbeing (8, 74).

The quantitative analyses revealed that social support provided by instructors served a buffering role for self-reported anxiety. The qualitative findings showed, however, that instructors were not always as sensitive as they could be in their interactions with their undocumented students or they simply did not understand their needs. Further, these students sometimes did not reach out as they felt shame and were uncertain who to trust. Previous analyses from this study, focusing on the open-ended question asking for advice to colleges to better serve these students, provided insights into tangible ways institutions could better support their students including providing safe spaces for them, training faculty and staff about undocumented student needs, providing up-to-date financial aid information, as well as providing culturally responsive counseling for them. Thus, this study builds on previous work adding insight into both the importance and gaps in social support for this population (73).

STUDY LIMITATIONS

The nature of this study renders population-based random sampling impossible. As such, as with all non-randomized samples, findings cannot be generalized. Students from 4-year colleges/universities are over-represented relative to community college students which are of concern as undocumented students are more likely to begin college in 2-year settings (54). The sample for this article was restricted to California, which is a particularly "UndocuFriendly" state affording more rights and benefits to the undocumented population relative to other states. We might expect that the stressors and anxiety levels may be even more elevated in other states (particularly "UndocuHostile" like Arizona, Georgia, or South Carolina). Further, this study was conducted prior to the current presidential administration which has placed additional burdens on this population by making anti-immigration sentiments a center of its platform (90, 91). Since then both deportations (92, 93) and "unabashed xenophobia" (94) have arisen, which are likely to be adding to anxieties for these students. As such, these findings are probably an under-count of current anxiety rates across the country for this population.

Other limitations should also be considered. Undocumented Latinx college students who were less engaged, distrusting and anxious are less likely to participate. It is likely that the students who participated in this study are amongst the most active and open about their status, and most connected to the undocumented community. Additionally, the survey was all self-reported and is subject to response bias, and did not include gender-inclusive terminology (i.e., "Latinx[2]" (95, 96). Lastly, resources allowing, more qualitative questions would have been included in the survey allowing for a richer interpretation.

Future studies should include more of a balance of quantitative and qualitative questions. Further, future research in this area should work to better understand the range of mental health problems (including depression, for example) faced by this population. Future studies should expand beyond Latinx with more diverse immigrant backgrounds and include age equivalent comparison samples.

CONCLUSION

This study has provided perspective not only on the potential prevalence of anxiety amongst undocumented Latinx college students but also what may be contributing to fuel these elevated states of anxiety. As these students now constitute an estimated 2% of our population, understanding their needs as they make this difficult transition is an important first step in serving them (22).

[2]The term *Latinx* has rapidly become a trend on the Internet, social media platforms and among research scholars. The term was developed to become a "gender-neutral label for Latino/a and Latin@... to disrupt traditional notions of inclusivity and shape institutional understanding of intersectionality" (95, p. 302).

An important, practical implication for institutions of higher education is to be more aware of the variety of challenges faced by their undocumented students. One of the biggest challenges faced by college campuses is their increase in psychological services. Just as their campuses are increasingly diverse with 20% being foreign-born or first-generation, the mental health needs of their student body are increasingly broad and multicultural (58). It is imperative that college counseling centers and college administration pay attention to this population and work together to develop programs to assist undocumented students in ways that may be more culturally sensitive and relevant.

DATA AVAILABILITY STATEMENT

The de-identified data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by The Institutional Review Board, of University of California, Los Angeles. The patients/participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable data included in this article.

AUTHOR CONTRIBUTIONS

CS-O was the PI for the study and was principally responsible for developing and piloting the survey and directing the research team for the research project. She was primarily responsible for writing the Introduction, Literature Review, Methods, and Discussion sections. GL was principally responsible for the writing of the Results section. All authors contributed to the article and approved the submitted version.

FUNDING

Funding for this study was provided by the Ford Foundation and an anonymous funder. Open access funding fees were covered through faculty research funds.

ACKNOWLEDGMENTS

The authors would like to acknowledge the Ford Foundation and a donor for their generous funding of this study. We also would like to thank members of the UndocuScholars research team who worked tirelessly to collect and analyze this data including particularly Cynthia Alcantar, Yuliana Garcia, Edwin Hernandez, and Dalal Katsiaficas.

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

frontiers in Psychiatry

ORIGINAL RESEARCH
published: 16 November 2020
doi: 10.3389/fpsyt.2020.574487

Facilitating Change in Drinking Cognitions and Behaviors Among Three Immigrant Generations of Latinx Youth Through a School-Based Intervention: Findings From a Multi-Site Clinical Trial

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: 19 June 2020
Accepted: 19 October 2020
Published: 16 November 2020

Citation:
Bacio GA, Garcia TA, Anderson KG, Brown SA and Myers MG (2020) Facilitating Change in Drinking Cognitions and Behaviors Among Three Immigrant Generations of Latinx Youth Through a School-Based Intervention: Findings From a Multi-Site Clinical Trial. Front. Psychiatry 11:574487. doi: 10.3389/fpsyt.2020.574487

Latinx youth experience disparities in the availability of and participation in evidence-based interventions to reduce hazardous alcohol use. The aim of this secondary data analysis was to examine whether Project Options, a brief, evidence-based alcohol use intervention was beneficial for Latinx participants. A total of 331 first-, second-, and third-generation immigrant Latina and Latino youth who participated in a multi-site, hybrid effectiveness/efficacy clinical trial of the intervention were selected for analyses. Mixed-effects growth models tested changes in drinking cognitions (i.e., perception of peer drinking, intention to drink next month, alcohol use and cessation expectancies) and behaviors (i.e., number of past-month drinking days, average number of drinks per occasion, and maximum number of drinks per occasion) across three time points (i.e., baseline, 4-weeks, and 12-weeks). Consistent with prior Project Options studies, participants with more drinking experience reported greater decreases in perception of peer drinking, intentions to drink next month, and all drinking behaviors than those with less experience. While no changes were observed in expectancies, first-generation participants endorsed lower positive use expectancies than second- and third-generation youth as well as more favorable cessation expectancies than third-generation teens. In concert with prior studies demonstrating the intervention's success in recruitment and retention of Latinx participants, results suggest that Project Options might be a promising school-based intervention for Latinx youth. This intervention has the potential to reach adolescents who might otherwise not participate in traditional programming and help decrease disparities in availability of evidence-based practices for Latinx youth.

Keywords: Latinx adolescents, alcohol expectancies, immigrant generation, adolescent alcohol use, alcohol cessation expectancies, alcohol use intervention, school-based intervention

INTRODUCTION

Latinx[1] youth are currently the largest ethnic group under the age of 18 in the United States (U.S.), and by 2060 they will account for 31.9% of all underage children, representing one of the fastest growing groups in the country (1). The rapid growth of Latinx youth only makes addressing the health disparities they face in the transition to adulthood even more pressing. For instance, while using alcohol and other substances is normative during adolescence [e.g., (2)], Latinx youth are at greater risk than their White counterparts to experience negative consequences (3, 4), less likely to have intervention services available (5), and less likely to complete treatment when enrolled (6). Thus, delivering evidence-based, culturally-responsive interventions for Latinx youth to address these disparities in service availability and utilization is a significant public health issue.

The disparities in alcohol use and related consequences among Latinx youth are exacerbated by a dearth of culturally-responsive, evidence-based interventions (EBIs) and compounded by low service utilization. Given the high need for intervention services and the many barriers to treatment faced by Latinx youth [e.g., cost, transportation, time; (7)], additional consideration has been given to programming accessibility or *reach*. Since attending school is compulsory for underage youth in the U.S., this setting offers an opportunity to reach Latinx youth that might otherwise not participate in traditional services. Furthermore, school-based interventions might be particularly apt to address key risk factors for underage drinking as schooling plays a significant role in socializing youth to peer norms (8, 9).

When and to what degree to adapt interventions for specific ethnocultural groups to increase EBIs' cultural responsiveness remains an ongoing discussion in intervention science. Several frameworks have been proposed to guide cultural adaptations that maintain fidelity to the EBI while improving ethnocultural fit [e.g., (10–13)]. While these frameworks provide valuable guidance in settings where a specific ethnocultural group can be easily targeted for intervention, the continuously changing ethnic composition of schools within districts and across geographical regions of the country complicates the implementation of culturally-responsive EBIs in a school setting.

Project Options is a brief, voluntary, cognitive-behavioral intervention, based on the premise of motivated, guided self-change that incorporates social cognitive components and developmental considerations important for adolescents. The model focuses on de-escalation of alcohol involvement and is grounded in a cognitive, social information processing approach (14). In this model, youth choose to reduce or stop drinking based on both distal and proximal cognitive and emotional factors. Targets for intervention include cognitive appraisal (e.g., perceived drinking norms; perceived prevalence of peer drinking behaviors) and evaluation processes (e.g., alcohol expectancies; beliefs about the effects of drinking alcohol), as well as improving skills that help youth manage deliberate and automatic-contextual temptations to drink (14–16). Project Options is adapted to the local context of each high school with the purpose of enhancing engagement across ethnic groups, genders, and levels of use but not specifically adapted to any particular ethnocultural group.

Efficacy studies demonstrated that Project Options attracts a diverse sample of youth (16, 17), that greater student participation in the program leads to higher levels of participant satisfaction (18), and that it facilitates youth change attempts in high frequency drinkers (14, 16, 17, 19). However, prior studies did not examine whether Project Options was effective for specific ethnocultural sub-groups.

Initial evaluations of a multi-site efficacy-effectiveness hybrid clinical trial of Project Options tested in three geographically and culturally different areas in the U.S. (i.e., Miami, FL, Minneapolis, MN, and Portland, OR) show that it is a promising EBI for Latinx youth. Specifically, a study of the intervention's voluntary recruitment and engagement strategies at each site demonstrated that participants more or less reflected the demographics of their corresponding school and that students who identified as African-American or Black where more likely to participate in the intervention than students of other ethnicities (20). Indeed, after attending one session, 79% of all participants were likely to voluntarily return to at least one more group. Similarly, an examination of the role of group ethnic diversity in therapeutic group processes among those in the motivational enhancement condition revealed that participants and interventionists in groups where the majority of participants (66% or higher) were African-American/Black or Latinx reported greater satisfaction and expressed more empathy than groups with non-Latinx white majorities (21). These findings suggest that the multi-site clinical trial showed promise for voluntarily attracting, retaining, and engaging Latinx youth in group content and positive therapeutic processes. However, it is currently unknown whether Project Options changed drinking cognitions (i.e., internalized thoughts and beliefs about alcohol use such as perceived prevalence of drinking among peers and the effects of drinking) and behaviors among Latinx participants.

Immigrant generation and gender are two important factors associated with alcohol use patterns and consequences among Latinx youth. Recent data indicate that 38% of the Latinx community are first-generation immigrants and only 34% are second-generation immigrant (U.S.-born of parents born in Latin America), while 28% are third-and-later generation immigrant [U.S.-born youth of Latin American ancestry whose parents are U.S.-born; (22)]. First-generation Latinx youth have been found to be less likely to start drinking in adolescence than their second-generation (23, 24) and third-and-later generation counterparts (23). Once first-generation youth begin drinking, they seem to drink at the same rate as second generation teens, but first- and second-generation youth report less problematic drinking than their third-and-later generation counterparts (23). These findings are consistent with the immigrant paradox [e.g., (25–27)], the pattern wherein first-generation immigrants seem to have more positive health outcomes than later generations despite the fact that immigrants experience multiple stressors before, during, and after immigrating to the U.S. (28).

[1]We use "Latinx" as a gender inclusive term that encompasses gender binary and non-binary individuals. We use "Latino" for findings specific to boys/men and "Latina" for findings specific to girls/women.

Several hypotheses have been proposed to explain the immigrant paradox in adolescent drinking among Latinx youth. The acculturative stress hypothesis posits that the strain encountered by Latinx youth as they encounter challenges in adapting to mainstream U.S. culture may elicit a maladaptive stress response such as drinking alcohol [e.g., (29)]. Some have proposed that the loss of protective Latinx cultural practices across generations such as *familismo* [i.e., a sense of obligation to, deriving support from, and acting in reference to the family; (30)] and parental monitoring help explain the increased drinking behaviors among second- and later-generations compared to first-generation youth [e.g., (29, 31–33)]. Others have suggested that youth environments in the U.S. are risky and that increased exposure to risky behaviors and norms explains the immigrant paradox through factors such as association with deviant peers [e.g., (34–36)]. Studies that have tested multiple explanatory hypotheses simultaneously have shown that both the increased association with substance-using peers across generations (23) and perceptions of peer drinking prevalence (24) help explain the increased likelihood of drinking initiation among U.S.-born youth compared to their first-generation counterparts. In addition, the simultaneous generational decrease in family cohesion and increase in association with substance-using peers contribute to the exacerbation of problematic drinking observed among third- compared to second- and first-generation youth (23). Lastly, alcohol cognitions are linked to observed generational differences. For example, second-generation Latinx youth were found more likely to evaluate negative alcohol expectancies (i.e., beliefs about negative effects of alcohol; "If I drink, I will be more clumsy") as "good"/desirable compared to first-generation youth. This difference in cognitions contributed to the finding that second-generation teens were more likely to initiate drinking in adolescence than were first-generation youth. Nevertheless, research to date does not identify a single explanation of the immigrant paradox in Latinx adolescent drinking. Rather, it seems that the mechanisms underlying this pattern are multidimensional and complex, often representing culture change processes at the adolescent, peer, family, and other ecodevelopmental levels (37). Less is known about whether generational differences are also observed in the context of intervention or treatment services aimed at reducing hazardous alcohol use.

Recent epidemiological studies have shown that Latinas are outpacing their Latino counterparts in some measures of alcohol use (38). For example, lifetime, current, and binge drinking is higher among Latinas compared to Latinos (38). This is troubling given that traditional Latinx households may hold stronger sanctions against alcohol use by girls than boys (39, 40). Few studies have examined how patterns of use by gender change across immigrant generational status (41, 42). However, there is some evidence to suggest that exposure to risky environments may have more influence on alcohol use behaviors for Latina than Latino teens. For example, Marsiglia et al. (43) showed that as Latinx students became more fluent in English, they were more likely to endorse pro-drug norms and, in turn, greater intentions for future use. These associations were observed among boys and girls, however, the mediating effect of pro-drug norms was stronger for Latinas than Latinos. Accordingly, some authors suggest that decreased parental monitoring and drinking restrictions for girls associated with longer time in the U.S., places Latinas at risk for negative drinking outcomes (44). At this time more research is needed to elucidate the mechanisms underlying the observed recent increases in alcohol use among Latinas compared to Latinos (38) and to ascertain whether the immigrant paradox might differ by gender. Differences by immigrant generation and gender on intervention provision and outcomes among Latinx youth have received even less attention.

While the literature has demonstrated the importance of drinking cognitions for understanding drinking behaviors, this area remains understudied among Latinx youth. Alcohol expectancies are cognitions that individuals develop regarding the probabilistic anticipatory effects of alcohol use that influence initiation and continued use of alcohol (e.g., people act like better friends after a few drinks of alcohol) (45, 46). The scant studies on Latinx youth replicate findings on general adolescent populations indicating that positive alcohol expectancies (expectation of positive outcomes from drinking) predict alcohol use (47–49). Even less is known about generational or gender differences in alcohol use expectancies among this group. Results from one study indicated that there might not be differences in positive or negative expectancies (expectations of poor outcomes from drinking) between first- and second-generation immigrants (24).

Among youth broadly, alcohol cessation expectancies, or expectancies about the consequences of stopping drinking or decreasing alcohol intake (50), are associated with lower rates of alcohol initiation among non-drinkers (51). Among drinkers, positive cessation expectancies predict less alcohol consumption and alcohol-related problems (50, 52). Research on cessation expectancies among Latinx adolescents is almost non-existent. One cross-cultural study found that Latinx students reported more peer-social and positive global cessation expectancies compared to the other ethnic groups (50).

Perceptions of peer alcohol use and intention to drink in the future are also important cognitions associated with concurrent and future alcohol use among adolescents. Peer perception of use is strongly associated with youth alcohol use over and above actual peer use (53, 54). Studies among Latinx youth indicate that second-generation adolescents endorse higher perception of peer use than their first-generation counterparts (24, 35). Importantly, these studies also demonstrated that this generational difference in perception of peer use mediated the relationship between immigrant generation and substance use. Further, intention to drink in the future captures motivation for actual behavioral change (14). While there are few studies that examine intentions among Latinx youth, drinking intentions have been found to prospectively predict alcohol use among primarily first-generation immigrant adolescents (39) and adolescents who identified as Mexican or Mexican American (55). More studies are needed to understand how these cognitions may differ by gender across immigrant generation.

The Current Study

Evidence-based interventions aimed at reducing progression to hazardous alcohol use delivered in schools represent a

promising avenue to reach underserved at-risk youth groups, including Latinx adolescents. While interventions adapted to the needs of specific ethnocultural groups are effective and, in some contexts, most appropriate (10, 13, 56), adapting school-based interventions for one ethnocultural youth group is not always indicated [e.g., (12)] or feasible given the diversity of student bodies. On the other hand, EBIs open to students regardless of ethnic background and experience with alcohol may be advantageous in reaching wide numbers of students. Project Options was developmentally tailored to the needs of adolescents, taking into consideration empirical findings regarding self-change processes and correlates of treatment efficacy. Preliminary studies suggest that Project Options successfully engaged Latinx youth across schools that differed in ethnic diversity and composition (20) and demonstrated positive group therapeutic processes for this ethnic group (21).

The purpose of this study was to conduct a secondary data analysis of the Project Options multi-site clinical hybrid efficacy/effectiveness trial to examine whether it is beneficial for Latinx youth. Consistent with the theoretical cognitive, social information processing model of the intervention, we examined changes across three time points (baseline, 4-weeks, and 12-weeks post-first session) in drinking cognitions (perception of peer drinking norms, alcohol use expectancies, alcohol cessation expectancies, and intention to drink) and drinking behaviors (past month drinking days, average number of drinks, and maximum number of drinks). Given findings from the initial Project Options trial (16), drinking experience was expected to moderate the changes in drinking cognitions and behaviors. Based on etiological studies of drinking patterns among Latinx youth, it was expected there would be differences at baseline in drinking cognitions and behaviors based on immigrant generation. First-generation participants were expected to evidence less positive alcohol expectancies, to view cessation expectancies more favorably, and perceive peer use to be less prevalent than second- and third-generation participants; differences between second- and third-generation youth were explored. Given recent trends in alcohol use by gender, it was expected that, at baseline, Latina participants would endorse riskier drinking cognitions and a higher number of drinking days and average number of drinks per drinking episode compared to their Latino counterparts.

Findings from this study will help determine whether Project Options, an EBI developmentally adapted to school settings, but not to specific ethnocultural groups, affects changes in drinking cognitions and behaviors among Latinx youth attending sociodemographically diverse schools. Further, this study contributes to the field's discussion of when to culturally adapt EBIs to enhance engagement and treatment effectiveness for Latinx youth.

METHODS

Participants

A total of 460 Latinx students (39.42% of all participants) self-selected into Project Options, a voluntary, developmentally tailored, school-based, cognitive-behavioral intervention to reduce alcohol use (14, 16). The intervention was open to all students across eleven schools in Miami, FL, Minneapolis, MN, and Portland, OR between 2013 and 2016. Students were randomized to either a motivational enhancement (ME) delivery style or a didactic approach at a ratio of 3:1. For this study, a total of 331 Latinx participants for whom we collected immigrant generation data were selected for analysis (72% of Latinx sample). All participants completed a baseline assessment immediately prior to participating in the intervention, 80.36% completed a 4-week follow-up assessment (days: $M = 29.43$, $SD = 4.78$) and 66.77% participants completed a 12-week follow-up assessment (days: $M = 86.76$, $SD = 5.89$). Consistent with the overall demographics of each site, 80.05% of the analytic sample participated in Miami, 11.62% participated in Minneapolis, and 8.33% participated in Portland. Across sites, 65.65% of Latinx participants identified as girls. Approximately 29.31% were first-generation immigrant (i.e., immigrated to the U.S.), 50.45% were second-generation immigrant (i.e., U.S.-born of immigrant parents), and 20.24% were third generation (i.e., U.S.-born with one or two U.S.-born parents). Participants were 16.23 ($SD = 1.44$) years old on average. **Table 1** illustrates participant demographics and key characteristics by immigrant generation.

Procedure

All high schools, respective school districts, and Institutional Review Boards approved procedures at each site. Information about Project Options was disseminated to students, parents, and teachers through flyers, posters, recurrent student newspaper ads, classroom and parent presentations, school websites, and newsletters. Advertisements were tailored to each school to appeal to students with different levels of alcohol experience and diverse backgrounds. Project Options was offered during lunch twice per week at each school by interventionists not affiliated with the schools to reduce impact on instructional time and maximize reach.

Based on prior adolescent self-change alcohol intervention research (16), Project Options protocol covered six topics: Perceived vs. Actual Alcohol Use Norms, Expectancy Effects/Balanced Placebo Studies, Managing Common & Uncommon Stress, Your Decisions/Consequences, Alternative Ways to Have Fun, and Communicating in Tough Situations. Participants could attend any session in no specific order regardless of drinking experience, up to six sessions. The specific language and style of materials were adapted to each site through focus groups. All interventionists were trained by Motivational Interviewing Network Trainers (MINT-certified) to deliver the intervention and supervised by a licensed clinical psychologist at each site.

The hybrid efficacy-effectiveness trial included two conditions with identical content, incentives, and length of session, but differed in *method* of content delivery: 1. A standard implementation of Project Options, including cognitive-behavioral skills building delivered in a motivational-enhancement, interactive, and collaborative style [ME; (16)], and 2. A didactic presentation of the same content wherein the cognitive-behavioral components were presented with

TABLE 1 | Demographic characteristics by immigrant generation.

	Overall *n* (%)/M(*SD*)	First generation *n* (%)/M(*SD*)	Second generation *n* (%)/M(*SD*)	Third generation *n* (%)/M(*SD*)
Total	*N* = 331	97 (29.31%)	167 (50.45%)	67 (20.24%)
Gender				
Girls	216 (65.65%)	65 (30.09%)	109 (50.46%)	42 (19.44%)
Boys	113 (34.35%)	31 (27.43%)	57 (50.44%)	25 (22.12%)
Age	16.23 (1.44)	16.05 (1.54)	16.25 (1.39)	16.46 (1.41)
Grade				
9th Grade	75 (22.87%)	28 (37.33%)	33 (44.00%)	14 (18.67%)
10th Grade	61 (18.60%)	18 (29.51%)	33 (54.10%)	10 (16.39%)
11th Grade	71 (21.65%)	20 (28.17%)	35 (49.30%)	16 (22.54%)
12th Grade	121 (36.89%)	29 (23.97%)	66 (54.55%)	26 (21.49%)
Country of ancestry[e]				
Caribbean[a]	120 (36.36%)	54 (45.00%)	66 (55.00%)	0
Central America[b]	31 (9.39%)	12 (38.71%)	19 (61.29%)	0
North America[c]	62 (18.72%)	5 (8.06%)	14 (22.58%)	43 (69.35%)
South America[d]	46 (13.94%)	26 (56.52%)	20 (43.48%)	0
More than one country	71 (21.52%)	0	47 (66.20%)	24 (33.80%)
Assessments				
4-week follow-up	266 (80.36%)	88 (90.72%)	127 (76.05%)	51 (76.12%)
12-week follow-up	221 (66.76%)	66 (68.09%)	113 (67.66%)	42 (62.69%)
Total number of sessions	3.52 (1.84)	3.95 (1.62)	3.25 (1.90)	3.54(1.90)
Lifetime drinking experience				
0 Drinks	100 (30.40%)	36 (37.11%)	43 (25.90%)	21 (31.82%)
1–5 Drinks	118 (35.87%)	34 (35.05%)	63 (37.95%)	21 (31.82%)
6–20 Drinks	54 (16.41%)	11 (11.34%)	32 (19.28%)	11 (16.67%)
21+ Drinks	57 (17.33%)	16 (16.49%)	28 (16.87%)	13 (19.70%)

[a]*Countries reported: Cuba, Dominican Republic, Puerto Rico.*
[b]*Countries reported: Costa Rica, Guatemala, El Salvador, Honduras, Nicaragua, Panama.*
[c]*Countries reported: Mexico, United States.*
[d]*Countries reported: Argentina, Bolivia, Chile, Colombia, Ecuador, Venezuela, Peru.*
[e]*Country of ancestry reflects either the participants' or the participants' parents' country of birth.*

limited interaction between students and where interventionists assumed a conventional expert/teacher role (57).

Students with parental consent self-selected into Project Options voluntarily. Participants determined the frequency with which they attended sessions independently and received free lunch (i.e., pizza) during session. Participants completed three assessments: immediately before their first session, ∼4 weeks post-initial assessment, and 12 weeks post-initial assessment. All participants received a $5 gift card of their choice after the baseline assessment, a $10 gift card for their 4-week assessment, and a $15 gift card for their 12-week assessment.

Measures

Demographics and Individual Characteristics at Baseline

Table 1 shows individual characteristics by immigrant generation.

Demographics

Participants endorsed whether or not they identified as Hispanic/Latino/a, and as a boy or girl (65.65%). Participants also reported their age (M = 16.23, SD = 1.44) and grade (9th = 22.87%, 10th = 18.60%, 11th = 21.65%, and 12th = 36.89%).

Immigrant generation

Participants wrote in the country in which they were born and the country in which their parents were born. All participants who reported having been born in a Latin American country were categorized as first-generation immigrants (29.31%). Those who were born in the U.S. and whose parents were born in Latin America were classified as second-generation immigrant (50.45%) while U.S.-born participants who reported that one or both of their parents were U.S.-born were categorized as third-generation immigrant (20.24%).

Lifetime drinking experience

Participants approximated the total number of times they drank alcohol over their lifetime by choosing: 0, 1–2, 3–5, 6–10, 11–20, 21–50, 51–100, and over 100. Due to the distribution of this variable, lifetime drinking categories were combined as follows: 0 (30.40%), 1–5 (35.87%), 6–20 (16.41%), and 21 or more (17.33%).

Number of sessions attended
The total number of sessions attended was calculated for each participant and ranged from 1 to 6 ($M = 3.52$, $SD = 1.84$).

Drinking Cognitions

Table 2 describes cognitive outcomes by immigrant generation at baseline assessment and **Table 3** illustrates correlations among drinking cognitions and behaviors.

Perceived peer norms of alcohol use
Participants reported the percent of students in their grade they thought drank alcohol in the past month on a range from 0 to 100 (58).

Alcohol use expectancies
Anticipated expectancies of drinking alcohol (i.e., beliefs about the effects of alcohol) were assessed with two items (59): "Parties are not as much fun if people are drinking alcohol" and "People act like better friends after a few drinks of alcohol." Participants rated each statement on a 5-point scale ranging from 1 "Strongly Disagree" to 5 "Strongly Agree." Answers to these statements were averaged to calculate an alcohol expectancies score.

Alcohol cessation expectancies
Anticipated effects of cutting down or quitting alcohol use were assessed with two items (60): "The future would be" and "Fitting in with others would be" if someone their age would cut down or stop drinking alcohol. Participants rated each statement on 5-point scale ranging from "A lot worse" to "A lot better." A cessation expectancies score was calculated by averaging these 2 ratings.

Intention to drink
Participants reported their intention to drink next month on a 5-point scale ranging from 1 (Definitely Not Drink) to 5 (Definitely Will Drink). Due to the distribution of responses, those who endorsed that they would definitely drink were compared to all other categories combined.

Drinking Behaviors

Table 2 illustrates descriptive statistics for drinking behaviors by immigrant generation at baseline assessment and **Table 3** shows correlations among drinking cognitions and behaviors.

Drinking behaviors in the past month
Items were adapted from the Monitoring the Future Survey (61) to assess current alcohol involvement at each assessment point (i.e., during the 30 days prior to assessment). Participants reported the number of days they drank at least one drink of alcohol, the average number of drinks they had on the days they drank, and the maximum number of drinks they had on any drinking day.

Analytic Plan

Mixed-effects growth models were used for all analyses to account for the nesting of repeated observations within participants (i.e., baseline assessment, 4-week follow up, and 12-week follow up). Analyses were conducted as intent-to-treat (i.e., all participants were included regardless of whether they had completed any follow up assessment). All participants regardless of drinking experience were included in all models. We accounted for the overdispersion of zeroes in drinking outcomes by using negative binomial mixed growth models. All likelihood ratio χ^2 tests comparing negative binomial models to Poisson models were significant, indicating that the negative binomial models provided better estimates. We used mixed growth models to test changes in alcohol use and cessation expectancies as well as peer perception of alcohol use and logistic mixed growth models to test intention to drink next month. Based on prior findings of the intervention's effectiveness for risky drinkers (16), we examined whether lifetime drinking experience moderated intervention effects by testing an interaction between lifetime drinking experience by follow-up assessment.

Randomization of treatment condition (i.e., ME vs. didactic) was completed at the school level; schools served as their own control (i.e., treatment condition was switched within schools after a washout period). Since Project Options was not adapted to any ethnocultural group and open to everyone regardless of drinking experience, some sites had uneven distributions of Latinx participants at each lifetime drinking level. For these reasons, we were unable to nest models

TABLE 2 | Descriptive statistics at baseline by immigrant generation.

	Overall %/M(SD)	First generation %/M(SD)	Second generation %/M(SD)	Third generation %/M(SD)
Drinking cognitions				
Perception of peer drinking	57.67%	48.66%	61.12%	62.04%
Alcohol expectancies	1.56 (0.97)	1.38 (1.05)	1.55 (0.96)	1.84 (0.85)
Cessation expectancies	2.85 (0.74)	3.01 (0.72)	2.80 (0.77)	2.75 (0.67)
Intention to drink next month	12.84%	7.45%	13.86%	17.86%
Drinking outcomes				
Number of drinking days	1.39 (3.93)	1.26 (3.93)	1.53 (3.31)	1.21 (2.46)
Average number of drinks per drinking episode	1.36 (3.88)	0.79 (1.56)	1.74 (5.14)	1.23 (2.12)
Maximum number of drinks per drinking episode	2.23 (5.16)	1.75 (4.63)	2.58 (5.87)	2.06 (3.78)

TABLE 3 | Correlations among drinking cognitions and behaviors.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
DRINKING COGNITIONS																				
Perception of peer drinking																				
1. Baseline	–																			
2. 4-week follow-up	0.18**	–																		
3. 12-week follow-up	0.16**	0.42**	–																	
Alcohol expectancies																				
4. Baseline	0.05	−0.05	−0.03	–																
5. 4-week follow-up	0.03	−0.04	0.01	0.36**	–															
6. 12-week follow-up	0.06	0.05	0.06	0.35**	0.37**	–														
Cessation expectancies																				
7. Baseline	0.01	0.07	0.02	−0.13**	−0.07	−0.14*	–													
8. 4-week follow-up	0.06	0.11	0.08	−0.13*	−0.02	−0.02	0.40**	–												
9. 12-week follow-up	−0.07	0.02	−0.13*	−0.10	−0.22**	−0.08	0.35**	0.46**	–											
Intention to drink																				
10. Baseline	0.01	−0.02	0.07	0.06	0.07	0.03	−0.13**	−0.11	−0.22**	–										
11. 4-week follow-up	−0.02	−0.01	0.07	0.11*	0.15*	0.04	−0.09	−0.14*	−0.12	0.53**	–									
12. 12-week follow-up	0.05	−0.06	−0.01	0.03	0.10	−0.01	−0.03	−0.05	−0.05	0.38**	0.39**	–								
DRINKING OUTCOMES[a]																				
Number of drinking days																				
13. Baseline	0.13**	0.08	<0.00	0.04	0.07	<0.00	−0.16**	−0.22**	−0.16**	0.37**	0.27**	0.21**	–							
14. 4-week follow-up	0.09	0.10	0.14*	0.10	0.14*	0.09	−0.12*	−0.22**	−0.21**	0.44**	0.39**	0.29**	0.46**	–						
15. 12-week follow-up	0.06	0.11	0.13*	0.12	0.12	0.05	−0.01	−0.24**	−0.15*	0.36**	0.34**	0.26**	0.27**	0.43**	–					
Average number of drinks																				
16. Baseline	0.07	0.11*	0.03	0.02	0.04	<0.00	−0.05	−0.20**	−0.11	0.18**	0.12*	0.19**	0.43**	0.25**	0.15*	–				
17. 4-week follow-up	0.10	0.03	0.05	0.06	0.10	0.12	−0.03	−0.18**	−0.16*	0.27**	0.28**	0.32**	0.32**	0.59**	0.34**	0.32**	–			
18. 12-week follow-up	0.06	0.08	0.10*	0.03	0.09	<0.00	−0.03	−0.22**	−0.20**	0.31**	0.28**	0.33**	0.35**	0.50**	0.61**	0.26**	0.43**	–		
Maximum number of drinks																				
19. Baseline	0.11*	0.10	0.09	0.03	0.02	0.01	−0.08	−0.16**	−0.11	0.25**	0.15**	0.29**	0.53**	0.29**	0.19**	0.82**	0.33**	0.26**	–	
20. 4-week follow-up	0.11	0.05	0.07	0.08	0.15**	0.12	−0.07	−0.18**	−0.18**	0.31**	0.29**	0.33**	0.42**	0.61**	0.34**	0.41**	0.91**	0.43**	0.44**	–
21. 12-week follow-up	0.05	0.09	0.13*	0.11	0.12	<0.00	−0.01	−0.22**	−0.20**	0.36**	0.41**	0.36**	0.36**	0.52**	0.76**	0.22**	0.47**	0.88**	0.25**	0.47**

*$p < 0.05$, **$p < 0.01$.

[a] *Drinking outcomes were measured 30 days prior to assessment point.*

at the site or school level. To account for nesting by site, we included site as a covariate in each model. Time was modeled as the number of days since baseline. All models included participant gender, immigrant generation, lifetime drinking experience, total number of sessions attended, delivery style (ME vs. didactic), site, and time since baseline, and these were modeled as Level 1 fixed effects. Observations nested within participants were modeled as Level 2 fixed effects. Modified sandwich variance estimators were used in all models to account for non-normality and non-independence of observations by participants (62–64). Analyses were conducted using Stata 15.

RESULTS

Drinking Cognitions

Perceived Prevalence of Peer Drinking

The linear growth model testing changes in perceived percentage of peer drinking was significant [Wald $\chi^2(14) = 170.30$, $p < 0.001$]. The interaction between lifetime drinking experience and follow-up assessments was significant [$\chi^2(3) = 18.84$, $p < 0.001$]. Compared to non-drinkers at baseline, those in the 1–5 ($b = -0.195$, $p < 0.001$), 6–20 ($b = -0.191$, $p = 0.002$), and 21 or more ($b = -0.150$, $p = 0.007$) categories reported greater decreases in perceived prevalence of peer drinking. In addition, the main effects of total number of sessions attended ($b = -1.46$, $p = 0.030$) and gender ($b = -5.68$, $p = 0.027$) were significant. That is, attending more sessions decreased the perceived prevalence of peer drinking. Similarly, boys endorsed lower levels of perceived prevalence of peer drinking, on average, than girls. The main effects of condition, site, and immigrant generation were not significant.

Alcohol Expectancies

Though the model testing the interaction between baseline lifetime drinking experience and assessments in predicting alcohol expectancies was significant, the interaction was not; therefore, the main effect model is presented [Wald $\chi^2(11) = 32.01$, $p = 0.001$]. Lifetime drinking experience [$\chi^2(3) = 10.02$, $p = 0.018$], immigrant generation [$\chi^2(2) = 7.96$, $p = 0.019$], and site [$\chi^2(2) = 7.62$, $p = 0.022$] independently predicted alcohol expectancies. Specifically, those who reported 6–20 ($b = 0.378$, $p = 0.003$) and 21 or more ($b = 0.028$, $p = 0.029$) drinks endorsed more positive alcohol expectancies compared to non-drinkers; no significant differences were found in any other comparisons. Participants in Minneapolis reported more positive alcohol expectancies compared to those in Miami ($b = 0.447$, $p = 0.006$), and there were no site differences between Portland and the other two sites. First-generation participants reported lower positive alcohol expectancies than their second- ($b = 0.25$, $p = 0.014$) and third-generation counterparts ($b = 0.313$, $p = 0.012$), while there were no differences between second- and third-generation participants. Condition, number of attended sessions, assessment time point, and gender did not have main effects on alcohol expectancies.

Cessation Expectancies

The model testing the interaction of lifetime drinking experience and assessment time point in predicting cessation expectancies was significant, but the interaction was not, therefore, the main effects model is presented [Wald $\chi^2(11) = 52.55$, $p < 0.001$]. Lifetime drinking experience [$\chi^2(3) = 17.36$, $p = 0.001$], condition ($b = 0.313$, $p = 0.012$), and generation ($\chi^2(2) = 10.27$, $p = 0.006$) had significant main effects on cessation expectancies. Those who reported 21 or more drinks at baseline endorsed more negative cessation expectancies compared to non-drinkers ($b = -0.426$, $p < 0.001$). There were no differences between those in the 1–5 and 6–20 categories compared to non-drinkers, respectively. Similarly, those randomized to the ME condition reported worse cessation expectancies ($b = -0.252$, $p = 0.002$). While third generation immigrants endorsed worse cessation expectancies compared to their first generation counterparts ($b = -0.301$, $p = 0.001$), there were no differences between third- and second- as well as first- and second-generation immigrants. Site, assessment time point, total number of sessions, and gender had no main effects on cessation expectancies.

Intention to Drink

The model examining intentions to drink next month was statistically significant [Wald $\chi^2(14) = 45.44$, $p < 0.001$]. The interaction between lifetime drinking experience and assessment time point was significant [$\chi^2(3) = 13.96$, $p = 0.003$]. Compared to non-drinkers at baseline, intention changes between those in the 1–5 lifetime drinks category ($b = 0.962$, $p = 0.003$) and those in the 21 or more lifetime drinks category ($b = 0.968$, $p = 0.015$) were significantly different. Similarly, the rate of change in intentions to drink next month was significantly different between those in the 6–20 baseline lifetime drinks category and those in the 1–5 drinks category ($b = 1.03$, $p = 0.002$) and between those in the 6–10 category and those who reported 21 or more drinks at baseline ($b = 0.969$, $p = 0.013$). The main effects of condition, total number of attended sessions, site, gender, and immigrant generation on intention to drink next month were not significant.

Drinking Behaviors in the Past Month

Number of Drinking Days

The negative binomial growth model testing changes in number of drinking days in the past month was statistically significant [Wald $\chi^2(14) = 223.52$, $p < 0.001$]. The interaction between lifetime drinking experience and assessment time point was significant [$\chi^2(3) = 20.97$, $p < 0.001$]. There were significant differences in the rate of change in number of drinking days between those in the 1–5 ($IRR = 0.979$, $p = 0.013$), 6–20 ($IRR = 0.973$, $p = 0.001$), and 21 or more drinks ($IRR = 0.968$, $p < 0.001$) categories compared to non-drinkers. Similarly, the rates of change between those in the 21 or more drinks and those in the 1–5 category ($IRR = 0.989$, $p = 0.025$) were significantly different. The main effects of condition, site, total number of attended sessions, gender, and generation were not significant.

Average Number of Drinks per Drinking Episode

The negative binomial growth model that examined changes in average number of drinks per drinking occasion was significant [$\chi^2(14) = 146.17$, $p < 0.001$]. The interaction between drinking experience and assessment time point was significant [$\chi^2(3) = 17.62$, $p = 0.001$]. Compared to non-drinkers, the rates of change in average number of drinks per drinking occasion were significantly different by those who reported 1–5 ($IRR = 0.975$, $p = 0.008$), 6–20 ($IRR = 0.970$, $p = 0.001$), and 21 or more ($b = 0.969$, $p < 0.001$) drinks at baseline. Condition had a main effect on average number of drinks such that those randomized to the ME approach reported a rate of average number of drinks 1.757 times greater than those in the didactive condition ($z = 2.17$, $p = 0.030$). Site, total number of attended sessions, gender, and generation did not have significant main effects of average number of drinks per occasion reported by participants.

Maximum Number of Drinks per Occasion

The negative binomial growth model that tested changes in maximum number of drinks per occasion was significant [$\chi^2(14) = 212.52$, $p < 0.001$]. The interaction between drinking life experience and assessment time point was significant [$\chi^2(3) = 17.55$, $p = 0.001$]. There were significant differences in the rates of change between those who reported 1–5 ($IRR = 0.967$, $p = 0.001$), 6–20 ($IRR = 0.965$, $p < 0.001$), and 21 or more ($IRR = 0.963$, $p < 0.001$) drinks at baseline compared to non-drinkers. Condition had a marginally significant main effect on maximum number of drinks such that those randomized to the ME condition reported a rate of 1.68 times greater than those in the didactic condition ($z = 1.93$, $p = 0.054$). Total number of attended sessions, site, gender, and immigrant generation did not have main effects on the maximum number of drinks per drinking occasions in the past month reported by participants.

DISCUSSION

While strides have been made in the past few decades to improve the cultural responsiveness and reach of adolescent drinking interventions, Latinx youth continue to experience disparities in the availability of, participation in, and completion of evidence-based interventions. The purpose of this secondary data analysis was to examine whether Project Options, an alcohol use EBI adapted to the school setting but not to any specific ethnocultural group, was beneficial for Latinx participants in a real-world setting. Project Options is a motivationally enhanced, brief, cognitive-behavioral intervention that was designed to be voluntary, developed for adolescents, and open to students regardless of drinking experience. Using data from a hybrid effectiveness-efficacy multi-site clinical trial of the EBI, we tested changes across three assessment time points (i.e., baseline, 4-weeks, and 12-weeks) in drinking cognitions and behaviors by lifetime drinking experience among 331 first-, second-, and third-generation immigrant Latinx participants. Consistent with our hypotheses, Latinx participants with more lifetime drinking experience evidenced changes in drinking cognitions (i.e., perceptions of peer drinking norms, intention to drink next month) and behaviors (i.e., past month drinking days, average number of drinks per occasion, and maximum number of drinks per occasion) regardless of immigrant generation or gender.

Participant changes in drinking cognitions and behaviors did not differ by the method in which the information was provided (e.g., treatment condition: ME vs. didactic). This finding differs from the comparison of Project Options (ME condition) to Assessment Only condition in prior studies (16, 19). However, no differences comparing two active treatment conditions (ME vs. didactic) emerged in this study. Though we cannot fully attribute observed changes to participation in Project Options because the motivational enhancement delivery approach is posited to be an elemental part of the EBI, prior evaluations of intervention efficacy and positive findings from this multisite efficacy-effectiveness hybrid trial provide some evidence that participation in Project Options leads to the changes in drinking cognitions and behaviors reviewed below. The lack of condition effects may be due to several reasons. First, it may reflect the challenges inherent in discerning differential effects in relation to an active control condition that delivered identical content and differed only in *style* of delivery. Second, it is possible that the effect of intervention style was not sufficient to enhance outcomes over and above the effect of intervention content, which was based on theoretical and empirical evidence and was developmentally tailored to adolescents in school contexts. In fact, both conditions utilized in the multisite Project Options trial incorporated materials for which prior studies provided initial evidence of utility for changing drinking behavior when compared with a no-treatment control condition (16, 19). A third possibility is that we had limited statistical power to detect a differential effect of condition style. Though interventions based on ME principles are effective in changing substance use behaviors among adolescents, the effect size tends to be small on average (65). In addition, only a relatively small proportion of those self-selecting into this trial had substantial drinking experience. As such, relatively few participants were likely to feel ambivalent or concerned about their drinking and thus be amenable to motivational enhancement. A key precept of motivational interventions is the evocation and reinforcement of change talk (i.e., desire to change) which presupposes that participants have internalized concerns about their drinking behaviors (66). As such, the possibility of eliciting change talk could only be expected for a subset of intervention participants. This combination of factors may have decreased our ability to detect a difference between the two group-based treatment conditions. Fourth, condition randomization did not account for participant drinking profiles. For example, participants randomized to the ME condition reported a higher average number of drinks per occasion and worse cessation expectancies than those in the didactic style condition, thereby potentially concealing condition differences. Fifth, there is growing recognition that therapeutic *common factors,* including therapeutic alliance, as well as cultural sensitivity and content, can complicate distinguishing active treatment effects from a placebo condition (67). Though interventionists were asked to take a more conventional teacher role when delivering the didactic condition style, they still had to establish a therapeutic alliance with participants, which other studies have positively

linked to treatment outcomes (68, 69). Lastly, the intervention content in both delivery styles was contextualized to fit cultural features of the schools (e.g., language/lingo) in which they were administered which could have obscured condition differences. Although there were no differential condition style effects, given prior evidence for efficacy from the initial EBI trials when compared with a no-treatment control condition (14, 16, 19) and the observed changes across time evidenced by the multi-site trial participants, we interpret the present multi-community findings to provide tentative support for the value of Project Options content as a school-based intervention for addressing alcohol use by Latinx youth.

Changing Drinking Cognitions

This secondary data analysis of Project Options evaluated changes in four drinking cognitions: intention to drink next month, perception of peer drinking prevalence (i.e., beliefs about the percentage of peers who drink), positive alcohol expectancies (i.e., beliefs that alcohol has positive effects), and cessation expectancies (i.e., beliefs of whether things are better or worse if people reduce or quit drinking alcohol). As expected, Latinx youth with more drinking experience reduced their intention to drink and increased their accuracy of perception of peer drinking more so than those with less or no experience. This suggests that more experienced participants were more likely to be motivated to decrease or quit drinking alcohol. On the other hand, this could also be the result of the fact that those with more drinking experience have more room, or range in use, to change than those with less drinking experience. These results are consistent with our findings on drinking behaviors discussed below. In addition, attending more sessions was associated with greater reductions in perceived peer drinking prevalence. Further, Latino participants on average endorsed lower prevalence of peer drinking than their Latina counterparts. These findings are consistent with other studies (70) and prior EBI trials (19). Perception of peer behaviors is a strong predictor of initiation of use as well as intensity of substance use among Latinx youth across gender (8) and changing this cognition is related not only to concurrent drinking (71) but also to future drinking patterns (39, 72) regardless of drinking experience. The higher endorsement of peer drinking norms among Latinas across immigrant generations in this study is troubling given that it contradicts traditional gender norms among the Latinx community (73). This gender difference may be due to the greater number of Latina than Latino participants across generations in this sample. Further, this gender discrepancy might also reflect the observed increases in drinking behaviors reported by Latinas compared to Latinos at the national level (38). Finally, this disparity might reflect a potential differential impact of exposure to U.S. risky drinking norms. For instance, time in the U.S. across first- and later generations and increased English fluency has been associated with positive substance use norms more strongly for Latinas than Latinos (43, 44), signaling an erosion of protective traditional Latina drinking norms. This suggests that more studies are needed to understand the mechanisms that seem to be placing Latina youth at greater risk for potentially problematic drinking cognitions. Further, future intervention efforts are sorely needed to address this emerging gender disparity among Latinx youth.

Whereas, no changes were observed in expectancies for alcohol use and cessation across time, there were significant differences by immigrant generation in these two cognitions. Specifically, first-generation immigrants endorsed less favorable positive alcohol expectancies (i.e., fewer expectations of positive effects from drinking alcohol) than their second- and third-generation counterparts while first-generation participants also perceived reducing or quitting drinking more favorably (i.e., greater expectations that decreasing/quitting alcohol made things better) than their third-generation counterparts. While there are very few studies examining generational differences in alcohol outcome expectancies and none to our knowledge that have evaluated cessation expectancies *within* Latinx youth, these findings are in line with other studies (24). In addition, these differences map on to differences in drinking behaviors by immigrant generation among youth (23, 24, 35) and adults [e.g., (25)] that reflect the immigrant paradox in drinking patterns. While we could not test explanations of this paradox directly, these findings are consistent with the hypothesis that exposure to risky behavioral norms and behaviors inherent in youth environments in the U.S. helps explain why first-generation youth report less risky drinking behaviors than later generations (23, 24, 35). For example, studies have shown that immigrant youth have peer networks that are less prone to drink because they are more likely to have friends who are also immigrants due to placements based on English proficiency at school and a preference for Spanish speaking peers (74–76). In addition to being more likely to have lived in the U.S. for less years than Latinx youth of later generations, these first-generation teen peer networks seem to protect them from risky drinking norms and behaviors. Although no generational differences in drinking behaviors were observed in this sample, it is possible that this variance in beliefs about drinking and reducing/quitting drinking may portend differences in future drinking behaviors consistent with the immigrant paradox.

Changing Drinking Behaviors

As expected, participants with more baseline lifetime drinking experience reduced the number of days they drank, as well as the average, and maximum number of drinks they consumed per drinking occasion across time. Neither gender nor immigrant generation were associated with these changes, suggesting that participating in Project Options might have been beneficial for Latinx participants regardless of participants' immigrant generation and gender. These findings are in line with prior efficacy trials of the EBI. For example, Schulte et al. (19) found that regardless of intervention attendance, the greatest reductions in drinking behaviors were observed among the heaviest drinkers. In sum, while Project Options was open to all Latinx participants regardless of drinking experience, it seems to be more beneficial for heavier drinkers over and above immigrant generation and gender.

In concert, findings from this multi-site hybrid efficacy/effectiveness trial suggest that Project Options content might have changed drinking cognitions and behaviors among

Latinx participants. Prior studies of this multi-site trial showed that the intervention was successful in voluntarily recruiting and retaining participants regardless of delivery condition (i.e., ME vs. didactic) (20) and engaging Latinx participants in positive group processes in the motivational enhancement condition (21). These prior studies demonstrated that the adaptations of Project Options to each site facilitated engagement of Latinx youth thereby lowering barriers to participation and showed that mechanisms of change at the group level were favorable for Latinx participants. Findings from this study extend these promising results by examining the tentative utility of this EBI for changing drinking cognitions and outcomes for this underserved group across immigrant generation and gender. Findings also contribute to the field's discussion of when and whether to adapt EBIs to maximize benefits for underserved youth (12, 77). Additionally, it adds to the small, but growing body of innovative research implementing hybrid efficacy-effectiveness trials [e.g., (72)] in order to serve the community in the real-world given the high need.

Implications

Together these results tentatively demonstrate that adapting an EBI to the local context and the developmental stage of adolescent participants might be an effective way to ensure its usefulness for Latinx youth of different immigrant generations. Although the intervention content was not specifically adapted to the culture of Latinx youth, the EBI's adaptation to the local context of each site might have captured aspects of the general cultural school environment in which these youth are developing, thereby meeting their needs. These adaptations are consistent with one of the data-driven arms proposed by Lau (12) wherein barriers to EBI engagement for underserved ethnocultural groups are eliminated by decreasing participation barriers while maintaining the style and content of the EBI. Therefore, adapting to the immediate context of youth might be particularly useful for school-based interventions that service the setting to maximize reach regardless of its continuously changing ethnic composition. As such, Project Options might be a promising intervention for Latinx youth.

Limitations

Study findings must be considered within its limitations. Ethnic background and drinking experience were not considered in the initial randomization of participants to the ME or didactic conditions. As a result, not enough Latinx participants in each lifetime drinking experience category were present at each site to allow for nesting of observations by site or school. In addition, this led to differences in participant drinking profiles. For example, those randomized to the ME condition reported a higher average number of drinks per occasion and less positive cessation expectancies than those in the didactic style condition. As expected, the majority of Latinx participants in the BI across the three sites (Miami, Minneapolis, and Portland) were from Miami. While we attempted to account for these differences analytically, these findings might reflect the Latinx culture of Miami and may not be generalizable to other Latinx local contexts. Relatedly, we were unable to examine potential variation by sub-groups of Latinx youth; some studies have found differences in alcohol use by generation and Latinx sub-group [e.g., (25, 42, 78)]. Furthermore, since this multi-site clinical trial was not developed for Latinx youth specifically, important characteristics such as acculturation, ethnic identity, and familism were not assessed [see (79) for a review].

CONCLUSIONS AND FUTURE DIRECTIONS

In combination with prior evaluations of engagement/retention (20) and therapeutic processes (21) of this multi-site hybrid efficacy-effectiveness clinical trial of Project Options, this secondary analysis cautiously suggests that this voluntary EBI might be a promising intervention for Latinx youth of different immigrant generations. Findings tentatively suggest that adaptations to the local school context may capture cultural aspects important to the ecology of each site thereby also including key aspects of Latinx youth culture within each setting. Importantly, conducting an effectiveness study comparing this EBI to a control condition that appropriately mirrors treatment as usual will help elucidate whether Project Options content delivered through motivational enhancement style is effective for Latinx youth. In addition, results indicate that future research must examine whether and how EBIs serve the needs of Latinx youth by immigrant generation and gender. Additionally, examining whether attending sessions on specific topics is associated with intervention outcomes may also shed light on important intervention targets for Latinx youth. Only by addressing the mechanisms that lead to the differences in risk and protective factors by gender and immigrant generation will interventions successfully help curtail the health disparities encountered by Latinx youth as they transition to adulthood.

DATA AVAILABILITY STATEMENT

The data analyzed in this study is subject to the following licenses/restrictions: The datasets for this article are not publicly available because the study involved underage participants with alcohol use experience. We are not able to release data as part of the publication given the sensitivity of the data and our agreement with the institutions' Institutional Review Boards. Requests to access these datasets should be directed to Mark G. Myers, mgmyers@health.ucsd.edu.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Institutional Review Boards at Florida International University, Reed College, University of Minnesota, and the University of California, San Diego. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

GB reviewed the literature, conducted statistical analyses, wrote initial manuscript drafts, and was responsible for edits. TG conducted the literature review, consulted on statistical analyses, and contributed to the writing and editing of the manuscript. KA was a co-investigator on the clinical trial, consulted on hypotheses, guided statistical analyses, and contributed to manuscript revisions. SB was a co-principal investigator on the clinical trial, provided feedback on drafts of the manuscript, and supervised the completion of the study. MM was a co-principal investigator on the clinical trial, consulted on statistical analyses, revised multiple drafts of the manuscript, and oversaw the completion of the study. All authors contributed to the article and approved the submitted version.

FUNDING

This research was funded by the National Institute of Alcohol Abuse and Alcoholism R01AA012171 (PIs: SB and MM).

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

frontiers in Psychiatry

ORIGINAL RESEARCH
published: 27 November 2020
doi: 10.3389/fpsyt.2020.535624

Diminished Health Returns of Educational Attainment Among Immigrant Adults in the United States

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OPEN ACCESS

Edited by:
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: 17 February 2020
Accepted: 09 October 2020
Published: 27 November 2020

Citation:
Assari S, Cobb S, Cuevas AG and Bazargan M (2020) Diminished Health Returns of Educational Attainment Among Immigrant Adults in the United States. Front. Psychiatry 11:535624. doi: 10.3389/fpsyt.2020.535624

Objectives: Marginalization-related diminished returns (MDRs) refer to weaker health effects of educational attainment for socially marginalized groups compared to the socially privileged groups. Most of the existing literature on MDRs, however, has focused on marginalization due to race, ethnicity, and sexual orientation. Thus, very limited information exists on MDRs of educational attainment among immigrant populations in the United States.

Aims: Building on the MDRs framework and using a nationally representative sample of US adults, we compared immigrant and native-born adults for the effects of educational attainment on psychological distress, self-rated health (SRH), and chronic diseases (CDs).

Methods: The 2015 National Health Interview Survey (NHIS) has enrolled 33,672 individuals who were either immigrant (n = 6,225; 18.5%) or native born (n = 27,429; 81.5%). The independent variable (IV) was educational attainment, which was treated as a categorical variable. The dependent variables included psychological distress, SRH, and CDs, all of which were dichotomous variables. Age, gender, race, ethnicity, and region were confounders. Immigration (nativity status) was the moderator.

Results: Higher educational attainment was associated with lower odds of psychological distress, poor SRH, and CDs. However, immigration showed a significant statistical interaction with college graduation on all outcomes, which were suggestive of smaller protective effects of college graduation on psychological distress, poor SRH, and CDs for immigrant than native-born adults.

Conclusions: In the US, the associations between educational attainment and psychological distress, SRH, and CDs are all weaker for immigrant than native-born adults. To prevent health disparities, it is essential to decompose health inequalities that are due to low educational attainment from those that are due to diminished returns of educational attainment (i.e., MDRs). There is a need to help highly educated immigrant adults secure positive health outcomes, similar to their native-born counterparts. Such

changes may require bold and innovative economic, public, and social policies that help immigrant adults to more effectively mobilize their educational attainment to secure tangible outcomes. Elimination of health disparities in the US requires efforts that go beyond equalizing access to education.

Keywords: population groups, immigration, nativity, socioeconomic status, socioeconomic position, psychological distress, self-rated health, chronic disease

BACKGROUND

Extensive theoretical and empirical work has established a connection between socioeconomic status (SES) indicators, particularly educational attainment and a wide range of physical and mental health outcomes (1–3). For example, individuals with high levels of formal education are less likely to report depression (4), anxiety (5), suicidal ideas (6), or psychological distress (7, 8), and are more likely to report happiness (9). Various types of social marginalization (e.g., based on race, ethnicity, sexual orientation, and immigrant status) may reduce the salience of educational attainment on the mental well-being of populations (10–13). Immigration also exposes populations to a wide range of stressors and social risk factors that increase risk of mental distress (14–17).

Research on intersectionality (18–20) has well-established that subpopulations, however, differ widely in the health effects of educational attainment (21–24) and other SES indicators (25–27). According to the marginalization-related diminished returns (MDRs) (28, 29), the effects of educational attainment (30) on mental (31, 32) and physical health (33–36) are weaker for racial and ethnic minority adults than the majority group. Although comparisons of Black and White people (22, 23) shape most of this literature, some similar results have been reported for Hispanics (37, 38), Asian Americans (39), Native Americans (40), and even members of the lesbian, gay, bisexual, and transgender (LGBT) community (41–43). For example, educational attainment shows weaker effects on mental well-being (41), smoking (42), and obesity (43) for LGBT adults than non-LGBT people.

While there is compelling evidence that racial, ethnic, and sexual minority adults tend to gain fewer health benefits from their educational attainment (33), it is yet unknown if the same MDRs may also be relevant to the comparison of immigrant and native-born people. Similar to Black (31), Hispanic (37, 44), and LGBT (41–43) individuals, immigrant adults experience marginalization and discrimination by the host society (45–49). Exposure to unequal treatment, in turn, reduces immigrant adults' participation in social activities and labor market. Societal and structural factors such as social stratification, residential segregation, labor market discrimination, and low quality of education in urban areas may hinder the full benefit of education. Due to social and economic adversities, educational attainment may not be an equalizer of health for marginalized groups. Nevertheless, little is known on whether the association between education and health differs by nativity status.

Previous research on immigrant populations has shown considerable differences in health status between immigrant and native-born individuals. A pattern known as the healthy immigrant effect (50–52) suggests that despite experiencing a wide range of social disadvantages (e.g., lower levels of education and income, poor access to healthcare), immigrant individuals show better health profile than native-born individuals. For example, a large body of research has established lower mortality risk of Latino immigrant adults compared to White adults (53–56). For Hispanics, this phenomenon has been coined the Hispanic or Latino mortality paradox because Hispanic and Latino immigrants have lower education and higher exposure to social risk factors such as economic adversities and social disorder, yet have lower mortality risk than White adults (50, 54, 57–65). The relationship between nativity status and health cannot be interpreted unequivocally, as immigration-related factors, such as country of origin, reason behind immigration, and age play important roles in the relationship (15, 16, 66). For instance, the degree to which immigrant adults acculturate and adopt the host country's culture influences their health outcomes, health behaviors, and well-being (67–71).

Marginalization and discrimination are major drivers of immigrant peoples' poor health (46, 47, 49, 72–74). Another factor is that they may live in ethnic enclaves with low access to resources (75–80). Another factor is that some immigrant groups have high and some have low SES (81–85). For example, in the US, Asian Indian, Cuban, Asian American, and Chinese people have higher SES while Mexican, Puerto Rican, and Filipino people have lower SES compared to White people in the US. These are a source of heterogeneities and should be considered in future analysis of the association between immigration and health (81–85).

Despite immigrant populations showing better health profiles than native-born people, they may not gain the same health benefits provided by social structures. Xenophobia can be seen as another source of poor health and well-being of immigrant populations (86, 87). Exposure to Xenophobia and related hate and discrimination, may, however, not be the same across regions (88). As such, experiences of immigrant people may widely depend on a wide range of geopolitical factors such as which political party that holds administrative and legislative power (89). Even within the same region, drastic changes may occur as a result of elections and changes in the leadership of countries, states, and even cities (90). Life condition of immigrant populations and resources that they can access can be heavily influenced by the political party that takes power (91). In the US, for example (92), a major part of the nationalist, populist

political rallies have focused on generating fear in the voters. These policies commonly focus on safety, crime, and scarcity of jobs and resources so immigrant individuals are perceived as a security threat and competitors to jobs (91). Such policies and rhetoric's have historically helped the conservative politicians to collect votes (86). As such, there has been an inertia against advocating for the health and well-being of immigrant adults by the right-wing policymakers. Two latest examples of these changes are remarks by Donald Trump in the US (91–93), and Boris Johnson and Nigel Farage in the UK (94). As a result, many undocumented immigrant people, and even legal immigrant adults, may face fear, hate crimes, and discrimination (95).

Intersectionality research has been also used to study the health status of immigrant populations in the US and other countries (96). Another source of health inequalities in immigrant populations is low SES, which may partially explain poor health of some of the groups of immigrant adults, compared to the native people (97, 98). Not all groups of immigrant populations, however, have lower SES than the native-born people. In the US, for example, Cubans, Asian Americans, and Asian Indians have comparable or even higher SES than the average for Whites (99). There is also some research on this topic, showing that SES may generate less outcomes for immigrant than native-born individuals (100). Thus, all this literature and all these patterns suggest that health of immigrant populations have major nuances and complexities, and one size does not fit all (50, 59, 60, 62, 101, 102). These nuances emerge as a result of complex interactions between immigration, acculturation, culture, and visible and invisible identity markers that depend on country of origin and SES and clash with various systems of privilege in the host county (103, 104). Intersectionality framework has helped us understand some of these complexities (105).

AIM

By borrowing data from the National Health Interview Survey (NHIS), and informed by the MDRs and intersectionality frameworks, we conducted a cross-sectional study to compare immigrant and native-born people in the US for the association between educational attainment and income and psychological distress of American adults. As suggested by both intersectionality and MDRs, we conceptualized immigration status as a combination of visible or invisible marginalizing identities that would reduce access of individuals to the opportunity structure, deny them their dignity and privilege, and expose them to prejudice and injustice. Thus, we expected diminished effects of educational attainment on psychological distress, self-rated health (SRH), and chronic diseases (CDs) of immigrant compared to native-born people. While the same research question could be asked in an international scope, the focus of this paper is exclusively the US.

METHODS

Data of the NHIS 2015 were used. The NHIS is the primary source of information regarding the physical health status of American adults 18 years or older. The NHIS sample is composed of US residents, civilians, and non-institutionalized people.

PARTICIPANTS AND SAMPLING

The NHIS used a multistage sampling: First, was to sample 428 primary sampling units (PSUs) drawn from 1,900 geographically defined PSUs. All 50 US states and the District of Columbia had PSUs in the study. The PSUs were either a metropolitan statistical area, a single county, or a small group of contiguous counties.

PROCESS

The data are collected by the National Center for Health Statistics (NCHS), which is a part of the Centers for Disease Control and Prevention (CDC). The U.S. Census Bureau collects the data. Data are collected via face-to-face interviews in participants' households. On some occasions, this face-to-face interview is followed or replaced by telephone interview.

PARTICIPANTS

The total sample in this study was 33,672 individuals who were either immigrants ($n = 6{,}225$; 18.5%) or native-born ($n = 27{,}429$; 81.5%). We did not impose any exclusion criteria.

MEASURES

Predictor

Educational Attainment (EA)

Educational attainment was operationalized as a categorical variable with four levels. Participants were asked about the number of years of schooling. The educational levels included (1) <12 years (reference group), (2) 12 years, (3) some college education, and (4) college graduate.

Moderator

Immigration Status

Nativity was self-reported. All participants were asked if they were born in the US. The responses were coded 1 for immigrant and 0 for native born.

Covariates

Demographic Factors

Demographic factors included age, gender, census region, race, and ethnicity. Age (years) was a continuous variable. Gender was a dichotomous measure (female = 0 and male = 1). The region was either Northeast, Midwest, South, or West. Participants self-identified their race and ethnicity. Race and ethnicity were both operationalized as categorical variables. Race included White only (reference category), Black/African American only, Native American/Alaska Native only, Asian only, Multiple race, and race group not releasable (masked or missing). Ethnicity included Non-Hispanics = 0 (reference category) and Hispanics = 1.

Dependent Variable

Psychological Distress

The following items were used to measure psychological distress. (1) How often you felt so sad nothing cheers you up during the past 30 days, (2) How often you felt nervous during the past 30 days, (3) How often you felt restless/fidgety, during the past 30 days, (4) How often you felt hopeless during the past 30 days, (5) How often you felt everything was an effort during the past 30 days, and (6) How often you felt worthless during the past 30 days. Responses to these items included (0) none of the time, (1) a little of the time, (2) some of the time, (3) most of the time, and (4) all of the time. We calculated a sum score, ranging from 0 to 24, with a higher score indicating higher psychological distress.

Self-Rated Health (SRH)

We used the conventional single item of SRH to measure overall health. Responses were excellent, very good, good, fair, and poor. Responses were dichotomized so fair and poor reflected poor, and other responses reflected good health. Poor SRH is predictive of morbidity and mortality in clinical as well as community settings (106).

Chronic Diseases (CDs)

Participants were asked if they had any of the following conditions: cancer, epilepsy/seizure, sinusitis, hay fever, emphysema COPD, chronic bronchitis, weak/failing kidneys, liver condition, arthritis, carpal tunnel syndrome, hypertension, high cholesterol, diabetes, coronary heart disease, angina pectoris, stroke asthma, ulcer, and/or Crohn's disease/ulcerative colitis. The exact items read as: "Ever been told you have diabetes," etc. We calculated a dichotomous variable that included presence or absence of any CDs, regardless of their type.

Statistical Analyses

Given the NHIS's multistage sampling design, we needed to apply SPSS 23.0 (IBM Inc, NY, USA) for our data analysis. Using SPSS, we adjusted for the NHIS survey weights that were due to the design variables (strata, clusters, and non-response). Taylor series linearization was applied for the re-estimation of the standard errors (SEs). For descriptive statistics, we used weighted means and frequencies.

For our multivariable analyses, given our binary outcomes, we applied two logistic regression models for each outcome. In these models, either psychological distress, SRH, or CD were the dependent variable. In all these models, which were all significant, educational attainment was the independent variable, while demographic factors, income, and region were the control variables, and immigration status was the moderator. Both our models were calculated in the pooled sample that included both immigrant and native-born adults. *Model 1* did not include immigration by educational attainment interaction terms. *Model 2*, however, included immigration by educational attainment interaction terms. To generate an interaction term, three interaction terms were entered to the models: 12 years × immigrant, 13–15 years × immigrant, and 16 + years × immigrant. If these interactions were significant and positive, they would suggest that the protective effect of 12 years education, in comparison to the reference group (<12 years of education) is smaller for the immigrant than native-born groups. This would be in support of our MDRs hypothesis. For our immigrant variable, immigrants were coded as 1 and native-born coded as 0. Similarly, for race, White only was the reference group so the OR would mean the effect of a particular race relative to

TABLE 1 | Descriptive statistics overall (33,672).

	All		Native born		Immigrant	
	n	%	*n*	%	*n*	%
Immigration status						
Native born	27,429	81.5	27,429	100.0	–	–
Immigrant	6,225	18.5	–	–	6,225	100.0
Race*						
White only	25,831	76.7	21,937	80.0	3,881	62.3
Black only	4,673	13.9	4,033	14.7	637	10.2
Native American/Alaska Native only	392	1.2	311	1.1	81	1.3
Asian only	1,983	5.9	492	1.8	1,489	23.9
Multiple race	699	2.1	609	2.2	90	1.4
Race group not releasable	94	0.3	47	0.2	47	0.8
Ethnicity*						
Non-Hispanics	28,080	83.4	25,128	91.6	2,942	47.3
Hispanics	5,591	16.6	2,301	8.4	3,283	52.7
Region*						
Northeast	4,681	13.9	4,346	15.8	1,232	19.8
Midwest	8,359	24.8	6,395	23.3	705	11.3
South	9,047	26.9	9,579	34.9	2,061	33.1
West	11,436	34.0	7,109	25.9	2,227	35.8
Gender						
Female	18,601	55.2	15,152	55.2	3,440	55.3
Male	15,071	44.8	12,277	44.8	2,785	44.7
Education*						
Less than 12 years	5,580	16.6	2,852	10.4	1,826	29.3
12 years	7,102	21.1	7,045	25.7	1,313	21.1
13–15 years	11,646	34.6	7,990	29.1	1,057	17.0
16+ years	9,344	27.8	9,457	34.5	1,970	31.6
Psychological distress						
No	25,266	78.3	20,512	74.8	4,741	76.2
Yes	6,990	21.7	5,792	21.1	1,196	19.2
Self-rated health (SRH) (Poor)						
Yes	28,614	85.0	23,272	84.8	5,328	85.6
No	5,046	15.0	4,147	15.1	896	14.4
Chronic diseases (CDs)*						
No	16,653	50.6	13,066	47.6	3,574	57.4
Yes	16,227	49.4	13,727	50.0	2,495	40.1
		SD	**Mean**	**SD**	**Mean**	**SD**
Age (years)*	49.94	18.38	50.57	18.68	47.19	16.71

*$p < 0.05$ for comparison of immigrant and native born.

Whites. Similarly, non-Hispanic was the reference group, thus the effect of ethnicity referred to the effect of being Hispanic compared to non-Hispanic. Adjusted odds ratio (AOR), 95% confidence intervals (CI), SE, and *p*-values were reported. A $p < 0.05$ was considered significant.

RESULTS

Descriptive Statistics

The total sample in this study was 33,672 immigrant and native-born American adults 18+ years old. Of the participants, 18.5% were immigrants, and 81.5% were native born. From the total sample, 77% were White, and 23% were a member of other racial groups. Additionally, 17% were Hispanic, and 83% were non-Hispanic. **Table 1** depicts the descriptive statistics of the participants overall and based on the nativity.

Table 1 also compares the two groups. Compared to native-born people, immigrant adults were more likely to be Asian, less likely to be White, more likely to be Hispanic, more likely to live in the West and Northeast, and less likely to live in the South. Compared to their native-born counterparts, immigrant adults were 3 years younger, and have lower rates of chronic disease.

Logistic Regressions

Table 2 shows the results of two logistic regressions in the pooled sample with educational attainment as the predictor and psychological distress, SRH, and CDs as the outcomes (dependent variables). *Model 1* only included the main effects. However, *Model 2* added the interaction terms between immigration status with educational attainment.

Based on *Model 1*, high educational attainment was inversely associated with psychological distress (OR = 0.71, 95% CI = 0.65–0.77; $p \leq 0.001$ for 12 years, OR = 0.66, 95% CI = 0.60–0.72; $p \leq 0.001$ for 13–15 years, OR = 0.44, 95% CI = 0.40–0.48; $p \leq 0.001$ for 16 + years.), SRH (OR = 0.51, 95% CI = 0.46–0.55; $p \leq 0.001$ for 12 years, OR = 0.43, 95% CI = 0.39–0.47; $p \leq 0.001$ for 13–15 years, OR = 0.19, 95% CI = 0.17–0.21; $p \leq 0.001$ for 16 + years), and CDs (OR = 0.85, 95% CI = 0.78–0.93; $p \leq 0.001$ for 12 years, OR = 0.90, 95% CI = 0.82–0.99; $p = 0.022$ for 13–15 Years; OR = 0.70, 95% CI = 0.64–0.77; $p \leq 0.001$ for 16 + years). *Model 2,* however, revealed a statistically significant interaction between educational attainment and immigration on psychological distress (OR = 1.36; 95% CI = 1.11–1.67; $p = 0.003$ for 16 + Years× immigrant term), SRH (OR = 1.36; 95% CI = 1.11–1.67; $p = 0.003$ for 16 + Years × immigrant term), and CDs (OR = 1.36; 95% CI = 1.11– 1.67; $p = 0.003$ for 16 + Years × immigrant term). The model suggested that the protective effects of educational attainment against psychological distress, SRH, and CDs are all smaller for immigrant than native-born adults (**Table 2**).

Logistic Regressions

Table 3 shows the results of two logistic regressions in native-born (*Model 3*) and one in immigrant (*Model 4*) adults for each outcome. In these models, educational attainment was the predictor and either psychological distress, SRH, and CDs were the outcome (dependent variable). Based on *Model 3*, high educational attainment was inversely associated with psychological distress, SRH, and CDs for native-born adults. *Model 3* also showed some protective effects of educational attainment on psychological distress, SRH, and CDs for immigrant adults. These protective effects were all larger for native-born than immigrant adults (**Table 3**).

DISCUSSION

The current study supports the finding that all educational credentials are associated with lower odds of psychological distress, poor SRH, and CDs; however, the protective effects of 16+ years of education are stronger for native-born than immigrant adults in the US.

The observation that as educational attainment credentials are gained, odds of psychological distress, poor SRH, and CDs decreases, but 16+ years of education better promote health for native-born than immigrant adults in the US, is an extension of previous literature on MDRs (28, 29). Previous research found that the association between educational attainment and a wide range of physical health outcomes such as self-rated health (32, 37, 107), CDs (35, 108, 109), depression (110, 111), suicide (31), obesity (33, 34), disability (112), and mortality (36) was weaker in Black and Hispanic relative to Non-Hispanic White people. It is also in line with the observations that education generates less health for LGBT than non-LGBT individuals (41–43).

The robust and consistent nature of the MDRs suggests that differences in education and health may be due to the function and structure of society. US social institutions differentially treat people based on their color, race, ethnicity, class, heritage, and nativity (113). These result in systemic marginalization of non-majority groups. Such marginalization reduces people's chance of full participation and full benefit from resources that are available to them. Racism, xenophobia, and nationalism are embedded in the social fabric of the US society and reduce immigrant adults' ability to fully benefit their own human capital and turn their resources into tangible outcomes. As a result, they show less than expected benefits in the presence of educational attainment (28, 29).

It seems that it is not just educational attainment (32) but also income (109), occupation (36), and marital status (114) that tend to generate better health for the majority than marginalized people. These MDRs are not just for psychological distress (107), SRH (12, 32, 107), and CDs (35, 108, 109) but for obesity (33, 34), vaping (115), smoking (40, 42, 116–118), drinking (44, 119), diet (120), exercise (11), hospitalization (121), and mortality (36). Thus, MDRs are neither specific to SES indicators nor to any health outcomes. They are seen for mental health, behaviors, and physical health. These universal patterns of MDRs suggest that they are due to upstream social processes rather than group behaviors.

The observed MDRs of educational attainment on the protective effects of high educational attainment on psychological distress, SRH, and CDs may be because, similar to poverty, race, and ethnicity, immigration status shapes life chances and health. Immigrant adults generally have better

TABLE 2 | Logistic regressions in the pooled sample (33,672).

	Psychological distress				Self-rated health				Chronic diseases			
	OR	95% CI		p	OR	95% CI		p	OR	95% CI		p
Main effect model												
Immigrant	0.88	0.80	0.96	0.004	0.78	0.70	0.87	< 0.001	0.58	0.54	0.63	< 0.001
Hispanic	0.85	0.78	0.93	< 0.001	1.18	1.06	1.32	0.002	0.92	0.85	1.00	0.043
Race				< 0.001				< 0.001				< 0.001
Black only	0.96	0.88	1.04	0.312	1.65	1.51	1.80	< 0.001	1.18	1.09	1.27	< 0.001
Native American/Alaska Native only	1.40	1.12	1.76	0.004	1.66	1.28	2.14	< 0.001	1.38	1.10	1.73	0.006
Asian only	0.77	0.67	0.89	< 0.001	1.04	0.87	1.24	0.674	0.96	0.85	1.08	0.496
Multiple race	1.48	1.25	1.76	< 0.001	1.79	1.47	2.19	< 0.001	1.38	1.16	1.64	< 0.001
Race group not releasable	0.96	0.58	1.60	0.890	0.35	0.13	0.97	0.044	0.81	0.52	1.28	0.367
Gender (male)	0.72	0.68	0.76	< 0.001	0.99	0.93	1.06	0.757	0.97	0.92	1.02	0.274
Region												
West												
Northeast	1.06	0.97	1.15	0.197	0.97	0.88	1.08	0.592	1.04	0.96	1.12	0.371
Midwest	0.96	0.89	1.04	0.363	0.91	0.82	1.00	0.051	1.03	0.96	1.11	0.456
South	0.98	0.91	1.05	0.570	1.11	1.02	1.21	0.013	1.02	0.96	1.09	0.475
Age	0.99	0.99	0.99	< 0.001	1.03	1.03	1.03	< 0.001	1.06	1.06	1.06	< 0.001
Education				< 0.001				< 0.001				< 0.001
Less than 12 years												
12 years	0.71	0.65	0.77	< 0.001	0.51	0.46	0.55	< 0.001	0.85	0.78	0.93	< 0.001
13–15 years	0.66	0.60	0.72	< 0.001	0.43	0.39	0.47	< 0.001	0.90	0.82	0.99	0.022
16+ years	0.44	0.40	0.48	< 0.001	0.19	0.17	0.21	< 0.001	0.70	0.64	0.77	< 0.001
Constant	0.92			0.183	0.09			< 0.001	0.12			< 0.001
Interaction model												
Immigrant	0.79	0.68	0.92	0.002	0.67	0.58	0.79	< 0.001	0.66	0.57	0.77	< 0.001
Hispanic	0.87	0.79	0.95	0.002	1.21	1.09	1.35	0.001	1.01	0.92	1.10	0.859
Race				< 0.001				< 0.001				< 0.001
Whites only												
Black only	0.95	0.88	1.03	0.250	1.64	1.50	1.79	< 0.001	1.37	1.27	1.48	< 0.001
Native American/Alaska Native only	1.39	1.11	1.75	0.005	1.65	1.28	2.14	< 0.001	1.35	1.06	1.70	0.014
Asian only	0.74	0.64	0.86	< 0.001	1.01	0.84	1.20	0.956	1.06	0.94	1.21	0.350
Multiple race	1.48	1.25	1.75	< 0.001	1.79	1.46	2.19	< 0.001	1.26	1.06	1.51	0.010
Race group not releasable	0.97	0.59	1.61	0.918	0.35	0.13	0.98	0.045	1.01	0.62	1.64	0.979
Gender (male)	0.72	0.68	0.76	< 0.001	0.99	0.93	1.05	0.701	1.17	1.12	1.24	< 0.001
Region												
West												
Northeast	1.06	0.97	1.15	0.201	0.97	0.88	1.07	0.548	1.05	0.97	1.14	0.219
Midwest	0.96	0.89	1.04	0.323	0.90	0.82	1.00	0.041	1.10	1.02	1.19	0.012
South	0.98	0.91	1.05	0.498	1.10	1.02	1.20	0.020	1.16	1.08	1.24	< 0.001
Age	0.99	0.99	0.99	< 0.001	1.03	1.03	1.03	< 0.001	1.07	1.07	1.07	< 0.001
Education				< 0.001				< 0.001				< 0.001
Less than 12 years												
12 years	0.69	0.62	0.76	< 0.001	0.48	0.44	0.54	< 0.001	0.84	0.76	0.94	0.002
13–15 years	0.64	0.58	0.71	< 0.001	0.41	0.37	0.46	< 0.001	0.86	0.78	0.96	0.008
16+ years	0.41	0.37	0.46	< 0.001	0.18	0.16	0.20	< 0.001	0.68	0.61	0.75	< 0.001
Education × immigrant				0.009				0.056				0.053
12 years × immigrant	1.04	0.85	1.28	0.699	1.17	0.94	1.46	0.154	1.09	0.89	1.33	0.402
13–15 Years × immigrant	1.03	0.83	1.28	0.782	1.24	0.97	1.58	0.086	1.06	0.86	1.31	0.558
16+ Years × immigrant	1.36	1.11	1.67	0.003	1.39	1.08	1.79	0.010	1.28	1.06	1.54	0.011
Constant	0.95			0.451	0.09			< 0.001	0.04			< 0.001

TABLE 3 | Logistic regressions in native-born and immigrant adults.

	Psychological distress				Self-rated health				Chronic diseases			
	OR	95% CI		*p*	OR	95% CI		*p*	OR	95% CI		*p*
Native born												
Hispanic	0.85	0.76	0.94	0.002	1.08	0.95	1.23	0.257	1.00	0.90	1.11	0.991
Race				< 0.001				< 0.001				< 0.001
White only												
Black only	0.97	0.89	1.06	0.476	1.66	1.52	1.82	< 0.001	1.40	1.29	1.52	< 0.001
Native American/Alaska	1.36	1.06	1.76	0.017	1.47	1.09	1.97	0.012	1.44	1.10	1.87	0.008
Native only												
Asian only	0.77	0.61	0.98	0.036	1.05	0.78	1.43	0.732	1.12	0.90	1.39	0.313
Multiple race	1.50	1.25	1.80	< 0.001	1.89	1.53	2.34	< 0.001	1.35	1.11	1.63	0.002
Race group not releasable	0.46	0.19	1.10	0.080	0.00	0.00		0.997	1.15	0.59	2.25	0.680
Gender (male)	0.72	0.68	0.77	< 0.001	1.03	0.96	1.11	0.337	1.19	1.12	1.26	< 0.001
Region	1.00	0.91	1.10	0.940	0.88	0.78	0.99	0.034	1.06	0.97	1.16	0.221
West												
Northeast	0.94	0.86	1.02	0.156	0.94	0.85	1.05	0.266	1.16	1.07	1.26	< 0.001
Midwest	0.97	0.89	1.05	0.384	1.17	1.06	1.28	0.001	1.24	1.15	1.34	< 0.001
South	0.99	0.99	0.99	< 0.001	1.02	1.02	1.03	< 0.001	1.07	1.07	1.07	< 0.001
Education				< 0.001				< 0.001				< 0.001
Less than 12 years												
12 years	0.69	0.62	0.76	< 0.001	0.48	0.44	0.53	< 0.001	0.85	0.76	0.95	0.003
13–15 years	0.63	0.57	0.70	< 0.001	0.40	0.36	0.45	< 0.001	0.87	0.78	0.97	0.009
16+ years	0.41	0.37	0.45	< 0.001	0.17	0.16	0.20	< 0.001	0.68	0.62	0.76	< 0.001
Constant	1.08			0.279	0.11			< 0.001	0.04			< 0.001
Immigrant												
Hispanic	0.90	0.75	1.08	0.257	1.65	1.31	2.07	< 0.001	0.97	0.82	1.16	0.753
Race				0.001				0.057				0.867
White only												
Black only	0.80	0.62	1.02	0.075	1.11	0.82	1.50	0.514	1.06	0.85	1.32	0.604
Native American/Alaska	1.44	0.87	2.38	0.160	2.42	1.41	4.14	0.001	1.03	0.61	1.74	0.913
Native only												
Asian only	0.72	0.58	0.88	0.002	1.00	0.76	1.30	0.991	0.93	0.77	1.12	0.438
Multiple race	1.25	0.76	2.04	0.382	1.07	0.56	2.04	0.836	0.85	0.51	1.40	0.521
Race group not releasable	1.96	1.02	3.78	0.044	1.00	0.34	2.88	0.996	0.88	0.43	1.80	0.723
Gender (male)	0.70	0.62	0.80	< 0.001	0.79	0.68	0.93	0.005	1.14	1.01	1.29	0.031
Region	1.28	1.07	1.54	0.007	1.30	1.05	1.60	0.015	1.06	0.89	1.26	0.504
West												
Northeast	1.11	0.89	1.39	0.344	0.68	0.50	0.94	0.018	0.87	0.70	1.07	0.173
Midwest	1.00	0.85	1.17	0.966	0.80	0.66	0.97	0.025	0.89	0.77	1.03	0.108
South	1.00	1.00	1.01	0.427	1.05	1.05	1.06	< 0.001	1.08	1.07	1.08	< 0.001
Education				< 0.001				< 0.001				0.851
Less than 12 years												
12 years	0.75	0.62	0.89	0.002	0.63	0.52	0.78	< 0.001	0.95	0.80	1.13	0.588
13–15 years	0.72	0.58	0.88	0.001	0.59	0.47	0.75	< 0.001	0.96	0.79	1.16	0.668
16+ years	0.61	0.50	0.73	< 0.001	0.31	0.24	0.40	< 0.001	0.92	0.77	1.10	0.378
Constant	0.38			< 0.001	0.02			< 0.001	0.02			< 0.001

health than US-born individuals, despite having lower education. We would assume that additional education would significantly augment immigrant health. However, the diminished health return of education suggest that additional education may not protect immigrant individuals from exposure to discrimination, risky work conditions, and having limited access to quality healthcare (122). We found that relative to highly educated native Americans, highly educated immigrant adults remain at an increased risk of health problems such as psychological distress, poor SRH, and CDs. Clinicians and healthcare providers should be cognizant that immigrant adults, regardless of education, are exposed to structural barriers such as immigration laws, labor market laws, and residential segregation that potentially reduce the health gain of social upward mobility.

Area of Future Research

First of all, the results reported here are exclusively relevant to the US context. Thus, there is a need to conduct similar studies in other countries. Immigration is not a simple and singular variable such as age, gender, or even nationality. Immigration is a proxy of culture, lived experiences, life history, and marginalization. That said, research has continuously shown that one size does not fit all regarding immigrant adults' health status. By that we mean that these factors contribute to health profile of immigrant adults across education levels. In this study immigration was conceptualized as an over-simplistic dichotomous variable due to the data that were available to us. This should be addressed in future research; however, here we partly discuss the intersection of SES, immigration, and health.

While this study relied on MDRs (10, 28, 29), which predominantly focused on diminished returns of SES indicators for marginalized people (100), other frameworks and theories could also help us understand the involved processes that may explain our findings. One related framework is intersectionality (19, 20, 123). Supporting the intersectionality framework (19, 20, 123), we found different predictors of health of population subgroups based on the intersection of immigration status and SES. That is, in the US, intersections of immigration status and SES, rather than each of them separately, have implications for the health of population. In line with the intersectionality theory, we found multiplicative rather than additive effects of immigration status and SES on health. Each intersectional group has a unique set of social identities, resources, risk factors, and social identities. As such, they differ in how their visible and invisible identity markers clash with systems of privilege and marginalization in the US. Acculturation is also another framework that can advance the existing knowledge on the observed MDRs and make sense of the results. Immigrant people integrate to the host country and become more similar to them as time passes since immigration (68, 70, 124). We, however, did not have data on length of time post immigration (67, 68, 125, 126). As individuals lose their attachment to their culture and original identity, and as they acquire the behavioral characters of the host country, their health status becomes more similar to the native-born people (67, 68, 125, 126).

As a result of Xenophobia, and as seen as "foreigners," immigrant people may experience high levels of hate crime, discrimination, and prejudice (95), which result in marginalization and social isolation. Discrimination is one of the major factors in explaining poor health of immigrant people (16, 45, 47, 49, 127). Immigrant populations face additional difficulties to enter the labor market and secure high-quality jobs, as they compete with native-born people (128). Many immigrant adults work in low-paying jobs and provide uncompensated labor (129). Finally, some immigrant people live in ethnic enclaves and highly segregated areas, and some send money back to their country (130).

The observed MDRs (interaction between education and immigration status) can be attributed to discrimination in the education system (131). Immigrant and native-born individuals do not have the same opportunity for education in the US. They are also not equally treated by the education system (132). Discrimination, second tier education, and systematic marginalization might uniquely contribute to the observed MDRs in the immigration. The labor market may also undervalue their education (133), if education is achieved in their own country not the US (134).

We argue that immigrant individuals are also racialized in the US; however, the effect of immigration status depends on SES, as shown by this study. While the focus of this study was on how immigration status and SES intersect, most previous literature on the intersectionality has focused on race, ethnicity, gender, sexual orientation, and socioeconomic status (18–20). As such, this study extends the previous work to one of the less frequently studied aspects of intersectionality of social identities. Still, the intersectionality framework helps us understand the results as it suggests that the complex and overlapping layers of inequities expose subgroups of the population to unique health risks. In this view, life experiences, sets of exposures, and vulnerabilities are not a function of each by combination of various social identities, as documented by the interactions between various social identities (multiplicative rather than additive effects). Thus, there is always a need to understand the differences in the health status of groups based on the intersections of nativity and SES, as shown here. The same applied to the intersections of race, ethnicity, gender, age, physical ability, and sexual orientation.

Implications

The result of this study has some policy implications. First, the solution to eliminate health inequalities should not be limited to closing the SES gap across social groups. While SES and SDOH are important, it is not just their access but utility and the degree by which they become outcomes. To eliminate health inequality between immigrant and native-born people, it is essential to equalize the health return of educational attainment. Thus, we need to go beyond equal access to education but equality in the returns of educational attainment for social groups. Specific policies and programs should help immigrant adults to more effectively mobilize and leverage their available human capital to gain tangible outcomes. When a policy is designed and implemented, these MDRs should be investigated. These types of evidence suggest that MDRs should be targeted as a part of equitable goals.

Limitations

The current results should be interpreted with the methodological limitations in mind. First, any cross-sectional study is limited in drawing causal inferences. We cannot rule out that excessive health problems would influence social mobility and the ability to attain education. Thus, reverse causality cannot be ruled out in this study. Prospective research is needed to better understand the association between immigration status, educational attainment, and health. Furthermore, future research should examine the mechanisms by which MDRs of educational attainment emerge. We did not have access to the country of origin, or whether education was attained in the US or the origin country. There is a need to compare immigrant subgroups from Asia, Africa, and Latino countries as each culture may differently adopt US culture. We also did not control for the type of college education of other covariates such as wealth or being a first-generation college student. Future research should replicate and validate these findings using longitudinal data, with a more comprehensive list of measures such as country of origin and details of educational attainment. Future research may also include contextual factors such as ethnic composition, SES, or density of resources at the neighborhood level. It is likely that highly educated immigrant individuals still live in areas with low availability of green spaces and parks that are essential for health.

Application of Single-Item Measures

Although this study has some strengths, such as a large n and representative sample, it was limited in terms of measurement. While single item is commonly used for overall and physical health, single-item measure of self-rated psychological health is limited in their ability to assess mental health. Thus, we compensated this weakness by including three outcomes that could cover various domains of both physical and mental health. Single-item measures are widely used for overall, general, and physical health (135–143). They are used, but less common to evaluate self-rated psychological health (144–150). Still, these measures reflect mental health, depression, and anxiety, and psychological distress. As they are cost efficient, easy to administer, reliable, valid, and easily understood by the people, they are commonly used in large-scale national surveys. They may, however, be prone to differential validity across demographic groups (151–154). That means, these single items may mean different things for different groups (151–154). It is, however, very unlikely that bias shapes a spurious association regardless of the domain of health. Similarity of the results across outcomes provided additional support and confidence for our findings. Thus, despite our measurement limitations, the observed MDRs seem to be robust. Still, at interpretation of the results, readers should be aware of the measurement problem in this paper.

Future research should find large and balanced sample sizes of ethnic groups and test for replication of these findings across ethnic groups. The reason we did not run ethnic-specific models was statistical power (e.g., few immigrant Black people) and unequal variance of SES across ethnic groups. Combining all or several years of NHIS data or General Health Survey (GSS) would probably have enough statistical power for such future investigations.

CONCLUSION

In the US, educational attainment better reduces the odds of psychological distress, poor SRH, CDs, and obesity for native-born than immigrant adults. Thus, at least some of the health disparities in the US between immigrant and native-born people are due to inequalities in marginal returns of educational attainment for immigrant population.

DATA AVAILABILITY STATEMENT

The datasets generated for this study are available here: https://www.cdc.gov/nchs/nhis/nhis_2015_data_release.htm.

ETHICS STATEMENT

All participants signed written consent. The NHIS protocol was approved by the CDC Institutional Review Board (IRB).

AUTHOR CONTRIBUTIONS

SA was responsible for the conceptualization, data analysis, preparation of the first draft, and revision. SC and MB were in charge of the revision of the manuscript and approved the final draft. All authors contributed to the article and approved the submitted version.

FUNDING

SA is supported by the NIH awards 5S21MD000103, 54MD008149, R25 MD007610, 2U54MD007598, U54 TR001627, D084526-03, and CA201415-02. AGC is funded by the Cancer Disparities Research Network/Geographic Management Program (GMaP) Region 4 funded by 3 P30 CA006927-52S2 and CTSI Mentored Career Development Award (KL2 TR002545).

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

frontiers in Public Health

ORIGINAL RESEARCH
published: 08 January 2021
doi: 10.3389/fpubh.2020.532883

Physical Activity in Relation to Wellbeing Among Newly Arrived Refugees in Sweden: A Quantitative Study

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Background: Little is known about physical activity among newly arrived refugees and what impact physical activity might have on their health, as measured by mental wellbeing, vitality, stress and sleep quality. Thus, this study sought to investigate the relationship between physical activity and wellbeing among refugees who were newly arrived in Sweden.

Methods: The present study was based on the results from a survey, conducted in 2015–2016 among newly arrived adult refugees who spoke Arabic, Pashto, Somali or Dari, participated in a mandatory public integration support programme in the Scania region of Sweden and agreed to participate in the survey. Ultimately 681 participants completed the survey (a response rate of 39.5%).

Results: We found a significant association between physical activity and mental wellbeing, vitality, stress and sleep quality among newly arrived refugees.

Conclusions: Newly arrived refugees need to be informed about the importance of prioritizing physical activity for their health and wellbeing, regardless of their external circumstances, and supported in their attempts to do so.

Keywords: health, migration, physical activity, refugees, wellbeing

OPEN ACCESS

Edited by:
Linda Juang,
University of Potsdam, Germany

Reviewed by:
Andreas Hoell,
University of Heidelberg, Germany
Jeffrey Cookston,
San Francisco State University, United States

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Public Health

Received: *05 February 2020*
Accepted: *10 December 2020*
Published: *08 January 2021*

Citation:
Sjögren Forss K, Mangrio E, Leijon M, Grahn M and Zdravkovic S (2021) Physical Activity in Relation to Wellbeing Among Newly Arrived Refugees in Sweden: A Quantitative Study. Front. Public Health 8:532883. doi: 10.3389/fpubh.2020.532883

INTRODUCTION

Refugees comprise a vulnerable group in several ways and they are frequently exposed to significant health-related risk factors. Good health is essential not only for everyday life (1) but also for refugees' abilities to integrate themselves into their new societies and labor markets (2). Refugees' health-related situations behaviors must therefore be addressed from multiple perspectives.

Previous studies have shown that many refugees suffer from complex mental health needs (3, 4) such as those caused by trauma, war or violence in their home country and difficult and traumatic journeys to their new host countries, which can cause depression, anxiety and post-traumatic stress disorder (5, 6). Refugees are also frequently exposed to stressful situations after arriving in their host countries such as lengthy asylum processes, poor living conditions, and uncertainty about their future and these can have additional negative impacts on their health and wellbeing (7–9). Previous research has also shown that insomnia,

potentially as a result of these circumstances, is common among refugees; moreover, insomnia is also often correlated with a variety of depressive symptoms (10).

Physical activity (PA) has a well-documented positive impact on health (11); it can prevent or delay the onset of a variety of mental disorders and may also have therapeutic benefits when used as alone or as adjunct treatment (12). PA significantly enhances wellbeing (13) and individuals who are regularly physically active has been found to have a higher life satisfaction as compared to those who are inactive (14–16). Evidence also suggests that moderate-to-vigorous PA ameliorate the quality of sleep in adults by reducing the length of time it takes to go to sleep and reducing the time one is awake after going to sleep and before rising in the morning. The time in deep sleep can also increase as a result of PA as well as a reduction of daytime sleepiness (17).

However, studies about PA among refugees are sparse. A few studies have found that the benefits of PA were well known among refugees, but that the biggest barrier to their participation was lack of familiarity and comfort with taking the first steps toward PA in their new host country (18, 19). A majority of refugees in one study also stated that they were less physically active since arriving to the host country than before they fled their home countries (18); it is plausible that newly arrived refugees feel that they have more important priorities than PA (20). In a recent study from Sweden that aimed to explore trauma-afflicted refugees' participation in PA as part of their treatment it was found that the refugees experienced that PA relieved their mental distress (21). As a consequence of being more physically active, they reported an increased wellbeing that for example could be related to that the felt more resilient and less stressed, had more energy and a better sleep. They also experienced PA as a positive interruption to their daily life (21). Moreover, a study among female Somali refugees in New Zealand found that PA also improved refugees' development of social relationships and community cohesion in their new home country (22). Studies by Ollif (23) as well as by Spaaij (24) have confirmed these findings. PA may therefore be an effective way for refugees to improve their mental health by helping them cope with circumstances in their new host countries as well as with their memories from their past.

In the light of recent global increases in refugee populations, it is likely that the incidence of both physical and mental health disorders among refugees will also increase, with consequent challenges for public health. It is therefore crucial to investigate refugees' participation in PA and the impact that PA can have on refugees' health and wellbeing, however to the best of our knowledge, few studies have explored this topic to date. The present study therefore sought to investigate the relationship between PA and wellbeing among newly arrived refugees in Sweden. Wellbeing was defined here as the balance point between an individual's available resources and challenges (physiological, social, physical) (25).

MATERIALS AND METHODS

Participants

All newly arrived (range: a few months to 2 years) adult refugees in the Scania region of Sweden, who spoke Arabic, Pashto, Somali or Dari, who held either a temporary or permanent residence permit, and who participated in the obligatory public integration support program for refugees (MILSA) between February 2015 and February 2016 were asked to participate in the study. As they had applied for asylum and were granted either temporary or permanent residence permits, they had obtained refugee status. The MILSA platform is a research-based support platform for migration and health and include a close collaboration between Malmö University and the county government in Scania. MILSA is a part of Partnership Scania which is governed by the Regional Agreement (RÖK) for enabling an effective integration of migrants (26).

Data collection was conducted through a self-administered questionnaire, distributed by the civic and health communicators, and included questions about health, sleep, education level, wellbeing, housing accommodations, social relationships, work and access to healthcare. The questionnaire was translated from Swedish to Arabic, Pashto, Somali and Dari by authorized translators. Approximately, 1,700 questionnaires were distributed.

Measures

Dependent Variables

We assessed four dependent variables: sleep quality, stress, mental health, and vitality.

i) Sleep quality was assessed by the question: *How do you sleep in general?* The answers were grouped into "good" or "poor".
ii) Stress was assessed by the question: *Do you feel stressed in your daily life?* The answers were grouped into "yes" or "no".
iii) Mental health was derived by the General Health Questionnaire (GHQ) 12 scale (27).
iv) Vitality was assessed by the vitality scale from The Short Form Health Survey Questionnaire (SF-36) (28).

Low vitality was measured by SF 36 (28) from the following four questions: *Did you feel full of pep? Did you have a lot of energy? Did you feel worn out?* and *Did you feel tired?* During the past 4 weeks. For each question, the respondent was asked to give the one answer that comes closest to the way he/she has been feeling. The response alternatives provided were: *All of the time*; *Most of the time*; *A good bit of the time*; *Some of the time*; *A little of the time* and *None of the time*. The questions *Did you feel full of pep?* and *Did you have a lot of energy?* were recoded so that a low score indicated a negative outcome on all four included questions. Mean value was calculated on all answered questions (at least two of the four questions had to be answered). Sum = 4 × the mean value was produced. The sum was indexed 0–100. A cutoff value corresponding to the respondent on average answering one of the two worst response alternatives gave a low vitality.

Independent Variables

We also assessed four independent variables: PA, education levels, age, and gender. Sine current guidelines stipulate that, in order to receive significant health benefits from PA, adults should engage in at least 150 min per week of moderate intensity, or 75 min per week of vigorous intensity aerobic activity (29), we assessed participants' PA using two questions, designed to

assess high-intensity and moderate-intensity PA respectively: (1) *During a regular week,* how *much time do you spend engaging in physical exercise that causes you to be out of breath, such as running, exercise or ball sport?* And (2) *During a regular week, how much time do you spend engaging in everyday physical activities, such as walking, cycling or gardening?*

The first *question* had six possible answer choices: 0 min/no time; <30 min; 30–60 min (0.5–1 h); 60–90 min (1–1.5 h); 90–120 min (1.5–2 h) 2 h or more; *the second question* had seven possible answer choices: Calculate all time (at least 10 min at a time). Zero minute/No time; <30 min; 30–60 min (0.5–1 h); 60–90 min (1–1.5 h); 90–150 min (1.5–2.5 h); 150–300 min (2.5–5 h); and more than 300 min (5 h). Each participant's responses to the two questions were then weighted and combined into a common measure called "activity minutes" in which the time from high- intensity activities were doubled (e.g., 45 min walking + 45 min running = 135 activity min) (30). The reference group for the analyses was >300 min per week.

Independent variables also included education levels, age and gender. Education levels were categorized as high (>12 years), medium (10–12 years) or low (<9 years). Age was divided into five groups (18–34, 35–44, 45–54, 55–64, or 65–80) and was measured as a continuous variable, but for descriptive statistics. Gender was listed as either female or male.

TABLE 1 | Participant characteristics.

Gender	***N* (%)**
	Total 681
Male	461 (68)
Female	204 (30)
Not reported	16 (2)
Age	
18–34	307 (45)
35–44	155 (23)
>45	219 (32)
Education level	
High education level (>12 years of school)	301 (44)
Medium education level (10–12 years of school)	141 (21)
Low education level (<9 years of school)	146 (21)
Not reported	93 (14)

Statistical Analysis

We used descriptive statistics to evaluate participants' sample characteristics, which were calculated as frequencies and percentages. Logistic regression was used to analyse the association between the dependent variables and the independent variable PA by calculating the odds ratios (OR) and 95% confidence intervals (CI). Multiple logistic regression was used to calculate adjusted OR and 95% CI for the influence of education levels, age, and gender as possible confounding variables. *P*-values below 0.05 were considered statistically significant. All statistical analyses were conducted using SPSS Statistics 22 for Windows (IBM Corporation, Armonk, New York, United States) was used for the analysis.

RESULTS

In total, 681 newly arrived refugees speaking Arabic or Dari answered the questionnaire (response rate 39.5%). Sociodemographic information of the participants is presented in **Table 1**.

The crude analyses resulted in significant association between all levels of PA and all wellbeing parameters except for poor mental wellbeing and PA of 150 and 299 min per week (presented in **Table 2**). The OR of poor sleeping resulted in 2.2 (95% CI 1.2–4.0) for those with a PA of 0 min/week and in 2.5 (1.4–4.4) for those with 1–149 min/week of PA. The OR of stress resulted in 3.9 (95% CI 2.1–7.2) for those with a PA of 0 min/week and in 2.3 (95% CI 1.3–3.9) for those with 1–149 min/week of PA. The OR of poor mental wellbeing resulted in 4.5 (95% CI 2.3–8.6) for those with a PA of 0 min/week and in 2.2 (1.2–4.0) for those with 1–149 min/week of PA. The OR of low vitality resulted in 5.0 (95% CI 2.2–11.5) for those with a PA of 0 min/week and in 2.4 (95% CI 1.3–4.7) for those with 1–149 min/week of PA. When adjusting these findings for age, gender, and level of education all significant OR remained significant (presented in **Table 3**). The non-significant crude association between poor

TABLE 2 | Correlations between physical activity levels and sleep, mental wellbeing, vitality and stress, given as crude odds ratios (ORs).

	Sleep		**Mental wellbeing**		**Vitality**		**Stress**	
	OR		**OR**		**OR**		**OR**	
Level of physical activity*	**95% CI**	***P*-value**	**95% CI**	***P*-value**	**95% CI**	***P*-value**	**95% CI**	***P*-value**
150–299 min/week	1.706 (1.149–3.079)	0.027	1.628 (0.969–2.378)	0.066	1.711 (1.015–2.885)	0.044	2.149 (1.337–3.452)	0.002
1–149 min/week	2.498 (1.436–4.345)	0.001	2.217 (1.228–4.005)	0.008	2.446 (1.283–4.662)	0.007	2.266 (1.305–3.936)	0.004
0 min/week	2.235 (1.247–4.006)	0.007	4.454 (2.316–8.566)	<0.001	5.027 (2.197–11.503)	<0.001	3.929 (2.135–7.228)	<0.001

**The reference group for all analyses was >300 min per week.*

TABLE 3 | Correlations between physical activity levels and sleep, mental wellbeing, vitality and stress, given as adjusted odds ratios (ORs) for age, gender and education levels.

	Sleep		Mental wellbeing		Vitality		Stress	
	OR		OR		OR		OR	
Level of physical activity*	**95% CI**	***P*-value**	**95% CI**	***P*-value**	**95% CI**	***P*-value**	**95% CI**	***P*-value**
150–299 min/week	1.881 (1.149–3.079)	0.012	1.558 (0.919–2.639)	0.1	1.749 (1.029–2.972)	0.039	2.323 (1.412–3.820)	0.001
1–149 min/week	2.826 (1.581–5.051)	<0.001	2.41 (1.310–4.436)	0.005	2.483 (1.284–4.804)	0.007	3.043 (1.691–5.475)	<0.001
0 min/week	2.504 (1.355–4.628)	0.003	4.814 (2.454–9.444)	<0.001	5.051 (2.176–11.722)	<0.001	5.426 (2.818–10.448)	<0.001

**The reference group for all analyses was > 300 min per week.*

mental wellbeing and PA of 150 and 299 min/week remained non-significant after adjusting for age, gender and educational level. Adjusting for these parameters increased the majority of the OR confirming the unadjusted results and increasing the risk that low levels of PA has on stress, poor mental wellbeing, and low vitality. For poor mental wellbeing, low vitality and stress the results indicates a trend meaning that the lower level of PA the higher risk for theses outcomes. However, this trend cannot be considered as significant.

DISCUSSION

Our findings suggest that there is a significant association between both sleep quality, mental wellbeing, vitality, and stress in relation to PA among newly arrived refugees. Consequently, encouraging participation in PA among refugees should be a priority from a public health perspective, as we know from previous research that many live in challenging conditions (7–9) that might have a negative impact on their health. Although PA cannot change refugees' living conditions, its ability to positively affect their health and wellbeing should not be underestimated and from a public health standpoint, newly arrived refugees should be encouraged to participate in PA. As we also know that there can be a decline in PA after arriving to the host country as compared to the previous PA level (19), it is important to find health promoting arenas and actors that can promote PA among refugees.

Participants in the present study took part in a public integration support program that is mandatory for all newly arrived refugees in Sweden. The program seeks to provide a basic understanding of Swedish society and a solid foundation for participants continued knowledge acquisition (26). As such, it provides an existing, practical framework within which PA opportunities could be offered to newly arrived refugees (31). For example, the programme could include information about the importance of PA and even integrate PA within the programme itself. Our findings demonstrated the importance of increasing refugees' awareness of the benefits of PA from both health and social and integration perspectives. By using a participatory approach, and thus allowing individuals to voice their perceptions to PA is important to understand and improve their health behavior and have in previous research (18) shown to be valuable in capturing refugees' perceptions of PA behavior.

It is also important to bear in mind that perceptions of PA may vary between cultures. Receptivity to PA is strongly influenced by an individual's beliefs, experiences and group identity, and it is therefore important to identify both the challenges that limit individual participation and the factors that enable it. For example, one review among culturally and linguistically diverse groups of migrants to Western societies found that environmental and socioeconomic factors, cultural or religious beliefs and issues with social relationships could all function as limiting factors of PA (32). Also, refugee's lack of knowledge about PA's benefits, as well as lack of role models who engaged in PA has been found to limit their participation in PA (33); in contrast, refugees who had social support for PA from family, friends, and their community were more physically active and expressed greater motivation for PA (18).

Thus, it is important to design PA respectfully and sustainably according to the needs of diverse groups and to the needs of the individual (34). Countries and communities should strive to create environments and conditions that enable PA, that has a potential as a calming influence, relaxation and a non-threatening social environment which can thus be a vital part to a community building process for refugees but might also promote sleep habits as well as psychological wellbeing and prevent stress. However, more research in the field is needed. Also, in most international models of refugee health, psychosocial interventions are highlighted, however few guidelines exist as to the implementation of specific programmes, for example how to promote PA.

STRENGTHS AND LIMITATIONS

The findings of the present study should be considered in the context of its limitations. The study might be considered to be of small size and thus, caution should be exercised in drawing conclusions from the findings. All participants were anonymous and thus, any dropout analysis was impossible, but an approximate drop out analyses was performed suggesting a higher participation of elderly, those with a higher level of education and lower participation of women (2). Nonetheless,

the study included all newly arrived refugees who participated in civic and health communication in the previously specified time period. In addition, it might be argued that the response rate is low, but in comparison with other studies in the field of migration and health (35) a response rate of 39.5% is to be considered rather good.

The primary limitations of the study are the cross-sectional nature of the data precluding statements of causality and also the single-items indicators for the measures of wellbeing. Also, PA were reported by the participants themselves and this may be a source of misclassification and bias the results. Self-reports are suitable to get information about PA among individuals, though there might be a risk that they either over-or underestimate their answers. It is also important to notice that the results presented in the current study should be seen in the light of that the majority of the participants were men (that might not be seen as a sample bias, but mirrors the composition of the newly arrived refugees), had a high educational level (more than 12 years) and were between 18 and 34 years. Also, the dependent variables sleep quality and stress only roughly record the underlying constructs and thus might be seen as potential limitations.

A strength of this study is at it was conducted closely after that the participants had received their permission to stay in Sweden, thus they had been in the country approximately between a few months and 2 years. The independent variables, PA, have earlier been used in Swedish public health surveys and are methodically tested concerning reliability and validity (36).

CONCLUSION

Our findings demonstrate the importance of informing refugees of the relationship between wellbeing and PA and of how and where they can participate in PA. Multisectoral efforts are needed, both to increase refugees' awareness and to support their engagement in PA, regardless of their external circumstances. However, further research is needed to identify the specific barriers to and facilitators of PA among newly arrived refugees.

DATA AVAILABILITY STATEMENT

The datasets generated for this study are available on request to the corresponding author.

ETHICS STATEMENT

This study was approved by the Regional Ethical Committee in Lund, Sweden (No 2014/2859). All participants received written information about the study and consented to participate by answering the questionnaire.

AUTHOR CONTRIBUTIONS

KSF, ML, and SZ contributed to the conception and design of the study. KSF was responsible for drafting the manuscript. MG and SZ were responsible for the analysis. EM, ML, MG, and SZ offered scientific suggestions. All authors contributed to the article and approved the submitted version.

FUNDING

Funding was provided by European Refugee Fund.

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

frontiers in Psychiatry

OPINION
published: 20 January 2021
doi: 10.3389/fpsyt.2020.587331

Refugee Status Determination Procedure and Mental Health of the Applicant: Dynamics and Reciprocal Effects

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Keywords: psychological status, post-traumatic stress disorder, asylum procedure, refugees, international protection, psychological and psychiatric assessment

OPEN ACCESS

Edited by:
Wulf Rössler, Charité – Universitätsmedizin Berlin, Germany

Reviewed by:
Kristian Garthus-Niegel, Dresden, Germany
Julia Hess, University of New Mexico, United States

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *10 August 2020*
Accepted: *22 December 2020*
Published: *20 January 2021*

Citation:
Vukčević Marković M, Kovačević N and Bjekić J (2021) Refugee Status Determination Procedure and Mental Health of the Applicant: Dynamics and Reciprocal Effects. Front. Psychiatry 11:587331. doi: 10.3389/fpsyt.2020.587331

INTRODUCTION

After being forced to flee their home countries, which is often preceded by traumatic experiences, refugees and asylum seekers are faced with multiple new transit risks while searching for safety (1–12). If they manage to make it through this journey, after arriving to destination countries, they must begin the long and often exhausting process of rebuilding their lives. This phase includes addressing existential concerns and reestablishing control over one's life, as well as psychological stabilization and going through the different phases of recovery from trauma. However, there is a growing evidence on the numerous challenges and risks for mental health stability and general well-being this phase can bring for a person in need of international protection.

There are numerous post-migration factors related to refugees' and asylum seekers' mental health and well-being (1, 2, 4, 6, 8, 13–20), including communication difficulties, difficulty in finding work and poor job conditions (2, 6, 14, 15, 21), low quality housing (22–25), difficulties in accessing health care and social services (14), loss of culture, limited access to traditional foods (1, 2, 14, 18), and reduction of social support networks which lead to experiences of isolation and loneliness (15, 26–29).

The refugee status determination procedure is a crucial step, and pre-condition for initiating the phase of rebuilding one's life. This procedure has been shown to have not only practical outcomes in terms of legal status determination and the rights it guarantees, but also a complex, dynamic, and reciprocal relationship with the mental health of the applicant, which carries additional protection and health risks. We see that this relationship is reflected through (1) the impact that different stages of the asylum procedure can have on mental health difficulties and well-being and (2) the impact different mental health difficulties can have on the refugee status determination procedure. Here we provide an evidence-based perspective on the reciprocal effects of the refugee status determination procedure and applicants' mental health status, with primary focus on trauma-related difficulties including post-traumatic stress disorder (PTSD); and provide arguments for increased sensitivity to mental health difficulties in refugee status determination procedure in order to minimize negative impact that the procedure may cause to the applicants' mental health as well as to reduce bias that can stem from PTSD symptomatology when making judgments the credibility of applicant testimonials.

REFUGEE STATUS DETERMINATION PROCEDURE: CHALLENGES FOR MENTAL HEALTH OF THE APPLICANT

The applicant must comply with several requirements in order to obtain international protection. One of them is a detailed report on the reasons for leaving their home country and previous experiences, which often includes reporting on traumatic experiences and painful human suffering that the person was exposed to. This process has been shown to increase the risk of both jeopardizing psychological stability and well-being and of retraumatization. These risks are even higher if the person in question is suffering from PTSD and/or is currently undergoing the phases of recovery from trauma in which ensuring a non-stressful and protective environment is of crucial importance.

Previous studies have shown that asylum interviews can have a stressful impact on traumatized refugees, indicating that asylum interviews can increase symptoms of intrusions (30). It has also been demonstrated that a longer asylum procedure and delays and uncertainties during the legal status determination process may have negative effects on refugees' psychological state and well-being (4, 6, 8, 13, 14, 20). In addition to this, the period during which they are expecting an asylum decision represents the phase in the asylum process that can trigger deterioration of psychological stability and impose additional risks for a person. We have witnessed, that in the case of a negative decision, there is an increased risk for a person to develop PTSD, depression and anxiety related difficulties, as well as suicidal ideation and intentions (31, 32). On the other hand, it has been demonstrated that obtaining international protection improves not only the overall well-being of a person, but also increases effects of trauma-focused therapy for PTSD (33).

It should also be noted that plethora of factors can mediate the effects of the status determination procedure on mental health. These factors include, but are not limited to gender, age, education, economic resources, country of origin, cultural, or religious background as well as previous traumatic experiences of war, torture, and family separation (18). All these can serve as both additional risk- and protective-factors depending on the individual circumstances (e.g., some age groups may be more vulnerable, but in response to that may have access to more focused and specialized services).

PSYCHOLOGICAL STATE OF AN APPLICANT: CHALLENGES FOR REFUGEE STATUS DETERMINATION PROCEDURE

Trauma-related psychological difficulties a person in need for international protection can experience represents an additional challenge in this process which can affect different stages of asylum procedure. Namely, the decision to apply for the asylum, the preparation for the asylum interview, the hearings i.e., asylum interviews, determination process, and finally the asylum decision can all be affected by applicants' psychological state. Here we focus predominantly on the asylum interviews as the stage where bias due to mental health is the most likely to happen, and with the most serious ramifications. Due to limited scope of this paper, we showcase how mental health may affect status determination procedure using the example of PTSD symptomatology.

People suffering from PTSD will experience at least some symptoms from a cluster of *Persistent avoidance of stimuli associated with the traumatic event(s),* indicating that a person will tend to *avoid distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s)* and/or *external reminders (people, places, conversations, activities, objects, situations) that arouse distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s)* (34). This can affect both readiness to apply for international protection, since applying for asylum would require a discussion of the trauma details (35), as well as difficulties in proceeding through the long and exhausting asylum procedure consisting of several stages which require a person to speak about traumatic experiences not only in detail but also repeatedly, e.g., on several occasions in asylum hearings.

Understanding the *negative alterations in cognitions and mood associated with the traumatic event(s),* cluster of PTSD symptoms (34) is of particular importance for mitigating its potential effects on the refugee status determination procedure. Namely, this process is based on appropriate evidence, but also to a large extent, determined by the capacities of the person and available legal aid which can provide support through the process of attaining credibility and making one's testimony believable Two aspects of this process are of particular importance due to their links with the psychological state of the person and the way in which trauma can affect one's capacities for providing believable/credible testimony. Specifically, people suffering from PTSD may experience difficulties related to an *inability to remember an important aspect of the traumatic event(s)*, which is exactly what is requested of an applicant during the asylum procedure. This could result in discrepancies in statements or an inability to recall some details of the traumatic experience which could be of crucial importance for the asylum claims. Previous studies indicated that these discrepancies can to occur in repeated asylum interviews and that for asylum seekers with severe post-traumatic stress, the number of discrepancies increased with the length of time between interviews (36). Results of this study strongly suggest that the assumption that discrepancies in statements or the inability to recall details of traumatic events reflect poor credibility should be put in question.

In addition to implications related to the cognitive aspect and verbal statements, the same cluster of symptoms is also related to one's emotional reactions, and can be experienced as *persistent negative emotional state, feelings of detachment or estrangement from others or persistent inability to experience positive emotions* (34), which can result in the absence of emotional reactions that are expected to follow different verbal statements and, therefore, the potential applicant may not display what would be considered normal emotional responses while recalling a traumatic event (35). Thus, the expectation that a person speaking about terrifying suffering must, at least to a moderate extent, demonstrate visible distress can be misleading

and result in an incorrect conclusion that the absence of such reactions indicates the questionable credibility of asylum claims. It is, therefore, important to bear in mind that if a person is feeling emotionally numb, or if they experience a general lack of emotional reactions, this could be a consequence of trauma-related psychological difficulties and should be carefully considered during the asylum procedure.

Finally, people experiencing PTSD, or other trauma-related difficulties, will experience at least some of the difficulties related to *marked alterations in arousal and reactivity associated with the traumatic event(s)*, including *hypervigilance* and *problems with concentration and sleep*, which could impact the asylum procedure and make it even more challenging for both the applicant and representatives of the decision-making authority.

IMPLICATIONS AND ACTION POINTS NEEDED

Bearing in mind the aforementioned challenges and links between the refugee status determination procedure and the psychological state of the applicant, action points and recommendations that lead to the prevention of both deterioration of applicant's mental health and unbiased, trauma-informed asylum decisions we believe need to be carefully considered. The issues of mental health assessment, as well as methodological and ethical considerations in designing refugee studies have been discussed in detail elsewhere (37–43), therefore here we focus on practical implications for policy makers and practitioners to build upon this evidence and establish data-driven approach to mental health protection during different stages of refugee status determination procedure.

It is important to outline that asylum procedures across the Europe are regulated in a different manner, and in terms of its stages, authority competent to decide on asylum claims, availability of legal, or psychosocial support at different stages, length of procedure, differential treatment of certain nationalities, etc. (44). However, the legal solutions do not always reflect the state of affairs in practice, which might impact asylum applicants and their expectations that are based on their knowledge on the existing legal system. Thus, legal aid, but also psychological support can be extremely significant for an individual who might be informed on the law and the steps in the procedure, but unaware of the practice. For instance, different European states have different time limits for the first instance procedure. It can last from 8 working days (45), to up to 21 months (46). Also, due to a high number of applicants, legal deadlines are often breached (47), sometimes even significantly, or the length can depend on the nationality of the applicant (48).

Therefore, it is of crucial importance, especially in countries that are developing and adjusting their asylum procedures, to establish multidisciplinary teams which will enable sensitive preparation for the asylum procedure by providing relevant information, continuous support throughout its different stages and, if needed conducting interventions by mental health experts after the interviews or hearings in order to prevent the deterioration of applicant's mental health and well-being. These teams should, by using different perspectives and expertise, be able to identify a wide scope of potential risks and intervene in a timely manner in order to provide proper protection and support.

Moreover, training programs aiming to educate and sensitize both legal representatives and decision-makers should be introduced and continuously implemented. These programs should help practitioners and decision-makers to recognize signs of psychological vulnerability and understand the effects PTSD, and other psychological difficulties could have on the asylum procedure. Finally, training programs should lead to a better understanding of the needs of traumatized refugees during asylum interviews and hearings which could lead to the asylum determination process becoming more mental health sensitive, resulting in readiness of relevant practitioners, and decision-makers to carefully consider total length of the asylum process, duration of asylum interviews, and hearings and the risks for retraumatization or jeopardizing psychological stability of an applicant. These measures can not only protect the mental health and well-being of a person in need of international protection, but also improve the quality of the decision-making process in the refugee status determination procedure.

AUTHOR CONTRIBUTIONS

MV drafted the article. NK and JB critically reviewed and revised the article. All authors contributed equally to the conception, design of work, read and approved the final version submitted for publishing.

FUNDING

MV and JB received institutional support for scientific research from the Ministry of Education, Science, and Technological Development of the Republic of Serbia. This work was supported by UNHCR Serbia, Open Society Foundation and Psychosocial Innovation Network.

ACKNOWLEDGMENTS

We owe our gratitude to UNHCR Serbia, Kahane Foundation, and Open Society Foundation, for funding projects focused on provision of psychological support to refugees and asylum seekers in Serbia, that are implemented by the Psychosocial Innovation Network, Belgrade, Serbia. The authors would like to thank Maria Caterina Gargano for language proof-reading.

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

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ORIGINAL RESEARCH
published: 27 January 2021
doi: 10.3389/fpsyt.2020.574412

Pre-school Teachers' Stereotypes and Self-Efficacy are Linked to Perceptions of Behavior Problems in Newly Arrived Refugee Children

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Introduction: Since 2015, increased numbers of refugee families with pre-school-aged children have arrived in Germany. In pre-schools, teachers' professional competence for teaching those children and adapting to their socio-emotional needs has become increasingly important. Previous research linked teachers' stereotypes and cultural beliefs to their self-efficacy and enthusiasm when teaching immigrant children. This study investigated the links between domains of pre-school teachers' professional competence (i.e., negative stereotypes, multicultural beliefs, self-efficacy, and enthusiasm when teaching newly arrived refugee children), and examined whether teachers' professional competence was linked to their perceptions of newly arrived refugee children's behavior problems.

Method: In a cross-sectional self-report survey, $N = 147$ German pre-school teachers reported on their professional competence and completed the Strengths and Difficulties Questionnaire (SDQ) for a selected refugee child from their pre-school group. We used regression modeling to link teachers' negative stereotypes and multicultural beliefs to their self-efficacy and enthusiasm for teaching refugee children. Next, we examined the links between teachers' beliefs, values, and motivational orientations to their ratings on the SDQ subscales. Last, we linked demographic data on teachers and children to teachers' professional competence and SDQ ratings.

Results: Teachers with more negative stereotypes toward newly arrived refugee children and less agreement with multicultural beliefs reported lower self-efficacy and enthusiasm for teaching newly arrived refugee children. Teachers with more negative stereotypes perceived more hyperactivity/inattention and total difficulties. Teachers with higher self-efficacy perceived less hyperactivity/inattention, less total difficulties, and more prosocial behavior. Additionally, teachers who had more experience with refugee children reported more negative stereotypes and higher agreement with multicultural beliefs. Teachers having more overall work experience perceived more total difficulties. Boys were perceived to display more externalizing behavior problems, less prosocial behavior, and more total difficulties. Older children were perceived as displaying more prosocial behavior and children from African countries were perceived as displaying more conduct problems.

OPEN ACCESS

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *19 June 2020*
Accepted: *21 December 2020*
Published: *27 January 2021*

Citation:
Chwastek S, Leyendecker B, Heithausen A, Ballero Reque C and Busch J (2021) Pre-school Teachers' Stereotypes and Self-Efficacy are Linked to Perceptions of Behavior Problems in Newly Arrived Refugee Children. Front. Psychiatry 11:574412. doi: 10.3389/fpsyt.2020.574412

Discussion: Our findings suggest that pre-school teachers' stereotypes and self-efficacy might be related to perception biases concerning newly arrived refugee children's externalizing behavior problems. Implications for the professional development of pre-school teachers and teacher-informant diagnostics of refugee children's socio-emotional needs are discussed.

Keywords: mental health, refugee, pre-school, teacher, perception, SDQ, early education, childcare

INTRODUCTION

Since 2015, large numbers of forcibly displaced children under the age of six have been arriving in Germany from conflicted and deprived regions [46.316 in 2019; (1)]. Increased levels of behavior problems of refugee children have been found in several countries, including evidence on the early childhood period (2–5). For example, elevated levels of aggressive behaviors, inattention, and peer problems were also found in refugee children attending early education programs in Germany when compared to norm data (6). Refugee children are exposed to large numbers of risk factors throughout migration periods. Many of those risk factors render the children extremely sensitive to the quality of child care services (7–9). Early childhood teachers' accurate perceptions and handling of refugee children's socio-emotional needs can promote adjustment processes and positive development during resettlement periods.

Early Education and Challenges for Teachers

In Germany, the great majority of all children aged three to six attend pre-schools, which are required to provide the learning basis for transitioning into primary school at around age 6 (10). They are in a unique position to support children at risk, as they can consider their specific needs without having to focus on strict academic content. Prior, early education was found to reduce the impact of risk factors on child development and school performance in low-income children (11, 12). Due to their backgrounds and experiences, such as interruption of formal education, young refugee children require teachers to be more flexible and to consider their specific needs (13). However, teachers often lack experience or training for working with refugee children. Teachers reported feeling insecure in effectively detecting and serving refugee children's specific needs (14–16) and to find overcoming language barriers as well as communication with the parents difficult (17). Enhancing teachers' abilities to detect specific needs and behavior problems can improve the positive impact of early education on refugee children. Especially when identifying socio-emotional needs in refugee children, understanding behaviors, overcoming stigma, cultural and linguistic barriers, engaging with parents, and having a Western understanding of mental health were identified as challenging for teachers (18). Here, teachers' professional competence seems to play an important role. To the best of our knowledge, no study has yet addressed the relationship between pre-school teachers' professional competence and their perceptions of behavior problems in refugee children.

Definition of Constructs

In their model of professional competence, Hachfeld et al. (19) define teachers' professional competence as an important component of effective teaching processes in multicultural settings. Teachers' beliefs and values (comprising stereotypes and cultural beliefs) and teachers' motivational orientations (comprising self-efficacy and enthusiasm for teaching immigrant students), amongst others, were identified as central domains influencing the teaching of culturally diverse children. In this study, we selected our constructs based on this model. We focus on multicultural beliefs, which are, besides colorblind beliefs, an aspect of cultural beliefs. Teachers with a higher agreement with multicultural beliefs recognize that students from different socio-cultural backgrounds have different perspectives and beliefs, value their students' different backgrounds as enriching and are open to embracing them in their teaching (20). This is opposed to colorblind beliefs. Teachers with colorblind beliefs believe that students' different cultural backgrounds should not be taken into account while teaching and teachers should focus on students' similarities (20). Multicultural beliefs were linked to more reported willingness to adapt one's teaching to immigrant students (19) such as ensuring that all students, despite their different cultural or linguistic backgrounds, are able to follow the lessons.

Hachfeld et al. (19) define stereotypes as negative expectancies toward immigrant students' educational engagement and motivations. We narrow down the definition to the extent to which the teachers perceive newly arrived students' refugee backgrounds as a burden for teaching. Self-efficacy and enthusiasm are looked at specifically in the context of teaching immigrant students (19). Following the model, self-efficacy is defined as the teachers' beliefs in their capabilities to successfully organize and execute specific teaching tasks in a particular context (21). We define teachers' enthusiasm as the degree of positive experiences during teaching (22) and their positive attitude to work with culturally diverse children. Differently to Hachfeld et al. (19), we relate teachers' professional competence explicitly to newly arrived refugee children in pre-school context instead of immigrant students in general.

Prior Research on the Relations of Teacher's Professional Competence

Multicultural beliefs were related to higher levels of self-efficacy and enthusiasm for teaching immigrant students as well as less negative stereotypes when teaching them (19, 23), and were negatively related to prejudicial thoughts (20). Expanding those findings, Bangura (24) found cultural awareness to positively

predict multicultural self-efficacy of teachers in training. Similar to multicultural beliefs, perceiving immigrant students as an asset instead of viewing them negatively was related to higher immigration-related self-efficacy in primary and secondary school teachers (25). Although large numbers of pre-school-aged refugee children have arrived in Germany, Hachfeld's et al. (19) model has not yet been applied to investigate adaptations of early education to refugee children's specific needs.

Prior Research on Professional Competence and the Perception of Students

Evidence suggests that teachers' professional competence influences their perceptions of children's behavior problems in educational settings. Different kinds of teachers' beliefs such as those concerning student skills and performances were linked to teachers' perceptions, judgments, and behaviors in the classroom (26). We assume that especially stereotypes and multicultural beliefs are linked to teachers' perceptions of behavior problems in refugee children. The term refugee has the potential to trigger bias in teachers, depending on their stereotypes toward traits associated with this term and their multicultural beliefs. Supporting this notion, students' ethnicity and skin color were linked to teacher ratings and expectations toward students' behavior as well as the feedback teachers provided during instructions (27). Teachers also attributed lower achievement scores to children who had ethnic first names (28). While distinct evidence for pre-school-aged children is limited, similar results were found for assessments of students' performance in primary schools (29). Evidence suggests that teachers report more behavior problems for certain subgroups of immigrant or minority children (30, 31). According to these findings, more stereotypes and less agreement with multicultural beliefs should lead to focusing on children's difficulties instead of their strengths and in consequence to increased perceptions of behavior problems. In contrast, high self-efficacy and enthusiasm could have opposite effects. Along these lines, studies found teachers' self-efficacy beliefs to be associated with their sense of efficacy in resolving cultural conflicts (32). Additionally, Gibbs (33) discussed that teachers' sense of control influences how they think, feel, and teach. Thus, higher self-efficacy could be related to lower teacher's perceptions of behavior problems in refugee children.

The Association of Teachers' Perceptions and Student Outcomes

Assessing teachers' perspectives on students in early education is crucial, as teachers' expectation biases were found to have effects on long-term student performance and also to partly mediate the effects of student characteristics on students' performance (34). Understanding the behavior problems of students increases the odds of teachers' readiness to help them (35). Furthermore, perception biases can put culturally and linguistically diverse children at a disadvantage due to misperceptions of their true learning needs. Brown (36) found teachers to misperceive foreign child behaviors as disabilities, leading to erroneous placements in language disability interventions.

Teachers' professional competence was also directly linked to motivation and achievements in students. In a systematic review of 34 articles on learning problems in refugee children, Graham et al. (37) found teacher stereotyping and low expectations to be two of the major risk factors for their students' learning problems. Similarly, teachers' self-efficacy was linked to teachers' behavior, such as trying out new techniques and being more persistent while helping, to students' academic outcomes (38), and it positively influences students' motivation and academic achievements (39). Teachers' enthusiasm was found to predict students' interests (40) and, through instructional quality, students' outcomes (41). According to these findings, accurate pre-school teachers' perceptions, along with their appropriate behavior and guidance, could help refugee children to build strong learning foundations for the transition into primary school.

This Study

To date, the links between teachers' attitudes and views on the behavior of newly arrived refugee children within early education settings are understudied. However, teachers are regular informants on children's behavior problems and thus important to understand newly arrived refugee children's socio-emotional needs. Therefore, we need to better understand (A) pre-school teachers' professional competence when teaching refugee children and (B) how teachers' professional competence facilitates serving the specific socio-emotional needs of those children. For this purpose, the present study investigates links between teachers' stereotypes, multicultural beliefs, self-efficacy, enthusiasm, and their perceptions of behavior problems in young refugee children. We hypothesize that (H1) teachers with less negative stereotypes and higher agreement with multicultural beliefs toward refugee children are likely to display increased levels of self-efficacy and enthusiasm when teaching newly arrived refugee children; (H2) teachers with more negative stereotypes and less agreement with multicultural beliefs are likely to perceive more behavior problems in newly arrived refugee children; (H3) teachers with higher self-efficacy and enthusiasm are likely to perceive fewer behavior problems in newly arrived refugee children. Additionally, we link the most important demographic child and teacher data to teachers' competence and ratings on behavior problems. This study provides important evidence on the teacher-related determinants of responding to the mental health needs of newly arrived refugee children in early education services. Implications for the professional development of pre-school teachers and their work with refugee children are discussed.

MATERIALS AND METHODS

Procedure

We surveyed teachers who worked in pre-school facilities in the German federal state of North Rhine-Westphalia (NRW) online between May and July 2018. NRW received more than **one** quarter of all refugees in Germany. The survey period

corresponds with the last quarter of the German academic year in pre-schools. First, we advertised our online survey to teachers in pre-schools via telephone, and later additionally via e-mail to increase the number of participants. When contacting pre-schools, we made sure to include both rural and urban areas. This sampling strategy intended to diversify our study sample increasing the generalizability of our results. Later, we additionally contacted pre-school teachers via a few selected social media channels, while clearly stating our inclusion criteria. Preschool teachers were included if they worked in pre-schools within NRW with at least one refugee child in their group who arrived after the year 2014. In each pre-school group, only one teacher was asked to participate. This ensured that children were not rated twice and children and groups were independent within our sample. Teachers filled in an online survey using the platform "Qualtrics" (SAP). They were asked to report on their professional competence and on the behavior problems of one selected refugee child of their group. Teachers were asked to select the child that had been attending their pre-school group for the longest period. As an incentive for participation, two tablets were raffled among the participants. The study protocol was approved by the Ethics Committee of the Faculty of Psychology of the Ruhr-University Bochum.

Participants

Overall, $N_{total} = 240$ teachers accessed the survey. We filtered out flawed datasets based on missing data analysis and, in preparation for statistical modeling, visual inspection of residual plots. We only considered fully completed questionnaires for further analysis. $N = 11$ teachers left the survey after filling in their demographic data and $n = 82$ teachers after filling in the scales of teachers' competence. We assume that those participants were not interested to fully complete the survey for unknown and random reasons. The effective sample consisted of $N = 147$ early childhood teachers. **Table 1** shows descriptive information on the participating teachers and the pre-schools they work in. Notably, more than two-thirds of teachers reported having "rather a lot" or "a lot" of experience working with refugee children. The most common languages spoken by newly arrived children in the pre-school facilities were Arabic (in 82.19% of all participating pre-schools), Kurdish (44.52%), Albanian (39.73%), Farsi (29.45%), and Serbian (21.23%). All children in this study learned German as their second language. The regional distribution of the facilities was nearly equally spread, with 46.94% being in rural or rather rural and 53.06% being in urban or rather urban areas. **Table 2** provides demographic information on the assessed refugee children. The most common countries of origin were Syria (28.35%), Iraq (10.24%), and Afghanistan (7.09%).

TABLE 1 | Descriptives on pre-school teachers and facilities.

	M	SD	Mdn	Min	Max	
Age ($n = 142$)	41.12	11.88	42.5	19	63	
Work experience in months ($n = 145$)	229.22	142.75	240	9	528	
Gender ($n = 147$)	Male					4.76%
	Female					95.24%
School-leaving qualification ($n = 147$)	Secondary school certificate					36.73%
	Vocational diploma					43.54%
	A-Levels					19.73%
Qualification ($n = 146$)	Educator					78.08%
	Employee with social and curative school qualification					8.22%
	Other					13.69%
Role at the facility ($n = 147$)	Pre-school educator					37.41%
	Pre-school manager					53.74%
	Other					8.84%
Work experience with refugee children ($n = 144$)	No experience					0.69%
	Rather no experience					29.17%
	Rather a lot of experience					52.78%
	A lot of experience					17.36%
Own migrant background[a] ($n = 147$)	Yes					10.88%
	No					89.12%
	M	**SD**	**Mdn**	**Min**	**Max**	
Total number of children in facility ($n = 146$)	74.36	39.03	67	10	369	
Newly arrived refugee children[b] ($n = 137$)	18.09	10.18	19	1	36	
Current number of refugee children ($n = 142$)	14.16	9.54	13.5	1	31	

n, number of cases; M, mean; SD, standard deviation; Mdn, median; Min, minimum stated by participants; Max, maximum stated by participants. [a]Either one parent or the teachers themselves migrated to Germany. [b]Newly arrived refugee children within the last 4 years.

Measurement

Teachers completed a set of standardized self-report questionnaires. First, teachers reported on their personal backgrounds and the pre-school facilities. Second, following the conceptual propositions by Hachfeld et al. (23) and Hachfeld et al. (19), teachers reported on their stereotypes and multicultural beliefs as central domains of their beliefs and values, and on their self-efficacy and enthusiasm for teaching refugee children as central indicators for their motivational orientations. Third, teachers reported on behavior problems of a systematically selected child using a standardized scale. For controlling order effects, scale items were presented randomly per construct. Mean values were computed for each scale of professional competence.

Demographic Information on the Teachers and Pre-school Facilities

We obtained socio-demographic information on the teachers (gender, age, professional qualification, position within the facility, experiences in educational work in general and with refugee children, migration background) and information on newly arrived children in the pre-school facilities (number of children within the facility, number of refugee children within the facility within the last four years, current number of refugee children within the facility, languages spoken by the refugee children, location of the facility). In addition, teachers provided information on the socio-demographic backgrounds of the

TABLE 2 | Descriptives on refugee children.

	M	SD	Mdn	Min	Max
Age in months ($n = 145$)	60	14.47	60	15	83
Time in pre-school in months ($n = 145$)	20.75	11.3	20	2	66
Time in Germany in months ($n = 104$)	32.8	14.69	36	2	65

		Rel number
Gender ($n = 146$)	Female	50.68%
	Male	49.32%
Region of origin ($n = 127$)	Southeastern Europe	12.59%
	Africa	10.23%
	Western Asia	47.25%
	South and Eastern Asia	11.02%
	Other	18.90%

n, number of cases; M, mean; SD, standard deviation; Mdn, median; Min, minimum stated by participants; Max, maximum stated by participants. Southeastern Europe = Albania, Greece, Montenegro, Romania, Serbia. Africa = Egypt, Eritrea, Morocco, Nigeria. Western Asia = Iran, Iraq, Syria, Turkey. South and Eastern Asia = China, Pakistan, Afghanistan.

TABLE 3 | Items assessing stereotypes and multicultural beliefs.

Stereotypes

1. In general, children from newly arrived families need more support.
2. In general, children from newly arrived families are an additional burden for the pre-school teacher.
3. Children from newly arrived families have more difficulties to cope with daily routines in pre-school.

Multicultural beliefs

1. During the apprenticeship, pre-school teachers should learn how to cope with cultural diversity.
2. During conversations with parents of different cultural backgrounds, I try to show consideration for their cultural background.
3. It is important for children to learn that people from other cultures can have different values.
4. In the pre-school classroom, it is important to be responsive to differences between cultures.

The table represents a translation of the original items.

selected children (gender, age, time spent within the facility, time spent in Germany, country of origin).

Teachers' Stereotypes and Multicultural Beliefs

In our study, stereotypes toward refugee children reflect the extent to which the teachers perceived newly arrived children's refugee backgrounds as a burden for teaching. We selected items following the SIMCUR survey (unpublished) that measured teachers' stereotypes toward immigrant children in primary schools and adapted wording to early education contexts (i.e., exchanging words such as school and pre-school). Items for the SIMCUR survey were constructed following the multicultural beliefs and stereotype scales from Hachfeld et al. (23). Whereas, the latter focused on students' school-related motivation and effort, items in the SIMCUR survey were framed to address newly arrived children's challenges in pre-school such as coping with the new surroundings and needing additional support. We assessed stereotypes using a 4-point Likert scale (1 = not accurate, 4 = very accurate).

According to Hachfeld et al. (20), multicultural beliefs measure how strongly teachers endorse that cultural backgrounds of refugee children should be considered in teaching. We selected four items of the Teacher's Cultural Beliefs Scale [TCBS; (20)] and adapted wording to early education contexts. In line with the TCBS, we used a 6-point Likert scale (1 = not accurate, 6 = very accurate). Hachfeld et al. (23) reported both scales to have a good internal consistency with $\alpha = 0.75$ for multicultural beliefs and $\alpha = 0.88$ for stereotypes. Items of both scales can be seen in **Table 3**.

Teachers' Self-Efficacy and Enthusiasm

We followed the conceptual propositions by Hachfeld et al. (19) to assess teachers' motivational orientations by measuring their perceived self-efficacy and enthusiasm for teaching refugee children. In our study, teachers' self-efficacy reflects their beliefs in their capabilities to successfully organize and execute specific teaching tasks in a refugee context. For both constructs, we used the same items and item numbers as Hachfeld et al. (23), except for changing the wording from "students with a migration background" to "newly arrived children." Self-efficacy was assessed by four items (e.g., "I am capable of addressing the specific needs of newly arrived children").

In our study, enthusiasm for teaching refugee students reflects the degree of positive experiences during teaching. It was assessed by the two items "I enjoy caring for newly arrived children" and "I enjoy working with children from different backgrounds." Participants responded to the items of motivational orientations on a four-point Likert scale (1 = not accurate, 4 = very accurate). Hachfeld et al. (19) reported both scales to have a good internal consistency with $\alpha = 0.81$ for self-efficacy and $\alpha = 0.90$ for enthusiasm.

Children's Behavior Problems

To assess perceptions of the refugee children's behavior problems, we used the German adaptation of the teacher-report Strengths and Difficulties Questionnaire [SDQ; (42, 43)] for children aged 4 to 17. The SDQ is a 25-item behavioral screening tool, consisting of five subscales (emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems, and prosocial behavior). Each subscale consists of five items on a 3-point Likert scale ranging from 0 = "absolutely not true" to 2 = "absolutely true." Sum scores were computed for each SDQ subscale. Additionally, all scale scores except for prosocial behavior are summed up into a total difficulties score. In Western and Non-Western cultures, the SDQ has demonstrated good cross-cultural validity (44). For scoring and missing data detection, we used a script provided by the authors of the SDQ measure (sdqinfo.org). We thus erased subscales for individual children if more than three items per subscale were missing and only calculated the total difficulties score if no more than two items per subscale were missing.

Statistical Analysis

All analyses were conducted in R version 1.2.1335. For the first hypothesis, we used multiple linear regression modeling to link teachers' stereotypes and multicultural beliefs to their self-efficacy and enthusiasm in separate models. For the second and third hypotheses, we used multiple linear regression modeling to, respectively, link teachers' SDQ ratings per subscale to their professional competence in separate models. Using the *plot* function for linear models, we visually inspected leverage plotted against standardized residuals and removed $n = 3$ influential data points from the dataset. We then used the function gvlma of the package "*Global Validation of Linear Model Assumptions*" [*gvlma*; (45)] to examine assumptions for linear modeling. The procedure provides information on linearity, kurtosis and skewness of residuals, homoscedasticity, and scaling of the variables. Overall, the assumptions were acceptable across all models. We used the function *vif* of the *car* package for assessing multicollinearity. The variance inflation factor did not suggest multicollinearity and we used linear regression for modeling. As theory substantiated directions for our hypotheses, we used one-sided *p*-values ($\alpha = 0.05$) for interpreting all regression models. We used Bonferroni–Holm adjustments to control for α-error inflation due to multiple testing (46). For regressing on the SDQ subscales, Bonferroni-Holm correction was used on all four subscales in one step as well as separately on total difficulties scores and prosocial behavior, as those were not part of the proposed hypotheses.

Additionally, we investigated the influence of teacher and child demographics. We conducted multiple linear regression analyses of teacher demographics (work experience, work experience with refugees, school-leaving qualification) on teachers' professional competence (enthusiasm, self-efficacy, stereotypes, multicultural beliefs) and the SDQ subscales. Additionally, we conducted multiple linear regression analyses of child demographics (age, gender, time spent in the pre-school facility, and country of origin) on SDQ subscales, as teachers reported on their professional competences before knowing which child they had to report on. Again, we used the function *gvlma* of the package *gvlma* and Bonferroni-Holm adjustments to control for α-error inflation due to multiple testing.

Based on literature, correlations, and content-wise decisions, we chose three important teacher and four important child variables for additional regression analyses on confounders. We excluded other confounding variables because some were closely related by content and our study sample did not allow for the inclusion of a large number of predictors. The excluded variables were the age of the teachers (as it highly correlated with work experience; $r = 0.932$ $p < 0.001$), qualification of pre-school teachers (as the majority of the teachers', 78.08%, had the required pre-school exam and qualification is highly correlated with teachers' school-leaving qualification), teachers' role in the facilities (as it turned out that teachers who do administrative work were also involved in regular teaching; teachers' migration backgrounds (as the percentage of teachers with a migration background was 10.88%); gender (as the proportion of men in our sample was too small for group comparisons, 4.76%). Furthermore, we excluded the time children had spent in Germany because this variable was only completed for $n = 104$ children.

RESULTS

In **Table 4**, we report descriptive information on teachers' stereotypes, multicultural beliefs, self-efficacy, enthusiasm, and perceptions of children's behavior problems. Eight teachers had one missing value in one of the subscales on professional competence. Those teachers were excluded from the analysis of the respective subscale. See **Table 4** for reliabilities of all scales. Regarding the measure for children's behavior problems, $n = 26$ SDQ subscales for $n = 20$ children were incomplete (equals 1.23% of all SDQ items).

In the first hypothesis, we expected stereotypes to be negatively associated with self-efficacy and enthusiasm, and multicultural beliefs to be positively associated with self-efficacy and enthusiasm. Our findings support this hypothesis (see **Table 5**).

Results on the second and third hypotheses are shown in **Table 6**. In the second hypothesis, we expected more stereotypes and less agreement with multicultural beliefs to be associated with the perception of more behavior problems. After Bonferroni–Holm correction, we found stereotypes to be positively associated with the perception of hyperactivity/inattention, but not with conduct, emotional or peer problems. Similarly, stereotypes were positively associated with the SDQ total difficulties score. Regression models linking multicultural beliefs to the SDQ subscales yielded no significant effects. Thus, the results only partially support the second hypothesis. In the third hypothesis, we expected higher self-efficacy and enthusiasm to be associated with the perception of fewer behavior problems. After Bonferroni-Holm correction, we only found self-efficacy to be negatively associated with the perception of hyperactivity/inattention, but no other subscale. Additionally, self-efficacy was positively associated with the SDQ total difficulties score. We found no significant links for enthusiasm.

Regression analyses of demographic data on teachers' professional competence and perception of behavior problems revealed that teachers' work experience with newly arrived children was positively associated with both teachers' stereotypes, $\beta = 0.218$, $t_{(134)} = 2.746$, $p = 0.021$, and multicultural beliefs, $\beta = 0.209$, $t_{(134)} = 2.749$, $p = 0.020$. The other demographic teacher variables, work experience and school-leaving qualification, were neither associated with stereotypes nor multicultural beliefs. Furthermore, neither self-efficacy nor enthusiasm for teaching newly arrived children were significantly associated with any of the demographic teacher variables.

Teacher's work experience, $\beta = -0.012$, $t_{(134)} = -2.575$, $p = 0.033$, was negatively associated with the perception of total difficulties. Children's male gender was positively associated with the perception of total difficulties, $\beta = 5.045$, $t_{(114)} = 3.958$, $p < 0.001$. The perception of total difficulties was not associated with any other demographic child or teacher variable. For the SDQ subscales, children's male gender was positively associated with both perception of hyperactivity/inattention, $\beta =$

TABLE 4 | Teachers' professional competence for teaching refugee children and measures of children's behavior problems (SDQ).

			M	SD	Mdn	Min	Max	Std alpha
Beliefs and values		Multicultural beliefs[a] ($n = 146$)	5.23	0.69	5.25	1.5	6	0.66
		Stereotypes[b] ($n = 146$)	2.92	0.66	3	1	4	0.67
Motivational orientation		Self-efficacy[b] ($n = 143$)	3.26	0.52	3.25	1.5	4	0.76
		Enthusiasm[b] ($n = 145$)	3.57	0.59	4	1	4	0.77[†]
SDQ	externalizing	Hyperactivity/inattention[c] ($n = 147$)	4.15	2.87	4	0	10	0.81
		Conduct problems[c] ($n = 147$)	2.24	2.45	1	0	10	0.72
	internalizing	Emotional symptoms[c] ($n = 146$)	2.59	2.39	2	0	10	0.79
		Peer relationship problems[c] ($n = 147$)	2.82	2.28	2	0	9	0.63
		Prosocial behavior[c] ($n = 147$)	6.03	2.59	6	0	10	0.78
		Total difficulties score ($n = 146$)	11.77	7.44	10.5	0	33	0.86

n, number of cases; M, mean; SD, standard deviation; Mdn, median; Min, minimum stated by participants; Max, maximum stated by participants; Std alpha, standardized Cronbach's alpha. [a] *6-point Likert-scale, 1 = "not accurate" to 6 = "very accurate."* [b] *4-point Likert-scale from 1 = "not accurate" to 4 = "very accurate."* [c] *3-point Likert-scale from 0 = "absolutely not true" to 2 = "absolutely true." For professional competence subscales, mean scores were calculated. For SDQ subscales, sum scores were calculated.* [†] *For the subscale "enthusiasm" (two items) the correlation was calculated.*

TABLE 5 | Multiple linear regression modeling for teachers' beliefs and values on teachers' motivational orientations.

Outcome	Predictor	*b*	*b (95% CI)*	*ß*	*p*[a]	Fit
Self-Efficacy	(Intercept)	2.5801	[1.84, 3.32]	−0.0057	0.944	
	Multicultural beliefs	0.2190	[0.09, 0.35]	0.2428	0.004**	
	Stereotypes	−0.1563	[−0.28, −0.03]	−0.1979	0.018**	Adj. R^2=0.0787**
Enthusiasm	(Intercept)	3.0725	[2.32, 3.83]	−0.0176	0.825	
	Multicultural beliefs	0.2231	[0.09, 0.35]	0.2411	0.003**	
	Stereotypes	−0.2207	[−0.34, −0.10]	−0.2726	<0.001**	Adj. R^2=0.1173 ***

*b, unstandardized regression weights; b (95% CI), 95% confidence intervals for the unstandardized regression weights; ß, standardized regression weights; p, two-sided p-values; Adj. R^2, adjusted R^2. **p < 0.01, ***p < 0.001* [a] *Markings indicating significances following one-sided Bonferroni–Holm correction.*

0.447, $t_{(114)} = 4.461$, $p < 0.001$, and the perception of conduct problems, $\beta = 0.284$, $t_{(114)} = 3.424$, $p = 0.023$. The children's male gender was also negatively associated with the perception of prosocial behavior, $\beta = -0.352$, $t_{(114)} = -3.860$, $p = 0.001$. Furthermore, children's age was significantly positively associated with the perception of prosocial behavior, $\beta = 0.012$, $t_{(114)} = 3.217$, $p = 0.010$. Considering the country of origin, children from the African continent (Egypt, Eritrea, Morocco, Nigeria) were rated higher on the conduct problems scale and above the average when compared to all children, $\beta = 0.363$, $t_{(114)} = 3.337$, $p = 0.030$. All other associations between teacher or child demographics and teacher's professional competence and perception of behavior problems were insignificant.

DISCUSSION

The aims of our study were two-fold: In the first part, we investigated the links between pre-school teachers' negative stereotypes, multicultural beliefs, self-efficacy, and enthusiasm when teaching newly arrived refugee children. In the second part, we investigated the links between those variables and teachers' perceptions of newly arrived refugee children's behavior problems. We found teachers' stereotypes and multicultural beliefs to be associated with their self-efficacy and enthusiasm for teaching refugee children. Moreover, we found that both teachers' stereotypes and self-efficacy were associated with their perceptions of externalizing behavior problems.

First Hypothesis

Our first research aim was to investigate the links between teachers' stereotypes and multicultural beliefs toward refugee children as well as teachers' self-efficacy and enthusiasm for teaching refugee children. In line with previous research (19, 23–25), we found that negative associations between stereotypes and motivational orientations as well as positive associations between multicultural beliefs and motivational orientations hold for pre-school teachers teaching newly arrived refugee children.

In several studies, teachers have reported feeling insecure when working with refugee children (14–16). Teachers' self-efficacy has accordingly been linked to their well-being (47), suggesting that not only the well-being of refugee children but also the entire pre-school facility could benefit from considering the links between teachers' beliefs, values, and motivational orientations. Working on teachers' stereotypes and cultural beliefs may likely improve their self-efficacy and enthusiasm, which in turn could foster teachers' well-being and allow them to be more confident when teaching refugee children. As classroom quality is linked to child performance (48, 49), pre-schools with teachers displaying less stereotypes and agreeing higher

TABLE 6 | Multiple linear regression modeling for teachers' professional competence on teachers' SDQ ratings.

Outcome	Predictor	*b*	*b (95% CI)*	*ß*	*p*[a]	Fit
SDQ–total difficulties score	(Intercept)	18.9507	[5.79, 32.11]	−0.0132	0.867	
	Enthusiasm	0.5776	[−2.17, 3.32]	0.0409	0.678	
	Self-efficacy	−5.1857	[−8.3, −2.34]	−0.3491	<0.001**	
	Multicultural beliefs	0.0932	[−2.34, 1.01]	0.0080	0.924	
	Stereotypes	2.3846	[−1.84, 2.03]	0.2147	0.011*	
						Adj. $R^2 = 0.1513$***
Hyperactivity/inattention	(Intercept)	0.6541	[−0.37, 1.68]	−0.0139	0.859	
	Enthusiasm	0.0478	[−0.17, 0.26]	0.0433	0.660	
	Self-efficacy	−0.4318	[−0.65, −0.21]	−0.3729	<0.001**	
	Multicultural beliefs	0.1531	[0.00, 0.30]	0.1684	0.046	
	Stereotypes	0.2034	[0.06, 0.35]	0.2165	0.005*	
						Adj. $R^2 = 0.1812$***
Conduct problems	(Intercept)	0.7856	[−0.11, 1.68]	−0.0033	0.967	
	Enthusiasm	−0.0350	[−0.22, 0.15]	−0.0370	0.714	
	Self-efficacy	−0.1774	[−0.37, 0.02]	−0.1788	0.074	
	Multicultural beliefs	−0.0203	[−0.15, 0.11]	−0.0261	0.761	
	Stereotypes	0.1606	[0.04, 0.29]	0.2467	0.0112	
						Adj. $R^2 = 0.0851$**
Peer relationship problems	(Intercept)	1.3958	[0.56, 2.23]	−0.0072	0.930	
	Enthusiasm	0.0151	[−0.16, 0.19]	0.0173	0.865	
	Self-efficacy	−0.2329	[−0.41, −0.05]	−0.2550	0.012	
	Multicultural beliefs	−0.0667	[−0.19, 0.06]	−0.0931	0.284	
	Stereotypes	0.0733	[−0.04, 0.19]	0.1074	0.213	
						Adj. $R^2 = 0.0738$**
Emotional symptoms	(Intercept)	0.9869	[0.05, 1.93]	−0.0208	0.806	
	Enthusiasm	0.0861	[−0.11, 0.28]	0.0921	0.386	
	Self-efficacy	−0.1967	[−0.40, 0.01]	−0.2002	0.057	
	Multicultural beliefs	−0.0522	[−0.19, 0.09]	−0.0677	0.456	
	Stereotypes	0.0416	[−0.09, 0.17]	0.0566	0.527	
						Adj. $R^2 = 0.0105$
Prosocial behavior	(Intercept)	−0.2828	[−1.19, 0.63]	0.0279	0.718	
	Enthusiasm	0.1643	[−0.03, 0.36]	0.1649	0.091	
	Self-efficacy	0.3031	[0.11, 0.50]	0.2894	0.003**	
	Multicultural beliefs	0.0457	[−0.09, 0.18]	0.0557	0.499	
	Stereotypes	−0.1091	[−0.24, 0.02]	−0.1393	0.090	
						Adj. $R^2 = 0.1998$***

*b, unstandardized regression weights; b (95% CI), 95% confidence intervals for the unstandardized regression weights; ß, standardized regression weights; p, two-sided p-values; Adj. R^2, adjusted R^2. *p < 0.05, **p < 0.01, ***p < 0.001. [a]Markings indicating significances following one-sided Bonferroni–Holm correction. Prosocial behavior and total difficulties scores were not part of the hypothesis testing and Bonferroni-Holm adjustment was calculated separately.*

with multicultural beliefs should be more effective in fostering academic and social-emotional learning in newly arrived refugee children. This is also likely to facilitate their transition into primary schools, as establishing a positive learning environment can be an important step toward catching up with learning delays and adapting to new and unfamiliar structures, e.g., during post-migration periods.

Second Hypothesis

We found that teachers with more stereotypes were also more likely to perceive hyperactivity/inattention and total difficulties in newly arrived refugee children. This is in line with findings that teachers reported more behavior problems for certain subgroups of migrant or minority children (30, 31) and more attention problems in refugee children (6). Negative expectations toward refugee children could lead to a selective focus on more problematic aspects of child behaviors. However, our data support this notion only for externalizing behavior. This partially inconsistent pattern could be explained by the higher visibility of children's externalizing behavior problems over their internalizing problems. Surprisingly, teachers with more stereotypes did not perceive more conduct problems, which are also externalizing problems. Nonetheless, our evidence on this is at the borderline as the link between stereotypes and

conduct problems had reached significance before Bonferroni-Holm correction ($p = 0.012$, one-sided). Future research should re-examine whether stereotypes are related to the perceptions of conduct problems as well.

We found no significant effects on behavior problems for multicultural beliefs. To the best of our knowledge, no prior evidence exists regarding the links between multicultural beliefs and perceptions. Possibly, multicultural beliefs reflect teachers' ideas on how refugee children could be integrated best–without impacting how they perceive refugee children's behaviors, emotions, or performance. Indeed, the items measuring multicultural beliefs did not refer to student achievements. During and after transitioning into primary school, however, self-regulation and navigation through social situations can become challenging for refugee children (17). Additionally, perceiving refugee children as more divergent can influence their school outcomes and performance (37). Thus, detecting conduct and other behavior problems as unbiased as possible is crucial for promoting refugee children's learning and positive development. Previous research found that teachers exhibited stereotypes toward refugee children (37). Teacher training aiming at improving early education for refugee children should thus focus on reducing teachers' stereotypes, whereas our findings suggest that considering the degree of multicultural beliefs is less important.

Third Hypothesis

We found that teachers with higher self-efficacy were less likely to perceive hyperactivity/inattention and total difficulties in newly arrived refugee children. Consistently, previous research found that teachers' self-efficacy beliefs contributed to predicting their sense of efficacy in resolving cultural conflicts (32). Thus, teachers with higher self-efficacy might perceive certain child behaviors as less problematic, as they are more confident about their ability to solve potentially arising conflicts. In our investigation, perception bias could have also arisen when teachers with lower self-efficacy did not trust their abilities to detect behavior problems and thus reported lower scores in the SDQ subscales. Again, it is surprising that teachers with higher self-efficacy perceived less hyperactivity/inattention, but not less conduct problems. The items for identifying conduct problems refer to negative interactions with peers and adults. Items for hyperactivity/inattention do not differ between hyperactivity and inattention, while the latter might not be equally observable in German pre-school settings. In contrast to early education in other countries, pre-school curricula in Germany include more play-based learning. Hyperactivity/inattention symptoms might be less visible in play situations, as those are not extrinsically structured. This would allow for more interpretation and influence of stereotypes and self-efficacy on the teacher ratings.

We found no associations between teachers' enthusiasm and their perceptions of behavior problems. For the professional development of pre-school teachers, teachers' self-efficacy, rather than their enthusiasm, could be more important when preparing them for working with refugee children. However, teachers' enthusiasm was only assessed with two items and future research should consider expanding this measuring instrument. Interestingly, we also found that higher self-efficacy of teachers was associated with their perceptions of children's prosocial skills. We found no previous literature on this link. Future research is needed to clarify whether this association can be replicated.

Perception of Externalizing Behavior Problems

We found hyperactivity/inattention to be associated with stereotypes and self-efficacy. This is in line with other evidence suggesting that teachers might be more sensitive to externalizing mental health problems than to internalizing mental health problems (6, 50). A possible reason could be that teachers' experiences are limited to pre-schools and that internalizing behavior might be more visible in home environments (51). In addition, children in our study were very young and at an age when externalizing behavior problems are more likely to be evident. Research suggests that young children tend to display externalizing behavior symptoms even when having internalizing disorders. For example, depressive symptoms were found to be manifest in externalizing and school problems in school-aged boys (52). As refugee children often show heightened mental health problems (4, 5), it is of special importance to raise teachers' awareness of possible underlying internalizing problems.

Demographic Variables

In addition to our main analyses, we found that children's age, gender, and region of origin, as well as their teachers' work experience and work experience with refugee children were partly associated with teachers' professional competence and SDQ ratings. Teachers' work experience with refugee children was moreover related to the higher agreement with multicultural beliefs and more negative stereotypes. Such patterns suggest that working with refugee children influences teachers' stereotypes and cultural beliefs in a way that teachers who are more experienced in working with refugee children could view children's different backgrounds more positively and consider them when interacting with these children, but also are more likely to assume that refugee children encounter more difficulties in pre-school and are thus in need of more support from their teachers. Moreover, we found that teachers' work experience was negatively linked to the perception of total difficulties. Increasing work experience could thus be linked to less stigmatization of newly arrived refugee children as "traumatized," a narrative that dominates public and partially also scientific discourses. Future research could clarify and further substantiate such associations.

Children's age was only positively associated with the perception of prosocial behavior, but not with SDQ problem scales. Possibly prosocial behavior is more visible in older children. Future research should re-investigate this possible link. Moreover, children's male gender was linked to increased perception of total difficulties and externalizing behavior problems (i.e., hyperactivity/inattention and conduct problems), as well as negatively associated with the perception of prosocial behavior. This is in line with previous research, in which teachers in day care centers perceived more externalizing behavior problems in boys (53). Also, teachers in elementary schools reported more hyperactivity/inattention for boys (54). We also

found that newly arrived refugee children from Africa were reported to display more conduct problems. To the best of our knowledge, no previous literature has reported this link. Future research is needed to verify whether this finding can be replicated.

Limitations and Future Directions

This study measured teachers' perceptions with questionnaires, but these data were not corroborated by other methods. To address this limitation, teachers were asked to rate the behavior problems of the child that had been in the pre-school facility for the longest time. With this approach, we hoped to reduce the bias of choosing the child with the most visible mental health symptoms. Since we were unable to verify whether teachers followed this guideline, we cannot exclude a selection process. Additionally, it remains unclear whether pre-school teachers' professional competence influences their perceptions of behavior problems, or whether refugee children's behavior problems in pre-schools shape teachers' professional competence. This should be considered in future research. Classroom determinants such as composition could help to clarify those relations and should be addressed in future research. Nonetheless, by only sampling one teacher and child per pre-school group, we ensured better generalizability across pre-schools. Teachers' own migrant background could be related to their professional competence and the way they perceive refugee children's behavior problems. This could be investigated in future research. We also assessed work experience with refugee children as an eligibility criterion. In our sample, pre-school teachers stated to be very experienced with refugee children, and they displayed rather high agreements with multicultural beliefs as well as self-efficacy and enthusiasm for working with newly arrived children. Thus, the generalizability of our results could be limited to pre-school teachers having already worked to some extent with newly arrived children. As findings from other studies suggest that teachers often lack experience or education in teaching refugee children (14–16), future research could examine whether our findings can be generalized to teachers with less work experience with refugee children.

CONCLUSION

A large number of refugee children with heightened risks for behavior problems entered early education settings. Early education can decisively promote learning trajectories of pre-school-aged refugee children. The role of teachers' motivations, beliefs, and perceptions toward those children and their assessment abilities of behavior problems demand additional research. Teachers can provide important insights into the socio-emotional needs of young refugee children during their post-migration periods. Our findings suggest that teachers' stereotypes and self-efficacy might be related to perceptions of refugee children's externalizing behavior problems. Possible perception biases might thus be addressed by fostering teachers' professional competence and considering teachers' stereotypes and self-efficacy in teacher training. Furthermore, researchers should consider teachers' professional competence when interpreting mental health assessments of refugee children conducted by teachers.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Ethics Committee of the Faculty of Psychology of the Ruhr-University Bochum. The participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

SC contributed to manuscript writing and revision, study conceptualization, data analysis, and interpretation. BL contributed to study conceptualization, funding acquisition, manuscript feedback, and revision. AH contributed to study conceptualization and implementation. CB contributed to data curation and data analysis. JB contributed to study conceptualization, data analysis and interpretation, supervision of the research project, manuscript feedback, and revision. All authors contributed to the article and approved the submitted version.

FUNDING

We acknowledge support by the DFG Open Access Publication Funds of the Ruhr-University Bochum.

ACKNOWLEDGMENTS

We gratefully thank all pre-school teachers and childcare facilities for supporting our study.

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

frontiers in Psychiatry

ORIGINAL RESEARCH
published: 15 February 2021
doi: 10.3389/fpsyt.2021.579173

Measurement Invariance of Screening Measures of Anxiety, Depression, and Level of Functioning in a US Sample of Minority Older Adults Assessed in Four Languages

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Edited by:
Anastasia Theodoridou, Psychiatric University Hospital Zurich, Switzerland

Reviewed by:
Milena Gandy, Macquarie University, Australia
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *01 July 2020*
Accepted: *25 January 2021*
Published: *15 February 2021*

Citation:
Cruz-Gonzalez M, Shrout PE, Alvarez K, Hostetter I and Alegría M (2021) Measurement Invariance of Screening Measures of Anxiety, Depression, and Level of Functioning in a US Sample of Minority Older Adults Assessed in Four Languages. Front. Psychiatry 12:579173. doi: 10.3389/fpsyt.2021.579173

Population aging in the US and its increase in racial/ethnic diversity has resulted in a growing body of literature aimed at measuring health disparities among minority older adults. Disparities in health outcomes are often evaluated using self-reported measures and, to attend to linguistic diversity, these measures are increasingly being used in languages for which they were not originally developed and validated. However, observed differences in self-reported measures cannot be used to infer disparities in theoretical attributes, such as late-life depression, unless there is evidence that individuals from different groups responded similarly to the measures—a property known as measurement invariance. Using data from the Positive Minds-Strong Bodies randomized controlled trial, which delivered evidence-based mental health and disability prevention services to a racially/ethnically diverse sample of minority older adults, we applied invariance tests to two common measures of anxiety and depression (the GAD-7 and the HSCL-25) and two measures of level of functioning (the Late-Life FDI and the WHODAS 2.0) comparing four different languages: English, Spanish, Mandarin, and Cantonese. We found that these measures were conceptualized similarly across languages. However, at the item-level symptom burden, we identified a non-negligible number of symptoms with some degree of differential item functioning. Spanish speakers reported more *worry* symptoms and less *somatic* symptoms for reasons unrelated to their psychological distress. Mandarin speakers reported more *feelings of restlessness*, and both Mandarin and Cantonese speakers reported *no interest in things* more often for reasons unrelated to their psychological distress. Mandarin and Cantonese speakers were also found to consistently report more difficulties performing physical activities for reasons unrelated to their level of functioning. In general, invariance tests have been insufficiently applied within psychological research, but they are particularly relevant as a prerequisite to

accurately measure health disparities. Our results highlight the importance of conducting invariance testing, as we singled out several items that may require careful examination before considering their use to compare symptoms of psychological distress and level of functioning among ethnically and linguistically diverse older adult populations.

Keywords: minority older adults, linguistic minorities, measurement invariance, anxiety, depression, level of functioning

INTRODUCTION

Fueled by low fertility and increased life expectancy, the population aged 65 and over is projected to increase 150% worldwide by 2050 (1). Consistent with this pattern, the US population aged 65 and over is expected to double by 2050 and to become more ethnically diverse, with racial/ethnic minority older adults projected to make up 39.1% of the 65 years and over population compared to 20.7% in 2012 (2). Since late-life mental illnesses—particularly depression—and associated comorbidities (e.g., cognitive decline and disability) are common health problems in US older adults, population aging and its increase in racial/ethnic diversity has resulted in a growing body of literature aimed at measuring health disparities in these populations (3). These studies have revealed that racial/ethnic US minority older adults are at increased risk for severity, persistence and recurrence of psychiatric disorders (4–7) and at increased risk of functional limitations, impairment and disability (8).

Notwithstanding the importance of recognizing racial/ethnic health disparities among older adults, most research studies characterizing these populations make the underlying—yet testable—assumption that the instruments measuring health outcomes are interpreted similarly across cultures, a property known as measurement invariance. Measurement invariance evaluates the extent to which the items within an assessment instrument capture the same underlying construct either across distinct groups or time periods. Although researchers are often interested in cross-group or cross-time comparisons, it is not yet common to present evidence that those comparisons are based on comparable measures (9, 10). Moreover, psychological studies of measurement invariance comparing more than two groups are even less common. For example, from 126 invariance studies published between March 2013 and April 2014 in the *APA's PsycNet* database, Putnick and Bornstein (11) found that only 25% of invariance tests compared more than two groups.

Consider a simple example of potential consequences of measurement non-invariance. Suppose we wanted to compare Latinos and non-Latino English Speakers on distress by asking about *heart pounding*, *crying easily, headaches,* and *feeling lonely*. While these symptoms might be related to distress in both groups, the first two might be more easy for Latinos to admit than English Speakers for cultural reasons; moreover, in some samples there might be some instances of *heart pounding* and *crying easily* that are related to religious experiences rather than distress (12). As a result, if we compare Latinos and non-Latino English Speakers on a composite of these symptoms, the Latino group could incorrectly appear more distressed than the non-Latino White group because of symptom response styles, even though distress levels might actually be the same in both groups.

Since adequate statistical power to detect non-invariance depends upon the number of observations in each group being compared (13, 14), a major barrier to conducting invariance studies comparing more than two groups may be lack of adequate power. Invariance studies comparing many groups are thus particularly suitable for large-scale international surveys, which can include hundreds of thousands of observations. Cieciuch et al. (15), for example, evaluated invariance in a *values* scale using 274,447 respondents from 15 countries and six time periods (*average group size* = 3,049) from the European Social Survey (15). In contrast, psychological studies of invariance are often constrained by smaller samples. In the same review mentioned above, Putnick and Bornstein (11) also found a median total sample size of 725 observations. This would result in a relatively small group size ($N \approx 180$) if, for example, the most prevalent US racial/ethnic groups were compared (English Speakers, Blacks, Latinos, and Asians). Given that racial/ethnic minorities have generally been underrepresented in randomized trials within psychiatry and psychology (16), sample sizes using data from randomized trials are in practice likely to be much smaller.

Despite sample size limitations, invariance testing of psychological constructs among racial/ethnic minorities is critical because health disparities are often measured using self-reported measures (17) and, to attend to linguistic diversity, these measures are increasingly being used in languages for which they were not originally developed and validated (18). Eliminating racial/ethnic health disparities has also become part of the national agenda (19). In addition, federal authorities have encouraged medical researchers to attend to diversity and inclusiveness in their work (3), creating numerous programs and policies intended to reduce disparities (20). However, racial/ethnic differences in self-reported measures cannot be used to infer disparities in theoretical attributes (e.g., late-life depression) and develop public health policies unless there is evidence that individuals from different groups responded similarly to the measures.

In the present study, we apply invariance tests to psychological measures in a sample of US minority older adults (60+ years old) using two common measures of anxiety and depression symptoms—the Generalized Anxiety Disorder 7-Item Scale [GAD-7 (21)] and the Hopkins Symptoms Checklist-25 [HSCL-25 (22, 23)]—and two measures of level of functioning—the Function Component of the Late Life Functioning and Disability Instrument [Late-Life FDI (24)] and the 12-item version of the World Health Organization Disability Assessment Schedule

2.0 [WHODAS 2.0 (25, 26)]. We examine the psychometric structure of the items that make up these measures when they were administered in four languages, using data from the Positive Minds-Strong Bodies (PMSB) randomized controlled trial (27). The PMSB trial was an evidence-based mental health and disability prevention intervention, which was delivered to a racially/ethnically diverse sample of 307 minority older adults in English ($N = 66$; 21.5%), Spanish ($N = 138$; 45.0%), Mandarin ($N = 48$; 15.6%), and Cantonese ($N = 55$; 17.9%).

Because the assessment instruments used to evaluate the effectiveness of PMSB were also applied in four languages based on participants' preference (27), invariance testing was performed comparing language groups. Almost all White and Black participants responded to the assessments in English (93.5 and 95.8%, respectively), almost all Latino participants responded in Spanish (95.6%) and almost all Asian participants responded in Mandarin or Cantonese (99.0%; see **Table 1**). Thus, analyzing language groups was almost equivalent to analyzing distinct races/ethnicities for Spanish, Mandarin and Cantonese speakers, but not for English speakers. However, in contrast with previous studies comparing racial/ethnic groups assessed in the same language [e.g., Vyas et al. (7)], the PMSB trial included minority older adults that would have otherwise been excluded (i.e., non-English speakers). To remain consistent with the design of the intervention (and because of very small samples within the White and Black racial groups), invariance tests were implemented comparing languages instead of race/ethnicity groups.

METHODS

Setting and Study Sample

Participants for the PMSB trial were recruited from clinical sites and community-based organizations in Massachusetts, New York, Florida and Puerto Rico between May 2015 and May 2018 (27). Research assistants approached potential participants in-person to administer a short screener after assessing their capacity to consent. A full screener was administered if participants were 60+ years old and spoke either English, Spanish, Mandarin or Cantonese. Eligible participants had screening measures indicative of mild to severe depressive or anxiety symptoms—scored five or more on either the Patient Health Questionnaire (28), the Geriatric Depression Scale (29) or the GAD-7 (21)—and reported some degree of mobility limitations—Short Physical Performance Battery scores between three and 11 (30). Participants disclosing serious suicide plans or attempts were referred to emergency health services and rescreened 30 days after; they were eligible if found to be non-suicidal, and ineligible otherwise.

From 1,057 individuals whom were fully screened, 307 were eligible and agreed to participate—and then randomized to the intervention or control groups and scheduled for a baseline interview (27). Additional interviews were administered two, six and 12 months after baseline using participants' preferred language (66 English, 138 Spanish, 48 Mandarin, and 55 Cantonese). For the present study, we used data from the baseline assessment (before any of the 307 eligible participants received the intervention). All assessments were structured in-person interviews by trained bilingual interviewers. The Institutional Review Boards of Massachusetts General Hospital/Partners HealthCare and New York University approved the study protocol.

Measures

Anxiety and Depression

GAD-7

The GAD-7 is a 7-item self-reported measure of probable cases of Generalized Anxiety Disorder (21). Respondents are asked how often, during the last 2 weeks, they were bothered by each symptom, with responses rated on a 4-point scale (0 = *not at all* and 3 = *nearly every day*). Total scores are calculated summing all items (range: 0–21), and higher scores represent worse symptoms. Previous studies in the general population have found a 1-factor model to be the preferable solution (31).

HSCL-25

The HSCL-25 is a 25-item screener of mood symptoms—ten anxiety symptoms and 15 depressive symptoms (22, 23). Respondents are asked how much they were bothered by each symptom in the last 4 weeks, with responses rated on a 4-point scale (1 = *not at all* and 4 = *extremely*). Total scores are computed averaging all items (range: 1–4), and higher scores represent worse symptoms. A 2-factor model comprising symptoms specific to anxiety and symptoms specific to depression has been found to be the preferable solution (32, 33).

Level of Functioning

Late-Life FDI

The Late-Life FDI is a 32-item self-reported measure assessing difficulty performing daily physical activities in older adults (24). Respondents are asked about difficulties performing an activity without help from someone else or the use of assisted devices, with responses rated on a 5-point scale (1 = *cannot do* and 5 = *none*). Total scores are calculated summing all items (range: 32–160), and scores approaching 32 indicate poor ability. A 3-factor solution has been found to explain most of the variance (24), with seven items representing *upper extremity functioning*, 14 items representing *basic lower extremity functioning*, and 11 items representing *advanced lower extremity functioning*.

WHODAS 2.0

The 12-item version of the WHODAS 2.0 is a brief generic instrument assessing level of functioning in six domains of life: Cognition, mobility, self-care, getting along, life activities, and participation (25, 26). Respondents are asked about functioning difficulties experienced in the last 30 days, with responses rated on a 5-point scale (1 = *none* and 5 = *extreme or cannot do*). Final scores are calculated summing all items (range: 12–60), with higher scores representing more difficulties.

Assessment Languages

Most measures included in the present study had been previously translated and psychometrically evaluated for use among Spanish, Mandarin, and Cantonese speakers. Although Mandarin

TABLE 1 | Demographic baseline characteristics for the overall sample and by language.

	Total Sample $N = 307$		English $N = 66$		Spanish $N = 138$		Mandarin $N = 48$		Cantonese $N = 55$		χ^2(df), p
	N	%	N	%	N	%	N	%	N	%	
Age											
60–64	21	6.84	3	4.55	16	11.59	1	2.08	1	1.82	$\chi^2(6) = 38.72$, $p < 0.01$
65–74	133	43.32	28	42.42	70	50.72	6	12.50	29	52.73	
75+	153	49.84	35	53.03	52	37.68	41	85.42	25	45.45	
Gender											
Male	59	19.22	7	10.61	29	21.01	9	18.75	14	25.45	$\chi^2(3) = 4.82$, $p = 0.19$
Female	248	80.78	59	89.39	109	78.99	39	81.25	41	74.55	
Race											
White	31	10.23	29	45.31	1	0.73	1	2.13	0	0.00	$\chi^2(15) = 522.71$, $p < 0.01$
Black	24	7.92	23	35.94	1	0.73	0	0.00	0	0.00	
American Indian	1	0.33	1	1.56	0	0.00	0	0.00	0	0.00	
Asian	102	33.66	1	1.56	0	0.00	46	97.87	55	100.00	
Latino	136	44.88	6	9.38	130	94.89	0	0.00	0	0.00	
Other	9	2.97	4	6.25	5	3.65	0	0.00	0	0.00	
Education level											
Less than high school	111	36.16	11	16.67	60	43.48	7	14.58	33	60.00	$\chi^2(3) = 37.29$, $p < 0.01$
High school or more	196	63.84	55	83.33	78	56.52	41	85.42	22	40.00	
Place of birth											
Outside of U.S	210	69.54	10	15.15	99	73.33	46	100.00	55	100.00	$\chi^2(3) = 137.32$, $p < 0.01$
U.S	92	30.46	56	84.85	36	26.67	0	0.00	0	0.00	
Marital status											
Married/cohabitating	96	31.27	7	10.61	31	22.46	30	62.50	28	50.91	$\chi^2(9) = 65.64$, $p < 0.01$
Divorced/separated	85	27.69	21	31.82	52	37.68	3	6.25	9	16.36	
Widowed	98	31.92	26	39.39	40	28.99	15	31.25	17	30.91	
Never married	28	9.12	12	18.18	15	10.87	0	0.00	1	1.82	
Suicidal risk[a]											
No	287	93.49	62	93.94	132	95.65	42	87.50	51	92.73	$\chi^2(3) = 3.96$, $p = 0.27$
Yes	20	6.51	4	6.06	6	4.35	6	12.50	4	7.27	
Suicidal attempt[b]											
No	288	99.65	63	98.44	126	100.00	46	100.00	53	100.00	$\chi^2(3) = 3.53$, $p = 0.32$
Yes	1	0.35	1	1.56	0	0.00	0	0.00	0	0.00	
Any chronic condition											
No	39	12.70	6	9.09	23	16.67	6	12.50	4	7.27	$\chi^2(3) = 4.20$, $p = 0.24$
Yes	268	87.30	60	90.91	115	83.33	42	87.50	51	92.73	

Measures for invariance testing	**M (SD) (range)**	**M (SD) (range)**	**M (SD) (range)**	**M (SD) (range)**	**M (SD) (range)**	**F(df1, df2), p**
GAD-7	6.0 (4.6) (0–21)	6.2 (4.3) (0–18)	6.8 (4.5) (0–20)	3.7 (4.0) (0–16)	5.6 (5.0) (0–21)	$F_{(3,303)} = 7.13$, $p < 0.01$
HSCL-25	1.6 (0.4) (1–3)	1.6 (0.4) (1–3)	1.7 (0.5) (1–3)	1.5 (0.4) (1–2)	1.5 (0.5) (1–3)	$F_{(3,306)} = 4.82$, $p < 0.01$
Late-life FDI	117.6 (26.1) (32–160)	112.0 (22.1) (65–153)	116.1 (28.5) (32–160)	120.8 (21.4) (82–158)	125.2 (26.2) (50–160)	$F_{(3,306)} = 3.43$, $p = 0.02$
WHODAS 2.0	22.2 (7.5) (12–48)	21.9 (6.9) (13–41)	23.2 (8.0) (12–48)	20.8 (7.2) (12–39)	21.1 (6.8) (12–36)	$F_{(3,306)} = 1.89$, $p = 0.13$

[a] *Suicidal risk includes participants who responded "yes" to either (1) feeling that life was not worth living, (2) wishing they were dead, and/or (3) having thoughts of taking their lives.*
[b] *Exclusion criteria included considering suicide/having a suicidal plan and/or suicide attempt during screening. One participant in the intervention group disclosed considering suicide/having a suicidal plan at baseline.*

and Cantonese translation-equivalents are orthographically identical—in fact, the Chinese Academy of Social Sciences refers to Mandarin and Cantonese as two dialects of the same language (34)—they have many characteristics associated with distinct languages, and their spoken forms are mutually unintelligible (35, 36). Since all measures were collected via structured interviews

by trained bilingual interviewers, in practice these measures were administered in four different languages, even though the written versions were the same in Mandarin and Cantonese.

Translations for Spanish speakers were available for the GAD-7 (37) and the WHODAS 2.0 (38, 39). Translations for Mandarin and Cantonese speakers were available for the GAD-7 (40), the HSCL-25 (41) and the WHODAS 2.0 (38, 39). Other translations (i.e., the HSCL-25 for Spanish speakers and the Late-Life FDI for Spanish, Mandarin, and Cantonese speakers) were performed using the English version, first by professional translators and then by bilingual PMSB staff. These translations were thoroughly reviewed and edited by supervising PMSB staff and back translated into English. A multicultural committee of clinicians and staff at partner agencies was convened afterwards to compare translations and back translations. When the back translations revealed ambiguities, a multinational panel of researchers knowledgeable about the measures were engaged to resolve them (27).

Statistical Analysis

We began by describing baseline demographic and clinical characteristics (age, gender, race/ethnicity, education, birthplace, marital status, suicidal behaviors, and chronic conditions) for the total sample and by language, using χ^2 tests to assess significant group differences. We also presented descriptive statistics (means, standard deviations, and range) for our two measures of anxiety and depression (GAD-7 and HSCL-25) and our two measures of level of functioning (Late-Life FDI and WHODAS 2.0) in the total sample and by language, using two-tailed *F*-tests to assess significant group differences. We then tested measurement invariance using multiple group confirmatory factor analysis [CFA (42)]. In CFA, item response variation for each scale is modeled as a reflection of a latent factor representing a theoretical construct. In factor analysis terminology, we say the items load on a single factor.

Measurement Invariance Models

Based on a sequence of nested models, we tested three different levels of equivalence (43): Configural (equivalence of model form), metric (equivalence of factor loadings), and scalar (equivalence of item means). Since final scores of all analyzed measures are commonly used as a continuous scale, we treated the observed item responses as continuous variables. Additionally, we fitted separate models to each subscale of the HSCL-25 and the Late-Life FDI (i.e., anxiety and depression subscales for the HSCL-25, and *upper extremity functioning*, *basic lower extremity functioning*, and *advanced lower extremity functioning* for the Late-Life FDI) to make the one factor solution more plausible. Models were estimated using the robust maximum likelihood mean and variance adjusted estimator in Mplus 7.4 (44). To concretely illustrate each step, we focused on an example using the GAD-7 to compare anxiety symptoms between English, Spanish, Mandarin and Cantonese speakers. In this particular case, anxiety would be measured through seven continuously distributed items (e.g., *feeling nervous*, *worrying too much*) that load onto a latent factor that represents anxiety.

Configural invariance

Configural invariance assesses whether the unobserved factor (in our example the latent factor of anxiety) was related to item responses similarly across languages; that is, whether the factor structure is the same. Invariance at this level means that the basic organization of the latent construct is the same in all four languages, i.e., that the GAD-7 items load onto the same anxiety latent factor in all four languages. It is tested by evaluating overall model fit according to the criteria described below.

Metric invariance

Metric invariance assesses whether item factor loadings are similar across languages, suggesting that the latent variable is related to specific item translations to a similar degree. This model is nested within the configural model because it has the same structure but imposes equality constraints on the factor loadings. In our example, the loadings of the GAD-7 items (i.e., the loadings of the seven items on the anxiety construct) are set to be equivalent across language groups. Metric invariance holds if model fit is not worse compared to the configural model.

Scalar invariance

Scalar invariance assesses whether the item means are equivalent across languages after adjusting for possible group differences in the level of the latent variable (i.e., anxiety in our example). This model is nested within the metric model because it has the same structure but imposes equality constraints on the item intercepts, which reflect the adjusted item means. In our example, the item intercepts (means) of the seven items that load onto the anxiety construct are set to be equivalent across language groups. Scalar invariance holds if model fit is not worse compared to the metric model.

Partial invariance

If either metric or scalar invariance did not hold, we applied the concept of partial invariance (45) by identifying and setting free the factor loadings (partial metric invariance) and intercepts (partial scalar invariance) responsible for non-invariance. Metric non-invariance means that at least one loading is not equivalent across languages. In our example, non-invariance of a loading related to *worrying too much* would mean that this item is either more or less closely related to the latent construct of anxiety in one language than in the others. Scalar non-invariance indicates that at least one item intercept (mean) differs across languages. In our example, non-invariance of an item intercept for *worrying too much* would mean that speakers from one language are bothered either more or less by this symptom, but that is not related to increased or decreased levels of anxiety in that language group. Although it is recommended that a majority of the items be invariant (46), partial scalar invariance allows cross-language latent (not observed) mean differences to remain meaningful, provided that at least two of the items are invariant (47). In addition, the summed—or averaged—item responses of the invariant items can be used to compare groups (48).

When only partial scalar invariance was supported (such that only item responses from invariant items can be used to compare groups), we calculated an approximate measure of bias—and

its 95% confidence interval—for each pair of languages. We defined $Bias = \Delta_{I+N} - \Delta_I$, where Δ_{I+N} is the mean difference in invariant plus non-invariant items and Δ_I is the mean difference in invariant items only. Consistent with previous literature, we considered $|Bias| < 0.05$ indicative of trivial bias, $0.05 \leq |Bias| \leq 0.10$ indicative of moderate bias, and $|Bias| > 0.10$ indicative of substantial bias (49, 50).

Fit of Measurement Invariance Models

We assessed model fit using the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the Root Mean Squared Error of Approximation (RMSEA). CFI and TLI values above 0.90 and 0.95 are considered adequate and good, respectively; RMSEA values below 0.08 and 0.05 are considered adequate and good, respectively (51, 52). Configural invariance held if configural model fit was either good or adequate. To compare fit between nested models (i.e., metric invariance model vs. configural invariance model and scalar invariance model vs. metric invariance model), we used the χ^2 difference test ($\Delta\chi^2$), the difference in the CFI (ΔCFI) and the difference in the RMSEA (ΔRMSEA). Fit of the nested model was not worse compared to the less restricted model if either $\Delta\chi^2$ was not significant at the $\alpha = 0.05$ level (53) or $\Delta CFI \leq -0.01$ (14) and $\Delta RMSEA \leq 0.01$ (54). That is, fit of the metric invariance model was not worse compared to configural invariance model (i.e., metric invariance held) if either $\Delta\chi^2$ was not significant at the $\alpha = 0.05$ level ($p < 0.05$) or $\Delta CFI \leq -0.01$ and $\Delta RMSEA \leq 0.01$. Analogously, fit of the scalar invariance model was not worse compared to the metric invariance model (i.e., scalar invariance held) if either $\Delta\chi^2$ was not significant at the $\alpha = 0.05$ level ($p < 0.05$) or $\Delta CFI \leq -0.01$ and $\Delta RMSEA \leq 0.01$. The same model comparison fit criteria applied to partial invariance models.

Power to Detect Non-invariance

The number of observations included in measurement invariance tests is known to influence the power to detect non-invariance (13, 14). However, when it comes to invariance testing large samples are not necessarily the rule of thumb: Power to reject the hypothesis of invariance using $\Delta\chi^2$ increases as the sample size increases, which may lead to the erroneous conclusion that there is measurement non-invariance in large samples. Measurement invariance tests have thus shifted toward changes in alternative fit indices (such as ΔCFI and ΔRMSEA) because they are less sensitive to variations in sample size (14). To increase the likelihood that our sample size would not be associated with the level of measurement invariance achieved, we chose to use ΔCFI and ΔRMSEA (in addition to $\Delta\chi^2$) because these two model fit indices are less sensitive to sample size.

RESULTS

Table 1 presents the distribution of demographic and clinical characteristics in the total sample and by language, including χ^2 tests for significant group differences. Most participants were 75+ years old (49.8%), female (80.8%), Latino (44.9%), widowed (31.9%), had a high school degree or more (63.8%) and at least one chronic condition (87.3%). English speakers were more likely to self-identify as either White (45.3%) or Black (35.9%) and to be US born (84.9%). Spanish speakers were younger, less educated, and more likely to self-identify as Latino (94.9%) and to be foreign born (73.3%). Mandarin speakers were all foreign born and more likely to self-identify as Asian (97.9%) and to be married or cohabitating (62.5%). All Cantonese speakers self-identified as Asian and were foreign born.

In **Table 1** we also present the distribution of the four measures used to test measurement invariance in the total sample and by language. Compared to English speakers, Mandarin speakers reported lower anxiety symptoms per the GAD-7 ($p < 0.01$) but Spanish and Cantonese speakers reported the same level of anxiety ($p = 0.31$ and $p = 0.50$, respectively). Regarding mood symptoms, Spanish speakers had higher HSCL-25 scores than English speakers ($p = 0.03$), while both Mandarin and Cantonese speakers presented the same level of mood symptoms than English speakers ($p = 0.22$ and $p = 0.64$, respectively). Level of functioning as measured by the Late-Life FDI was the same among Spanish speakers compared to English speakers ($p = 0.29$), but Mandarin and Cantonese speakers had both higher levels of functioning than English speakers ($p = 0.03$ and $p < 0.01$, respectively). There were no significant differences across language groups in level of functioning as measured by the WHODAS 2.0.

Measurement Invariance: GAD-7

Table 2 shows multiple group CFA results. A summary of the items that were found to have some degree of non-invariance is presented in **Table 3**. Regarding the GAD-7, configural model fit was adequate, indicating that the latent construct was conceptualized similarly across languages. There was evidence of similarity of factor loadings (metric invariance) but not of item intercepts. We investigated the source of scalar non-invariance by sequentially releasing (in a backward approach) item intercepts constraints and retesting the model. Partial scalar invariance was achieved after releasing the intercepts of two items. Adjusting for the latent variable, English and Spanish speakers reported being bothered more often by the symptom *worry too much* (i.e., higher item means) whereas Spanish and Mandarin speakers reported being bothered more often by the symptom *restless/hard to sit still* compared to respondents in other languages with the same level of anxiety.

Measurement Invariance: HSCL-25

Anxiety Subscale

In the anxiety subscale, configural model fit was adequate and fit of the metric model was not worse compared to the configural model, but fit of the scalar model was worse compared to the metric model. Partial scalar invariance was achieved after freeing the intercepts of four items related to somatic symptoms of anxiety (see **Table 3**). After adjusting for the latent variable, Spanish speakers reported being bothered less by these somatic symptoms (i.e., lower item means) compared to English, Mandarin and Cantonese speakers with the same level of anxiety.

TABLE 2 | Measurement invariance testing of PMSB outcome measures across four language groups.

Model	Model fit statistics				Measurement invariance test statistics				
	χ^2 (*df*)	CFI	TLI	RMSEA (90% CI)	$\Delta\chi^2$ (Δdf)	Δp	ΔCFI	ΔRMSEA	Decision
GAD-7									
1. Configural	72.04 (56)	0.945	0.917	0.061 (0.000, 0.099)					
2. Metric (vs. 1)	90.06 (74)	0.945	0.937	0.053 (0.000, 0.089)	18.07 (18)	0.451	0.000	−0.008	Accept
3. Scalar (vs. 2)	122.38 (92)	0.896	0.905	0.066 (0.028, 0.095)	45.44 (18)	<0.01	−0.049	0.013	Reject
3a. Partial scalar (vs. 2)	106.25 (86)	0.930	0.932	0.056 (0.000, 0.088)	19.71 (12)	0.073	−0.015	0.003	Accept
HSCL-25									
Anxiety subscale[a]									
1. Configural	171.72 (140)	0.925	0.904	0.054 (0.016, 0.080)					
2. Metric (vs. 1)	195.71 (167)	0.932	0.927	0.047 (0.000, 0.073)	24.66 (27)	0.594	0.007	−0.007	Accept
3. Scalar (vs. 2)	251.89 (194)	0.864	0.873	0.062 (0.038, 0.083)	96.97 (27)	<0.01	−0.068	0.015	Reject
3a. Partial scalar (vs. 2)	213.29 (182)	0.926	0.927	0.047 (0.000, 0.072)	21.05 (15)	0.135	−0.006	0.000	Accept
Depression subscale[b]									
1. Configural	231.54 (192)	0.941	0.918	0.052 (0.019, 0.075)					
2. Metric (vs. 1)	265.93 (225)	0.938	0.928	0.049 (0.016, 0.071)	40.21 (33)	0.181	−0.003	−0.003	Accept
3. Scalar (vs. 2)	343.09 (258)	0.872	0.869	0.066 (0.046, 0.084)	136.71 (33)	<0.01	−0.066	0.017	Reject
3a. Partial scalar (vs. 2)	299.81 (252)	0.928	0.925	0.050 (0.021, 0.070)	43.60 (27)	0.023	−0.010	0.001	Accept
Late-Life FDI									
Upper extremity[c]									
1. Configural	51.63 (36)	0.941	0.902	0.076 (0.013, 0.120)					
2. Metric (vs. 1)	59.79 (51)	0.967	0.961	0.048 (0.000, 0.092)	11.28 (15)	0.733	0.026	−0.028	Accept
3. Scalar (vs. 2)	96.63 (66)	0.885	0.896	0.079 (0.041, 0.111)	57.15 (15)	<0.01	−0.082	0.031	Reject
3a. Partial scalar (vs. 2)	66.05 (57)	0.966	0.964	0.046 (0.000, 0.088)	6.77 (6)	0.343	−0.001	−0.002	Accept
Basic lower extremity[d]									
1. Configural	265.01 (216)	0.935	0.921	0.055 (0.027, 0.076)					
2. Metric (vs. 1)	306.07 (249)	0.925	0.920	0.055 (0.030, 0.075)	47.93 (33)	0.045	−0.010	0.000	Accept
3. Scalar (vs. 2)	373.57 (282)	0.879	0.887	0.065 (0.046, 0.083)	114.94 (33)	<0.01	−0.046	0.010	Reject
3a. Partial scalar (vs. 2)	330.50 (267)	0.916	0.917	0.056 (0.031, 0.074)	33.61 (18)	0.014	−0.009	0.001	Accept
Advanced lower extremity[e]									
1. Configural	252.08 (176)	0.925	0.906	0.077 (0.054, 0.098)					
2. Metric (vs. 1)	280.13 (203)	0.924	0.917	0.072 (0.050, 0.092)	26.77 (27)	0.476	−0.001	−0.005	Accept
3. Scalar (vs. 2)	367.80 (230)	0.864	0.870	0.091 (0.073, 0.108)	133.09 (27)	<0.01	−0.060	0.019	Reject
3a. Partial scalar (vs. 2)	305.30 (218)	0.914	0.913	0.074 (0.053, 0.093)	34.36 (15)	<0.01	−0.010	0.002	Accept
WHODAS 2.0									
1. Configural	239.10 (192)	0.910	0.876	0.058 (0.029, 0.080)					
2. Metric (vs. 1)	288.94 (225)	0.877	0.856	0.062 (0.032, 0.082)	61.98 (33)	<0.01	−0.033	0.004	Reject
2a. Partial metric (vs. 1)	271.48 (219)	0.899	0.879	0.057 (0.027, 0.077)	39.93 (27)	0.052	−0.011	−0.001	Accept
3. Scalar (vs. 2a)	316.04 (246)	0.866	0.856	0.062 (0.039, 0.081)	64.80 (27)	<0.01	−0.033	0.005	Reject
3a. Partial scalar (vs. 2a)	291.99 (237)	0.894	0.882	0.056 (0.030, 0.077)	24.05 (18)	0.153	−0.005	−0.001	Accept

[a] *Includes the first 10 items of the HSCL-25.*
[b] *Includes items 11-15 of the HSCL-25.*
[c] *Includes items 1, 5, 6, 13, 16, and 17 of the Late-Lile FDI.*
[d] *Includes items 2, 10, 11, 14, 15, 18, 21, 22, 23, 26, 28, and 31 of the Late-Life FDI.*
[e] *Includes items 4, 7, 8, 9, 19, 20, 24, 27, 29, 30, and 32 of the Late-Life FDI.*

Depression Subscale

Configural model fit was inadequate in the depression subscale (CFI = 0.817, TLI = 0.787, RMSEA = 0.068), and this model indicated that three items were unrelated to the underlying construct (see **Table 3**). Model fit improved after removing these items but was still inadequate (CFI = 0.877, TLI = 0.850, RMSEA = 0.070). In exploratory factor analysis (EFA) we found a very strong general factor (first to second eigenvalue ratio of 5.55–1.02) with a second factor clustering the four items related to somatic symptoms of depression: *Low energy/slowed down*, *poor appetite*, *no interest in things* and *feeling everything is an effort*. We modeled this clustering using a bifactor model, with one general depression factor and one *somatic-symptoms* factor uncorrelated with the general factor. This strategy isolates item

TABLE 3 | Summary of non-invariant items.

Item	Type of non-invariance	Description
GAD-7		
GAD3. Worry too much	Scalar (item means)	English and Spanish speakers were bothered more often by this symptom in the last 2 weeks compared to Mandarin and Cantonese, but that was not related to increased levels of anxiety.
GAD5. Restless/hard to sit still	Scalar (item means)	Spanish and Mandarin speakers were bothered more often by this symptom in the last 2 weeks compared to English and Cantonese, but that was not related to increased levels of anxiety.
HSCL-25		
Anxiety subscale		
HSCL3: Faintness, dizziness, or weakness HSCL7: Tense or keyed up HSCL8: Headaches HSCL9: Spells of terror or panic	Scalar (item means)	All these items appeared to be related to *somatic symptoms* of anxiety. Spanish speakers were bothered less by all of these *somatic symptoms* in the last 4 weeks compared to the other three languages, but that was not related to lower levels of anxiety.
Depression subscale		
HSCL13: Crying easily	Insignificant factor loading	Unrelated to the underlying construct among English speakers.
HSCL14: No sexual interest or pleasure	Insignificant factor loading	Unrelated to the underlying construct among Mandarin and Cantonese speakers.
HSCL20: Thoughts of ending your life	Insignificant factor loading	Unrelated to the underlying construct in all languages.
HSCL22: Worry too much	Scalar (item means)	English and Spanish speakers were bothered more by this symptom in the last 4 weeks compared to Mandarin and Cantonese, but that was not related to increased levels of depression.
HSCL23: No interest in things	Scalar (item means)	Mandarin and Cantonese speakers were bothered more by this symptom in the last 4 weeks compared to English and Spanish, but that was not related to increased levels of depression.
Late-Life FDI		
Upper extremity subscale		
LLF1. Unscrew lid	Scalar (item means)	Mandarin speakers had more difficulty performing this activity on a daily basis compared to the other three languages, but that was not related to decreased upper extremity functioning.
LLF3. On/off trousers	Insignificant factor loading	Unrelated to the underlying construct among Mandarin speakers.
LLF13. Reach behind back	Scalar (item means)	Mandarin and Cantonese speakers had less difficulty performing this activity on a daily basis compared to English and Spanish, but that was not related to increased upper extremity functioning.
LLF16. Remove wrapping	Scalar (item means)	Mandarin speakers had more difficulty performing this activity on a daily basis compared to the other three languages, but that was not related to decreased upper extremity functioning.
Basic lower extremity subscale		
LLF12. On/off coat or jacket	Insignificant factor loading	Unrelated to the underlying construct among Mandarin speakers.
LLF25. Bend over to pick up clothes LLF15. Open heavy door, outside LLF21. Pick up chair and move it to clean LLF22. Use step stool LLF26. Walk around one floor of home LLF28. Wash dishes while standing	Scalar (item means)	Mandarin and Cantonese speakers had more difficulty performing all of these activities on a daily basis compared to English and Spanish, but that was not related to decreased basic lower extremity functioning.
Advanced lower extremity subscale		
LLF20. 3 flights of stairs inside, handrail LLF29. Walk several blocks LLF30. Take a 1-mile walk, no rest LLF32. Walk on a slippery surface	Scalar (item means)	Mandarin/Cantonese speakers had more difficulty performing these activities on a daily basis compared to English/Spanish, but that was not related to decreased advanced lower extremity functioning.
WHODAS 2.0		
WHO3. Learn new task	Metric (factor loadings)	*Learning a new task* was more related to the cognition domain of the WHODAS 2.0 in Mandarin/Cantonese compared to English/Spanish.
WHO7. Walk 0.6+ miles	Scalar (item means)	Mandarin/Cantonese speakers had more difficulty performing this activity in the last 30 days compared to English/Spanish, but that was not related to decreased functioning.
WHO9. Get dressed	Metric (factor loadings)	*Getting dressed* was less related to the self-care domain of the WHODAS 2.0 in Mandarin/Cantonese compared to English/Spanish.

(Continued)

TABLE 3 | Continued

Item	Type of non-invariance	Description
WHO11. Maintaining a friendship	Scalar (item means)	Mandarin speakers had more difficulty performing this activity in the last 30 days compared to the other three languages, but that was not related to decreased levels of functioning.
WHO12. Day-to-day work/school	Scalar (item means)	Spanish speakers had less difficulty performing this activity in the last 30 days compared to the other three languages, but that was not related to increased levels of functioning.

response variation unaccounted for by the general depression factor. Configural model fit became adequate and there was evidence of metric invariance but not of scalar invariance. Partial scalar invariance was achieved by freeing the intercepts of two items: After adjusting for the latent variable, English and Spanish speakers reported being bothered more by the symptom *worry too much* whereas Mandarin and Cantonese speakers reported being bothered more by the symptom *no interest in things* compared to respondents in other languages with the same level of depression.

Measurement Invariance: Late-Life FDI

Upper Extremity Functioning Factor

Configural model fit for this factor was inadequate (CFI = 0.900, TLI = 0.849, RMSEA = 0.089), and this model indicated that one item was unrelated to the underlying construct in Mandarin. After removing this item, fit of the configural model improved and became adequate. There was also evidence of metric invariance, and of partial scalar invariance after freeing the intercepts of three items. Adjusting for the latent variable, Mandarin speakers reported more difficulty performing the activities *unscrew lid* and *remove wrapping* whereas Mandarin and Cantonese speakers reported less difficulty performing the activity *reaching behind back* compared to respondents in other languages with the same level of functioning.

Basic Lower Extremity Functioning Factor

Configural model fit for this factor was adequate per the CFI and RMSEA but not per the TLI (CFI = 0.915, TLI = 0.900, RMSEA = 0.056), and this model suggested that two items were unrelated to the underlying construct in Mandarin. Configural model fit was adequate after removing these two items, and there was evidence of equality of factor loadings but not of equality of item intercepts. Partial scalar invariance was achieved after freeing the intercepts of the five items. Adjusting for the latent variable, Mandarin and Cantonese speakers reported more difficulty performing the activities listed on these items (see **Table 3**) compared to English and Spanish speakers with the same level of functioning.

Advanced Lower Extremity Functioning Factor

Configural model fit for this factors was inadequate (CFI = 0.917, TLI = 0.896, RMSEA = 0.081). In EFA we found a very strong general factor (first to second eigenvalue ratio of 5.95–0.83) but two items related to *walking* clustered in a separate factor. We modeled this clustering using a bifactor model with one general advanced lower extremity factor and one *walking-symptoms* factor uncorrelated with the general factor. Configural model fit became adequate, fit of the metric model was not worse compared to the configural model, and partial scalar invariance held after freeing the intercepts of four items. Adjusting for the latent variable, Mandarin and Cantonese speakers reported more difficulty performing the activities listed on these items (see **Table 3**) compared to English and Spanish speakers with the same level of functioning.

Measurement Invariance: WHODAS 2.0

Configural model fit for the WHODAS 2.0 was inadequate (CFI = 0.739, TLI = 0.682, RMSEA = 0.092). In EFA, we found a very strong general factor (first to second to third eigenvalue ratio of 4.50 to 1.31 to 1.07), but four items clustered in two separate factors corresponding to two of the six disability domains: Mobility (*stand for 30+ min* and *walk 0.6+ miles*) and self-care (*wash whole body* and *get dressed*). We modeled this clustering using a bifactor model, with one general disability factor and six domain specific factors uncorrelated with the general factor. Configural model fit improved and although the TLI still indicated inadequate fit, we continued invariance testing using this bifactor model. Only partial metric and partial scalar invariance were achieved. Partial metric invariance held after allowing two factor loadings to be freely estimated, while partial scalar invariance held after allowing three item intercepts to be freely estimated. Compared to English and Spanish speakers, *learn new task* was more related to the cognition domain and *get dressed* was less related to the self-care domain among Mandarin and Cantonese speakers. In addition, after adjusting for the latent variable, Mandarin speakers reported more difficulty with *walk 0.6+ miles* and *maintaining a friendship* while Spanish speakers reported less difficulty with *day-to-day school/work* compared to respondents in other languages with the same level of functioning.

Bias From Removing Non-Invariant Items in Cross-Language Comparisons

Since only partial scalar invariance was supported for all measures, we calculated the bias from removing non-invariant items in cross-language comparisons (**Table 4**). Bias was either trivial or moderate, and there was significant substantial bias in only three out of 42 pairwise comparisons: Removing non-invariant items would underestimate (*Bias* > 0) mean differences between English and Spanish speakers in the anxiety subscale

TABLE 4 | Estimated bias in cross-language observed mean differences.

	English vs. Spanish	English vs. Mandarin	English vs. Cantonese	Spanish vs. Mandarin	Spanish vs. Cantonese	Mandarin vs. Cantonese
GAD-7	−0.045 (−0.229, 0.139)	−0.015 (−0.234, 0.205)	0.032 (−0.213, 0.276)	0.030 (−0.163, 0.224)	0.076 (−0.145, 0.297)	0.046 (−0.205, 0.298)
HSCL-25						
Anxiety subscale[a]	0.171* (0.005, 0.336)	0.030 (−0.161, 0.222)	0.030 (−0.164, 0.225)	−0.140 (−0.329, 0.048)	−0.140 (−0.332, 0.052)	0.000 (−0.214, 0.215)
Depression subscale[b]	0.021 (−0.189, 0.232)	0.045 (−0.215, 0.304)	0.024 (−0.234, 0.281)	0.024 (−0.199, 0.247)	0.003 (−0.218, 0.223)	−0.021 (−0.289, 0.247)
Late-Life FDI						
Upper extremity[c]	−0.116 (−0.331, 0.098)	0.131 (−0.120, 0.383)	−0.169 (−0.453, 0.116)	0.247* (0.005, 0.490)	−0.053 (−0.329, 0.224)	−0.300 (−0.606, 0.006)
Basic lower extremity[d]	0.093 (−0.147, 0.333)	0.291* (0.027, 0.554)	0.183 (−0.104, 0.470)	0.198 (−0.045, 0.440)	0.090 (−0.178, 0.357)	−0.108 (−0.397, 0.181)
Advanced lower extremity[e]	−0.063 (−0.357, 0.231)	0.173 (−0.192, 0.537)	0.176 (−0.178, 0.529)	0.236 (−0.100, 0.571)	0.239 (−0.085, 0.562)	0.003 (−0.386, 0.392)
WHODAS 2.0	0.061 (−0.117, 0.239)	0.086 (−0.133, 0.305)	0.000 (−0.205, 0.205)	0.025 (−0.177, 0.227)	−0.061 (−0.248, 0.126)	−0.086 (−0.313, 0.140)

*95% confidence intervals in brackets; * $p < 0.05$.*

[a]*Includes the first 10 items of the HSCL-25.*

[b]*Includes items 11-15 of the HSCL-25.*

[c]*Includes items 1, 5, 6, 13, 16, and 17 of the Late-Life FDI.*

[d]*Includes items 2, 10, 11, 14, 15, 18, 21, 22, 23, 26, 28, and 31 of the Late-Life FDI.*

[e]*Includes items 4, 7, 8, 9, 19, 20, 24, 27, 29, 30, and 32 of the Late-Life FDI.*

of the HSCL-25 (*effect size* = 0.27), mean differences between Spanish and Mandarin speakers in upper extremity functioning (*effect size* = 0.39), and mean differences between English and Mandarin speakers in basic lower extremity functioning (*effect size* = 0.30).

DISCUSSION

Overview

Using a racially/ethnically diverse sample of US minority older adults, we applied invariance tests to common measures of anxiety, depression and level of functioning comparing four languages: English, Spanish, Mandarin, and Cantonese. We found that the underlying theoretical constructs were conceptualized comparably in all four languages, and that item response data had a similar psychometric structure across groups. However, item-means were only partially equivalent after adjusting for possible group differences in the level of the latent variable (i.e., speakers from certain language groups were bothered more or less often by some symptoms, but that was not related to increased or decreased levels of the theoretical construct). Since only item responses from invariant items can be used to compare language groups, we calculated the bias from omitting items that appeared to function differently, and found that omitting these items did not introduce substantial bias in cross-language comparisons. Nevertheless, we identified a non-negligible number of items that may require further study before their use to compare symptoms of anxiety, depression and level of functioning among linguistically diverse older adult populations: Two out of seven items in the GAD-7; nine out of 25 items in the HSCL-25; 15 out of 32 items in the Late-Life FDI; and five out of 12 items in the WHODAS 2.0.

Anxiety and Depression

English and Spanish speakers reported more worry symptoms in both the GAD-7 and the depression subscale of the HSCL-25 for reasons unrelated to anxiety and depression, which is consistent with prior literature comparing expression of psychological distress across cultures. In a diverse cohort of cancer patients 21–84 years old, Teresi et al. (55) found that Latinos, Blacks and Spanish speakers were posited to express greater worry in the Patient Reported Outcomes Measurement Information System (PROMIS) Anxiety item bank (55). Similarly, Varela et al. (56) found that US Hispanic youth reported more worry symptoms than US European American youth in the Revised Children's Manifest Anxiety Scale (56). Since our study sample was made of older adults 60+ years old, our findings suggest then that Latinos (most of whom were assessed in Spanish) are more likely to express symptoms of worry for reasons unrelated to anxiety throughout their lifespan, and that measuring anxiety via worry symptoms among Latinos and Spanish speakers might not be warranted.

We also found that Spanish speakers (94.9% of whom self-identified as Latino) and Mandarin speakers (97.9% of whom self-identified as Asian) reported feeling more restless in the GAD-7 for reasons unrelated to anxiety. In the same cohort of cancer patients 21–84 years old, Teresi et al. (55) found that

Latinos and Asians showed a higher probability of reporting feeling anxious in the PROMIS Anxiety item bank (55). Our results are thus consistent with this previous finding since restlessness is one of the most commonly reported symptoms of feeling anxious, highlighting the need to carefully examine whether feelings of restlessness are a true indicator of anxiety symptoms among Spanish and Mandarin speakers.

We encountered that Spanish speakers reported being bothered less on several somatic symptoms items of the HSCL-25 (*faintness, dizziness or weakness*; *tense or keyed up*; *headaches*; and *spells of terror or panic*) for reasons unrelated to anxiety. There is a common notion that Latinos report more somatic symptoms of psychological distress than English Speakers (57, 58), but recent evidence also suggests that Latino older adults might not somaticize their psychological distress. Letamendi et al. (59), for example, found that while many older Mexican-Americans experience clinically significant criteria for anxiety and depression, endorsement of physical symptoms of psychological distress was very low in the Brief Symptom Inventory-18 Spanish Version, a widely used tool to assess symptoms of anxiety, depression and somatization (59). Similarly, Teresi and Golden (60) found that some of the somatic symptoms of the SHORT-Comprehensive and Assessment and Referral Evaluation Depression scale were relatively less severe indicators of depression for Latinos than for English Speakers (60). It is possible then that Latinos report either more or less somatic symptoms for reasons unrelated to psychological distress at different timepoints througout their lives. Regardless, it seems to be the case that Latinos tend to express somatic symtpoms of psychopathology differently compared to other cultures, and these differences in somatization could be primarily cultural rather than linguistic.

We also found that Mandarin and Cantonese speakers, most of whom self-identified as Asian, reported being bothered more by the symptom *no interest in things* in the HSCL-25 for reasons unrelated to depression. This finding is consistent with previous work by Zhao et al. (61) whom found that *loss of interest* items in five depression measures had low discriminating power to distinguish Chinese patients with varied levels of depression, and that these items were only associated with moderate but not severe depressive symtpoms (61). Prior research has argued that compared to Western cultures, Chinese older adults are more likely to place greater emphasis on meeting sociocultural demands—possibly because they perceive future time as more limited—and to adjust personal goals to make them consistent with their cultural values (62). It is possible then that Mandarin and Cantonese speakers interpreted *no interest in things* as a symtpom related to their own self, so they reported being bothered more by this symptom to reflect a shift toward prioritizing cultural values over personal goals, and not for reasons related to depressive symptoms.

Finally, we found that three items were unrelated to the underlying construct in the depression subscale of the HSCL-25: *Crying easily* in English, *no sexual interest or pleasure* in Mandarin and Cantonese, and *thoughts of ending your life* in all languages. Thus, we dropped these items and tested invariance using 12-items instead of 15. Regarding *crying easily* and *thoughts of ending your life*, we believe this result might be associated with specific characteristics of our sample. Almost 90% of the English speakers were female, who have been consistently found to report crying more frequently for reasons unrelated to psychological distress (63). Crying has also been found to be weakly associated with depression among US older adults (64). As noted in the section Methods, participants disclosing serious suicide plans or attempts were ineligible to participate in the study, and this was most likely the reason why *thoughts of ending your life* was unrelated to the underlying construct in all languages. In regard to *no sexual interest or pleasure*, our results support the claim that Asian populations are more reluctant to discuss sexual topics (65) and that they also suppress the expression of emotional/affective symptoms (66).

Level of Functioning

Mandarin and Cantonese speakers reported more difficulties performing physical activities in both the Late-Life FDI and the WHODAS 2.0 for reasons unrelated to their levels of functioning. We observed this result for basic/moderate tasks like *unscrewing a lid*, *removing wrapping* or *washing dishes* and for more strenuous activities like *taking a one-mile walk without rest* or *walk on a slippery surface*. A similar result was previously found in the physical function subscale of the EORTC QLC-30, a widely-used health-related quality of life instrument (67). In that study, participants from six East Asian countries (South Korea, Singapore, Taiwan, China, Myanmar, and Hong Kong), most of whom responded to the EORTC QLC-30 in Chinese, tended to score relatively high on two items regarding their ability to *take a short walk* and *needing to stay in bed* compared to respondents from the UK (all of whom responded in English). Per the authors, differential item functioning was primarily cultural rather than linguistic, which they concluded from their observation that Singaporeans, whom were bilingual and could choose either the English or Chinese translation, had response patterns from the English version that appeared closer to those of the East Asian countries than to English speaking countries.

It has been argued that there are more negative views on aging in China compared to the US in several life domains, including physical and mental fitness (68, 69). These cross-country differences do not appear to be solely explained by biological changes related to aging [e.g., decreased ability to perform daily tasks as people get older (69)], so higher population aging rates in China compared to the US cannot completely account for these differences. Variations in other factors like individualism/collectivism seem to also explain these East-West differences (69). Individualism has been found to be associated with more positive views on aging (68), and it has also been found to be higher in the US compared to China (70). Mandarin speakers in our sample were older compared to other languages (85.42% were 75+ years old), but Cantonese speakers had age profiles similar to English and Spanish speakers, supporting the idea that age group differences might not completely explain the observed differences in reports of difficulties performing physical activities. In contrast, all Mandarin and Cantonese speakers were foreign born, making them more likely to have cultural values associated with higher collectivism and lower individualism,

which can in turn make them more likely to have negative views on aging in relation to their functioning.

We also found that the item *learn new task* was more related to the WHODAS 2.0 cognition domain among Mandarin and Cantonese speakers. The possibility of some degree of culturally determined differential functioning in this item has been previously found among rural Chinese older populations in the preceding version of the WHODAS 2.0 (the WHODAS II; 26]. Spanish speakers in the present study also seemed to report less difficulties with *day-to-day school/work* for reasons unrelated to their level of functioning. In contrast, the study by Sousa et al. (26) using the WHODAS II found no cultural differences between Spanish and Chinese speaking countries for the item *everyday activities* (which was replaced by *day-to-day school/work* in the WHODAS 2.0), suggesting that more research within Latinos and Spanish speakers in relation to this item might be needed (26).

Conclusion and Limitations

Screening measures of anxiety, depression and level of functioning were found to be conceptualized similarly in a randomized trial sample of US minority older adults who were assessed in English, Spanish, Mandarin or Cantonese. However, at the item-level symptom burden, we identified symptoms with some degree of differential item functioning. Although our results were consistent with prior literature comparing expression of psychological symptoms across language and racial/ethnic groups (suggesting that the source of differential item functioning might be primarily cultural rather than linguistic), we singled out a non-negligible number of non-invariant items that may require careful examination before considering their use to compare symptoms of psychopathology among linguistically diverse older adult populations.

Our study has several limitations. Like prior studies using racial/ethnic diverse samples from randomized trials, we were constrained by small sample size in each language. A 2016 analytical review found that sample size and number of groups seem to be unrelated to the level of invariance achieved (11); however, that does not mean that our study could have not benefited from both an overall larger sample and a larger sample in each language group. Further, respondents in our sample all had mild to severe depression and anxiety symptoms and some degree of mobility limitations, so results may not generalize to older adults who have no psychological diagnoses and are functionally intact. We tested invariance comparing linguistic groups which, though most likely was equivalent to racial/ethnic group for Spanish, Mandarin and Cantonese speakers, did not apply to English speakers whom included both White and Black older adults. Finally, although previous studies have documented differences in the expression of psychopathology between males and females, we did not examine whether there were differences in our results by gender since testing measurement invariance across both gender and language groups was not the aim of our study. In addition, we believe that we would have not had adequate power to test for differences in our results by gender given the low number of males in each language group, particularly among English ($N = 7$) and Mandarin speakers ($N = 9$).

Despite these limitations, our study expands invariance testing in self-reported health outcome measures within psychological research. Health disparities are often measured using data from self-reported measures (17). Thus, our findings emphasize the importance of performing invariance tests before claiming that racial/ethnic differences in health outcomes exist or do not exist. In particular, the results from the present study indicate that to objectively compare levels of psychopathology between linguistically diverse older adult populations, several symptoms with some degree of differential item functioning might need to be excluded. Our findings also highlight the need for additional cross-validation studies using larger samples of different racial/ethnic and language groups, which would allow more in-depth analyses of the type of differential item functioning and the potential risk of response bias among ethnically and linguistically diverse patients.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by The Institutional Review Boards of Massachusetts General Hospital/Partners HealthCare and New York University. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

MA, MC-G, and KA contributed to the conception and design of the study. MC-G organized the database and performed the statistical analysis. MC-G and MA wrote the first draft of the manuscript. IH wrote sections of the manuscript. PS advised on statistical methods. All authors contributed to manuscript revision and approved the submitted version.

FUNDING

Research reported in this publication was supported by the National Institute on Aging and the National Institute of Mental Health under Grant No. R01AG046149. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. The funders (NIA, NIMH) had no role in design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; or decision to submit the manuscript for publication.

ACKNOWLEDGMENTS

We acknowledge the contribution of the partnering community organizations, research staff, and study participants, without whom this paper would not have been possible. Furthermore,

we gratefully thank Sheri Markle, Lulu Wang, Larimar Fuentes, and Yuying Guo for their assistance with study data, and Isabel O'Malley for her contributions to the revisions and preparation of the manuscript.

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

frontiers in Psychiatry

REVIEW
published: 25 February 2021
doi: 10.3389/fpsyt.2021.574100

Depressive Symptoms and Emotional Distress of Transnational Mothers: A Scoping Review

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OPEN ACCESS

Edited by:
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Reviewed by:
Miguel Angel Cano, Florida International University, United States
Carmela Alcantara, Columbia University, United States

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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *18 June 2020*
Accepted: *02 February 2021*
Published: *25 February 2021*

Citation:
Pineros-Leano M, Yao L, Yousuf A and Oliveira G (2021) Depressive Symptoms and Emotional Distress of Transnational Mothers: A Scoping Review. Front. Psychiatry 12:574100. doi: 10.3389/fpsyt.2021.574100

Background: Female led migration is a recent trend that has been gaining momentum, particularly in Latin America. However, little attention has been given to the psychological consequences of mothers who leave their children in their country of origin and migrate to a host country to work. Therefore, it is important to investigate the mental health status of transnational mothers and to further identify issues for intervention and supportive services.

Methods: PubMed, PsycINFO, ERIC, CENTRAL, Scopus, and ScienceDirect databases were searched systematically for peer-reviewed articles published from inception through July 2019. The search included the following terms: migrant, immigrant, transnational, transnational mother, AND mood disorders, depressive symptoms, and depression. Initially, 8,375 studies were identified. After exclusionary criteria were applied, 17 studies were identified and included in the review.

Results: We found six quantitative studies that investigated depressive symptoms among transnational mothers. Of these studies, three found a positive association between transnational motherhood and depressive symptoms; three of these articles found a null correlation. A total of eight qualitative studies and three mixed-methods studies were found that addressed depressive symptoms and emotional distress among transnational mothers. The eight qualitative studies identified highlighted the significant emotional distress transnational mothers experience. Lastly, the three mixed-methods studies similarly discussed the emotional hardships faced by transnational mothers.

Implications: The studies identified suggest that depressive symptoms and emotional distress are prevalent among transnational mothers. Therefore, public health social workers and other mental health providers need to focus on developing strategies to identify and screen transnational mothers for depressive symptoms.

Keywords: transnational mother, immigration, mental health, emotional distress, depressive symptoms, maternal depression

INTRODUCTION

International migration was historically led by males (1). However, in recent decades, female migration has increased (1). Recent data suggest that 47% of international migrants around the globe are female (2). In the United States (U.S.), 51.7% of immigrants are women (3). From 1990-2017, the percent of female migrants has increased in most regions around the globe, with the exception of East Asia and the Pacific, possibly due to an increased demand in male-dominated work (4). Female migration patterns appear to fluctuate due to various economic and political forces within each country and the feminization of labor (4). However, at a population level, it is currently unknown how many of these women are mothers and are separated from their children.

Transnational motherhood, a term coined initially by Hondagneu-Sotelo (5), constitutes a phenomenon in which mothers are forced to leave their children in their country of origin in order to be able to work in the host country. Investigating transnational motherhood is important for three reasons. First, mothers are often key attachment figures for children (6, 7). As key attachment figures, the initial relationships children have with their mothers impacts subsequent relationships (6–8). Moreover, the rupture of this bond, as can occur when mothers migrate apart from their children, can have lasting harmful effects on children (9, 10). A second reason it is important to focus on transnational mothers has to do with the role and the expectations that women have around motherhood. In many cultures, motherhood is often a central part of women's identity. From a social constructivist perspective, motherhood is often heavily influenced by gender norms that portray women as self-sacrificing and emotionally bound to their children (11). For transnational mothers, emotional intimacy can feel compromised by distance, and women can fall short of social expectations, which can contribute to women's feelings of failure (11). The third reason investigating transnational motherhood is important is because we still have limited research available in this population. For instance, we do not know how prevalent transnational motherhood is, the characteristics of the mothers who migrate, or the situation in which mothers live post-migration.

Immigrants from Mexico and Latin American countries make up 50% of the overall immigrant population in the U.S., making Latin America the largest region where immigrants come from (3). Although women migrate for various reasons, many Latin American women (specifically from El Salvador, Honduras, and Guatemala) migrate to the U.S. due to political strife and economic instability in their countries of origin (12). In a study of 57 Latina transnational mothers, the participants characterized their migration as a sacrifice made for the well-being of their children (5). For a majority of transnational mothers, motherhood is continuously identified as their primary identifying factor over wifehood or employment (13). However, because of financial constraints, transnational mothers often feel that it is their duty to work abroad to fund their children's education and other needs (14). Leaving children in the country of origin complicates the migratory process given that many immigrant women may already have to deal with all of the hardships of migration (low-wage jobs, poverty, isolation, and discrimination, among others) plus the emotional burden of not being physically with their children (15, 16). The emotional tumult is exacerbated by legal uncertainty propagated through immigration policy (12).

Contextual experiences in the countries transnational mothers migrate to also play a role in the emotional well-being of these mothers. For instance, negative social discourse around immigration and restrictive immigration laws have been linked to depression and anxiety among immigrants (17). In the United States, for instance, state-level immigration policies that are restrictive for the Latinx population have been linked to depression, anxiety, stress, feelings of isolation, and lowered self-esteem among Latinx individuals who reside in these states (18). As anti-immigrant rhetoric has escalated in several countries in recent years, depression and emotional distress among immigrants appear to have exacerbated (12).

Depression affects over 300 million people around the world and it is the most prevalent mental health condition worldwide (19). Depression has been found to be twice as prevalent among women than men across different societies (20). Studies available on depression and depressive symptoms among immigrant populations suggests they have lower levels of depressive symptoms, compared to their native-born counterparts (19, 20). However, the case might be different for mothers who are separated from their children. To date, most research available on transnational families explores the sequelae that separation has on the children who stay in the country of origin (21–24). For instance, a systematic review and meta-analysis investigated the effects of parental migration on the health and mental health of children (21). The review summarized information from 111 studies and found that children who had stayed in the country of origin experienced an increased risk of negative mental health outcomes such as depressive symptoms, anxiety, and suicidal ideation, among others (21). Although an abundant amount of scientific evidence suggests that family separation due to immigration has a negative impact on children's mental health, the effects that transnational motherhood has on the mental health of mothers are not clear. To address this gap, the purpose of this study was to provide a landscape of quantitative, qualitative, and mixed methods studies that have investigated the emotional sequelae of transnational motherhood on immigrant mothers, particularly around depressive symptoms.

METHODS

This study utilized Arskey and O'Malley's methodological framework for conducting scoping reviews (25) since it is the recommended framework for these type of reviews (26). A scoping review was chosen given that the literature among transnational mothers is still in its early stages; therefore, it was pertinent to provide an overview of the available research to better understand this emerging field (27). In accordance with Arskey and O'Malley's framework, the review consisted of five stages, which included (1) identifying the research question, (2)

identifying relevant studies, (3) selecting studies, (4) charting the data, and (5) collating, summarizing and reporting the results (25).

Identifying the Research Question

Before the search was conducted, we identified the research question. Leaving children behind in the country of origin is no easy task. For women, this task may be more difficult since historically they have been the ones in charge of children's care and emotional well-being (28). The research question guiding this study is: what are the emotional and mental health needs of immigrant mothers who leave their children in their country of origin?

Identifying Relevant Studies

The search was conducted using electronic searches in the following databases: PubMed, PsycINFO, ERIC, CENTRAL, Scopus, and ScienceDirect. The search included the following terms: women, migrant, immigrant, transnational, transnational mother, immigrant mother, migrant mother, AND mood disorders, emotional distress, and depression (**Supplementary Table 1**).

Researchers created the search terms to most adequately identify relevant studies. The inclusion criteria included any studies that were conducted on: (1) immigrant mothers, (2) who had at least one child in the country of origin, and (3) discussed emotional distress or mental health, particularly as it pertained to depressive symptoms (9). We did not specify countries of origin or destination for participants in an effort to encompass as much information as possible. We did not rule out studies that focused on both parents; however, our results focus strictly on the experiences of mothers.

Study Selection

The initial search yielded 8,160 articles after duplicates were removed (**Figure 1**). One researcher reviewed all the titles and identified 197 potential matches that fit the inclusion criteria. Two researchers separately reviewed the abstracts of these 197 potential matches and identified 87 articles for full text review. To ensure that all potential articles were being included in the scoping review and to ensure that different disciplines were being considered, the 87 articles were shared with an expert in the field of transnational motherhood. The expert and co-author went through the list of articles and suggested five additional articles that are considered to be in-depth ethnographic studies in the fields of sociology and anthropology. One researcher then went through each article and conducted a reference search, identifying nine additional studies for a total of 101. Of these 101 full-text articles reviewed, two researchers identified 17 studies that met the full inclusion criteria. The studies at this stage were excluded because: (a) they focused exclusively on children's outcomes ($n = 43$); (b) they did not include a discussion of depression, depressive symptoms, or emotional distress ($n = 24$); (c) the separation between mother and child was not transnational ($n = 16$); (d) the study was a review of the effects that transnational separation had on children's mental health ($n = 1$). We included one mixed-methods study that particularly focused on refugees given that some populations would fall under this category and potentially consider themselves refugees without having this legal designation. However, we ruled out studies that focused on separations through deportations, as these are usually forceful and happen in an abrupt manner. The final number of studies included in this scoping review was 17. Quantitative, qualitative, and mixed-methods studies were included.

Charting and Summarizing the Data

In order to chart and summarize the data available from different studies, we created two separate tables, one for quantitative studies and another for mixed-methods studies. These tables include relevant information about the study including the country of origin of participants, the host country, the sample size, the number of years residing in host country, the number of years separated from children, the tools used to measure depressive symptoms, and the main findings of the study. **Table 1** summarizes the information available from quantitative studies. **Table 2** summarizes the information available from mixed-methods studies and **Table 3** includes information from qualitative studies.

We also assessed the quality of quantitative studies using the Quality Assessment Tool for Observational Cohort and Cross-sectional Studies from the National Heart, Lung, and Blood Institute. This 14-item tool is designed to help reviewers assess elements of rigor and guide a qualitative risk of bias assessment as low, moderate, or high. Some of the items to assess the rigor include the population assessed in the study, justification about the sample size, the use of follow-up measurements, among others. Using this tool, two researchers independently assessed the risk of bias of all six quantitative studies and compared their ratings (**Supplementary Table 2**). Disagreement about the ratings was discussed until an agreement was reached.

RESULTS

We identified 17 studies that met the selection criteria. Thirteen of the 17 studies included focused exclusively on Latina women. Of the 17 studies, six were quantitative, eight were qualitative, and three were mixed-methods. The six quantitative studies discussed symptoms of depression among transnational mothers. Of these six quantitative studies, three found a positive association between transnational motherhood and depressive symptoms and three of them did not find an association. The qualitative findings of the three mixed-methods studies discussed the emotional hardships faced by transnational mothers, but only one of them included quantitative information on depressive symptoms among transnational mothers. The eight qualitative studies identified also highlighted the significant emotional distress transnational mothers experience.

Quantitative Studies

Literature on transnational motherhood is rather scarce, especially regarding their mental health and emotional distress. Most quantitative studies have come out within the last 15 years. Four (16, 30, 31, 33) of the six studies focused on women who

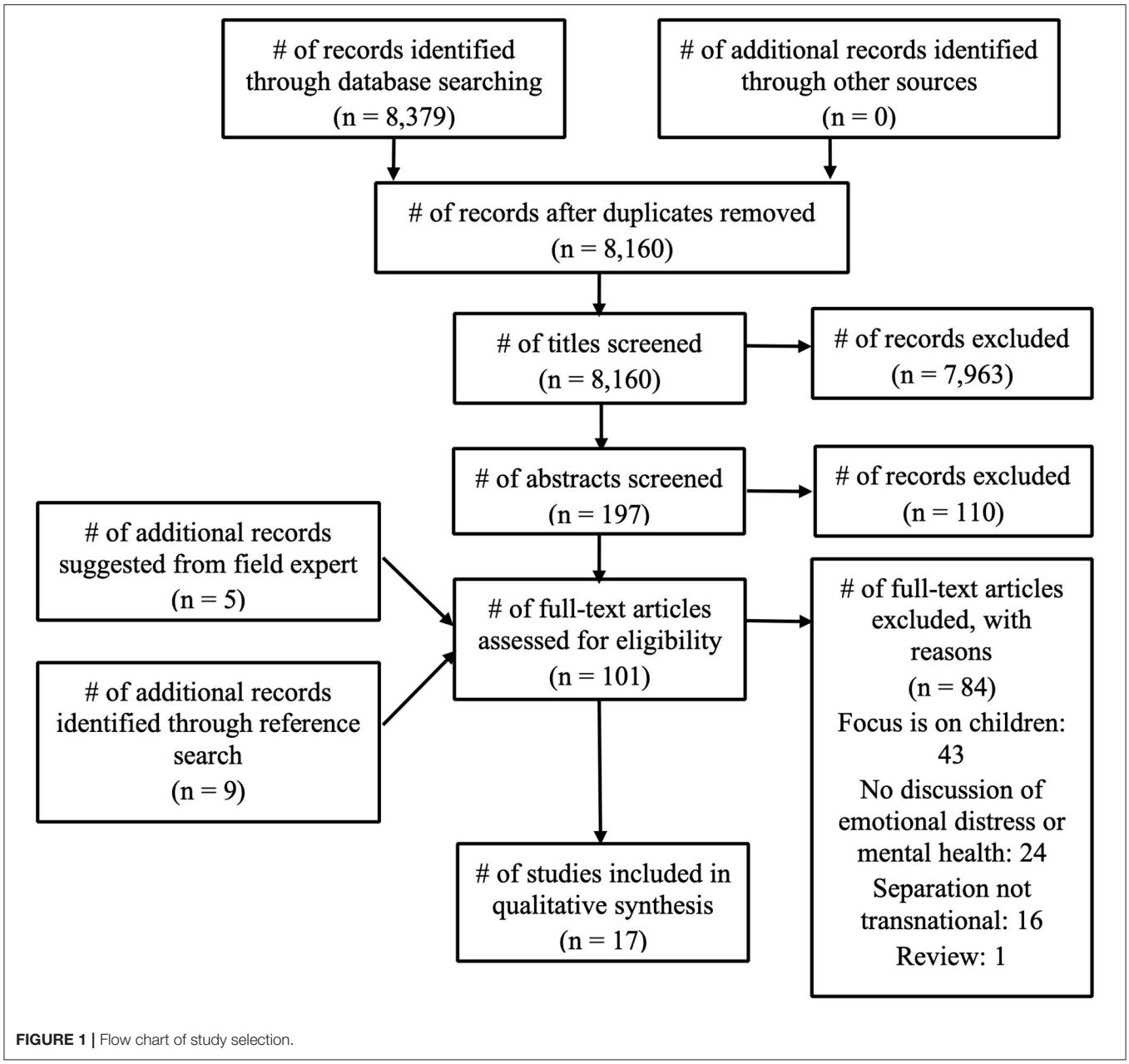

FIGURE 1 | Flow chart of study selection.

had migrated from Latin American countries to the United Sates. Most quantitative studies included recent immigrant women who had moved to the host country within the last 10 years (16, 29–31). The average age of the mothers ranged from 28 (10) to 39 years (32). Most women included in the studies had less than 12 years of education (16, 29, 31). The studies that provided information on the average length of separation between the mother and the children (30, 31, 33) ranged from 3 years (31) to about 6 years (30).

Miranda et al. (16) conducted the first quantitative study investigating the prevalence of depression among mothers who had a child living in the country of origin. In the study, the researchers screened 5,122 Latina immigrant mothers for major depression using the Primary Care Evaluation of Mental Disorders (Prime-MD). The study found that Latina mothers who had a child living in their country of origin, were 1.52 times more likely to experience depression compared to Latina immigrant mothers whose children lived with them and compared to Latina immigrant women who did not have any children (10). The risk of bias assessment indicated that this study had a low risk. One of the main strengths of this study is that it included a large and diverse sample of women from several countries in Central and South America and it was the first study to quantitatively assess the prevalence of depression among transnational mothers. However, the main limitation is that all women in the study were receiving services for a US-born

TABLE 1 | Characteristics of quantitative studies.

References	Country/countries of origin	Host country	Sample size	Years of residency in host country	Number of years separated from children	Depression scale	Results
Bouris et al. (29)	Various countries across globe. Regions where transnational mothers came from (%): Africa (33.7), Asia (20.7), Europe and North America (2.2%), and Latin America (43.5)	Canada	*N* = 514. Separated from children *n* = 92	52.2% of transnational mothers had lived in Canada for less than 2 years	N/A	Edinburgh Postnatal Depression Scale (EPDS)	Mothers who were separated from their children had a significantly higher prevalence of elevated depressive symptoms (28.3%), compared to mothers who were not separated from their children (18.6%). Mothers who were separated from their children, also displayed significantly higher symptoms of anxiety (16.5%) and clinical depression related to trauma (23.1%), compared to mothers who were not separated from their children (9.4 and 13.5%, respectively).
McCabe et al. (30).	Various Latin American countries+	USA	*N* = 425. Women with at least one minor child living abroad *n* = 37	Women with at least one minor child *M* = 6.41 (SD = 5.94)	Women with at least one minor child *M* = 5.73 years (SD = 5.47 years)	Center for Epidemiologic Studies Scale (CES-D)	Twenty-four percent of women who had not been separated from their children had elevated depressive symptoms. Twenty-eight percent of women who were separated from an adult child and 24% of women who were separated from a minor child had elevated depressive symptoms. There were not statistically significant differences on elevated depressive symptoms between women who had never been separated from their children, women who were separated from adult children, and women who were separated from minor children.
Miranda et al. (16)	Central America (%): El Salvador (40.9), Nicaragua (13.5), Guatemala (9.4), Mexico (5.6), Belize, Costa Rica, or Honduras (2.5). South America (25.2%)+, and the Caribbean (2.9%)+	USA	*N* = 5,122 Women separated from children *n* = 232	Women separated from their children *M* = 4.1 years (SD = 3.5)	N/A	Primary Care Evaluation of Mental Disorders (Prime-MD)	Among women separated from their children, the prevalence of depression was 18.1%, compared to 11.4% of women who were not separated from their children and 10.9% of women who did not have children. Women who were separated from their children were 1.5 times more likely to have depression.
Ornelas and Perreira (31)	Mexico (78%), El Salvador (4%), Honduras (6%), Central America+ (3%), South America+ (6%), and Caribbean countries+ (3%)	USA	*N* = 281. Women *n* = 223. Separated from children *n* = 124	*M* = 8 years	*M* = 3 years	Center for Epidemiologic Studies Scale (CES-D) and Patient Health Questionnaire (PHQ-9)	The prevalence of depressive symptoms was 26% measured by the PHQ-9 and of substantial depressive symptoms was 14% measured by the CES-D. Reunifying with family was associated with decreased odds of depressive symptoms (measured by the PHQ-9).
Pannetier et al. (32)	Various Sub-Saharan African countries+	France	*N* = 2,442 Women *n* = 1,189 Women with at least one minor child living abroad *n* = 114	Median = 13 years	N/A	Patient Health Questionnaire-4 (PHQ-4)	Twenty-four percent of women reported elevated depressive symptoms. There was not an association between transnational motherhood and elevated depressive/anxiety symptoms, after adjusting for sociodemographic variables.
Rusch and Reyes (33)	Mexico	USA	*N* = 53 Women separated from children *n* = 37	Most participants (*n* = 36) had lived in the US for 10 years or more	*M* = 3.27 years (SD = 1.95 years)	Center for Epidemiologic Studies Scale (CES-D)	Forty-six percent of participants had elevated depressive symptoms. Depressive symptoms of participants who had been separated from their children was not significantly different from participants who had not been separated from their children.

N/A indicates information was not available. +Countries of origin were not specified.

TABLE 2 | Characteristics of mixed-methods studies.

References	Country/countries of origin	Host country	Sample size	Years of residency in host country	Number of years separated from children	Depression scale	Findings
Rousseau et al. (34).	Latin America & Africa+	Canada	N = 113	Latin American participants *M* = 54 months African participants *M* = 40 months	*M* = 3.5 years	Symptom Checklist SCL-90R	Quantitative results demonstrated that there was not a statically significant difference in mental health symptoms among participants based on whether they had reunified with their children or not. Qualitative findings demonstrated that parents are worried about their children in their country of origin and want to reunite as soon as possible.
Suarez-Orozco et al. (35)	China (24%), Central America (19%), Dominican Republic (18%), Haiti (16%), and Mexico (23%)	USA	Quantitative longitudinal data *N* = 282 adolescents Qualitative data from parent-adolescent dyads *N* = 309	N/A	*M* = 1.2 years (SD = 1.1 year) 45% of the sample was not separated from the mother, 13% was separated for less than 2 years, 12% between 2 and 4 years, and 26% for 4 or more years	26-item psychological symptom scale developed by the research team. It included 5 domains: depression, anxiety, cognitive functioning, interpersonal sensitivity, and hostility.	Quantitative results only report children's depressive symptomology. Qualitative findings reported that separating from children generated angst and pain on the parents. Mothers maintained regular contact with their children abroad through phone calls, remittances, and letters. The reunification process was particularly difficult when the reunification process took too long; parents had to build trust and authority with their children once reunited.
Suárez-Orozco et al. (36)	China, Central America, Dominican Republic, Haiti, & Mexico	USA	*N* = 385 parent-adolescent dyads	N/A	34% of the sample was separated for their mothers less than 2 years, 38% between 2 and 4 years, and 28% for 5 or more years	26-item psychological symptom scale developed by the research team. It included 5 domains: depression, anxiety, cognitive functioning, interpersonal sensitivity, and hostility.	Quantitative results only report children's depressive symptomology. Qualitative findings suggested that parents had strong feelings of sadness about separating from their children. The findings also suggested that reunification was a complicated process fill of ambivalent emotions and it took time to readjust family dynamics.

N/A indicates information was not available. +Countries of origin were not specified.

child, which excluded mothers who did not have any children in the host country or were not receiving services for them.

More recent studies have found similar results. Ornelas and Perreira (31) studied the mental health outcomes of 281 Latina women living in the United States, with 41% having been separated from their children when migrating to the United States. Of the women who had been separated from their children, the average length of separation was 3 years. The researchers used the Patient Health Questionnaire (PHQ-9) and the Center for Epidemiological Studies Depression Scale (CES-D) to assess depressive symptoms. The study found that reunification with children reduced parents' risk for depressive symptoms, which supports the notion that separation may increase mothers' risk for depression (31). The risk of bias assessment suggested that this study had a low risk. One of the main strengths of this study is that it was conducted in North Carolina, which is considered to be a new destination for Latinx immigrants (31). However, one of the main limitations of the study is that participant recruitment was done through schools, which limited the pool to families who had already reunited, but could have been previously separated.

In a study of 514 immigrant women in Canada, Bouris and colleagues showed that 92 mothers had been separated from a child due to international migration (29). Researchers measured depressive symptomatology using the Edinburgh Postnatal Depression Scale and found that 28.3% of separated mothers had elevated depressive symptoms, compared to 18.6% of non-separated mothers, a difference that was statistically significant (29). Aside from postpartum depressive symptoms, researchers also found that separated mothers were about twice as likely to be *clinically* depressed than non-separated mothers (23.1 vs. 13.5%), as measured using parts one and two of the Hopkins Symptom Checklist-25 (29). The risk of bias assessment indicated that this study had a low risk. One of the main limitations of

TABLE 3 | Characteristics of qualitative studies.

Authors	Country/countries of origin	Host country	Sample size	Years of residency in host country	Number of years separated from children	Findings
Bernhard et al. (37)	Colombia (25%), Costa Rica (15%), Guatemala (12.5%), El Salvador (17.5%), Ecuador (15%), and Mexico (15%)	Canada	$N = 40$	N/A	Separations ranged from 2 to 96 months	Most mothers ($n = 29$) described feeling sad constantly. A total of 15 mothers described feeling very depressed. There were also discussions of feeling guilty for not being with their children. Separations were seen by the mothers as a violation of a cultural norm.
Dreby (11)	Mexico	USA	$N = 43$ Mothers n = 21	$M = 3.4$	Length of separation from mothers $M =$ 3.4 years	Findings indicated that they suffered greatly because they were not with their children. In fact, 14 mothers described they cried constantly, did not eat, or were depressed because of their children's absence. Mothers also expressed feeling guilty about not being able to be with their children.
Dreby (38)	Mexico	USA	$N = 136$ parents	N/A	N/A	Mothers described leaving their children was a difficult decision filled with sadness and inability to concentrate. Some mothers describe even having difficulty to sleep. It was also found that mothers are expected to provide more emotional support and maintain an emotional connection to her children in the country of origin, compared to fathers.
Hondagneu-Sotelo et al. (5)	Mexico, El Salvador, and Guatemala*	USA	$N = 26$	N/A	N/A	Participants described experiencing pain and sadness about not being able to live with their children and about having to negotiate their transnational relationships.
Horton (28)	El Salvador	USA	$N = 12$	50% had been in the US for less than 5 years	N/A	Participants described feelings of grief, pain, sadness, worry, and depression stemming from being separated from not being able to be with their children.
Madianou (39)	Philippines	UK	$N = 52$	54% arrived to the UK between 1973 and 1995. Forty-six percent arrived after 2000	$M = 15.65$ years	Participants described feeling sad, crying, having emotional pain, and feelings of failure by not being able to be and/or reunite with their children.
Parreñas (40)	Philippines	Italy and USA	$N = 72$	N/A	N/A	Participants described feelings of helplessness, loneliness, pain, anxiety, loss, and guilt. This emotional distress is exacerbated by taking care of children of their own as domestic workers.
Schmalzbauer (41)	Honduras	USA	$N = 157$	N/A	N/A	Participants described feeling great distress, emotional burden, and feeling heartbroken about being separated from their children, particularly from younger children. Parents feared that young children would not be able to remember them.

*N/A indicates information was not available. *Percentage breakdown was not provided.*

this study is that mothers were recruited from birthing units. It is possible that having a child in the host country could exacerbate depressive feelings among mothers by reminding them of their children and their experiences of motherhood in the country of origin.

However, not all quantitative studies have found a positive association between transnational motherhood and maternal depressive symptoms. In a study of Mexican immigrant parents who had been separated from their children, Rusch and Reyes (33) analyzed depressive symptom scores using the Spanish version of the CES-D for 37 parents who had been separated, and they compared the scores with scores from 16 non-separated parents. The study found that separated parents did not experience higher levels of depressive symptoms than non-separated parents. However, 43% of parents in the study scored 16 or above in the CES-D, indicating elevated depressive

symptoms in the overall sample (33). The risk of bias assessment for this study suggested a moderate risk. A particular strength of this study is that it included participants from a community sample, increasing diversity among participants. However, this study had a small sample size, particularly of non-separated parents ($n = 16$), which might not be sufficiently powered to detect significant differences.

In a study of Latina women, McCabe et al. (30) found that separations were not directly related to depressive symptoms. In this study, researchers compared depressive symptom scores measured using the CES-D among 60 women with separations from an adult child, 37 women with separations from minor children, and 328 women with no separation from children (30). A comparison of scores revealed that separation was not directly associated with depressive symptoms (30). However, in this same study, researchers found that separation can lead to economic and immigration-related stress, which in turn can increase the risk for mental health issues (30). The risk of bias assessment for this study suggested a moderate risk. Among its strengths, this study assessed whether the age (adult vs. minor) of the children left behind impacted maternal depressive symptoms differently. However, it is possible that the sample size of the different groups, particularly of adult children ($n = 37$) was too small to detect significant differences.

Lastly, in a study of 2,468 Sub-Saharan African migrants residing in France, Pannetier et al. (32) measured anxiety and depressive symptoms using the PHQ-4. The study found that cross-border separation from a minor child (i.e., less than 18 years of age) was not directly associated with anxiety or depressive symptoms (32). Assessment of the risk of bias indicated that this study had a low risk. This study had a large sample size, which contributed to its strengths. However, this study used the PHQ-4, which is a tool that has not been validated among diverse populations from Africa.

Mixed-Methods Studies

The three mixed-methods studies identified (34–36) support a potential association between transnational motherhood and emotional distress. Two of the studies were conducted in the United States (35, 36). All three studies were highly diverse in their samples, which included participants originating from different countries around the world (e.g., China, Haiti, Mexico). Most mothers included in the studies had less than a high school education (34–36). The studies found that the average length of separation ranged from 1.2 years (35) to 3.3 years (34). However, the studies by Suárez-Orozco et al. (35, 36) suggest that the length of separation depended on the family's country of origin. For instance, mothers from Mexico and China reunited with their children faster than families from Central America and Haiti (35, 36).

One mixed-methods study of 113 refugees in Canada from Latin America and Africa found that separation from children was a traumatic event that contributed to psychological distress among parents (34). In this study, researchers used the Symptom Checklist (SCL-90) to measure several mental health symptoms among fathers and mothers. The results indicated that there was not a statistically significant difference on mental health symptoms based on reunification patterns with their children. Researchers also conducted semi-structured interviews with 113 parents, of whom 70% had not yet reunited with their children after an average of 3.5 years (34). A qualitative analysis revealed feelings of powerlessness, worry, and an overall sense of hopelessness among participants who were or who had been separated from children (34). Although this study provided robust information regarding mental health symptoms among refugee populations in Canada, it is possible that the sample sizes for the quantitative analysis were too small to identify a significant difference across different reunification patterns. Moreover, this study did not provide a stratified analysis by sex on the SCL-90, which could have provided different results.

The second mixed-methods study identified in the review consisted of 309 Chinese, Central American, Dominican, Haitian, and Mexican parents who had been separated from their children at some point during the migration journey (35). The researchers used a 26-item psychological symptom scale, which was informed by the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders and the SCL-90 (35). Unfortunately, the quantitative results are only available for children and not for parents, thus they are not reported here. This study also collected qualitative data from the parents and it found that mothers described feelings of agony and sadness after separating from their children (35). The last mixed-methods study was conducted by Suárez-Orozco et al. (36) with 385 transnational families. Similar to the previous study (36), the quantitative data was only provided for adolescents. The qualitative data collected among parents found that immigrant parents consistently described feelings of sadness stemming from separating from their children. In this study, qualitative interviews revealed poignant feelings of sadness and desperation among parents during separation (36). These two studies provided important and relevant information about the repercussions that separations had for the family. Although data were collected from adolescents and parents, the results focused more on the adolescents than the parents.

Qualitative Studies

Eight of the 17 studies identified were qualitative. Although inferences about correlations or associations cannot be made from qualitative studies, they do provide important information about the lived experiences of transnational mothers who have at least one child in their country of origin. Most studies were conducted in the United States (5 out 8), one was conducted in Canada (37), one in the United Kingdom (39), and one in Italy and the United States (40). Six studies focused on the experiences of women from Latin American countries (5, 11, 28, 37, 38, 41) and the other two focused on women from the Philippines (39, 40). Most studies indicated that the majority of their participants left their children under the care of grandparents in their country of origin, usually maternal grandparents. Only three studies (11, 37, 39) provided information regarding the length of separation between the mothers and their children, which ranged from 2 months (37) to an average of 15.6 years (39).

The majority of the studies we found did not focus exclusively on emotional distress or depressive symptoms, but these experiences became evident throughout the descriptions the participants provided. It is important to underscore that many of the experiences described by transnational mothers fall under the criteria of Major Depressive Disorder (MDD), which include depressed mood, loss of interest, excessive guilt, weight loss/gain, loss of energy, insomnia, inability to concentrate, and thoughts of death (42). These criteria are not to say that if assessed, transnational mothers would have a formal MDD diagnosis; however, it provides information regarding how their feelings may indicate that some depressive symptomatology may be present.

In the qualitative literature, many participants described being constantly sad (5, 11, 37) and even depressed (11, 28, 37). In many studies, participants mentioned crying very often, especially when they think about their children and also when they talk to them over the phone (11, 38–40). For many mothers, the hardest part of migrating to another country has been leaving their children behind (11, 38), particularly if their children were very young when they left (41). Studies also described that many mothers felt pain and guilt for leaving their children in their country of origin, being accused of not being good mothers, and for not giving them personal love and attention (5, 11, 39–41). Although most transnational mothers hope the reunification process is fast, many end up being separated from their children for many years (39, 40), even to the point where they can no longer reunite because children are over 18 (37). These long-term separations appeared to exacerbate feelings of helplessness and hopelessness because mothers were unsure about when they would be able to see their children again (37, 40). Sometimes these feelings can be ameliorated based on the type of childcare arrangements that mothers had for their children in the country of origin. Most studies (5, 11, 37–40) reported that maternal grandparents or female relatives were the ones in charge of taking care of the children after the mother migrated, which made mothers feel comfortable because they knew their children were being cared for.

Not only did some mothers describe emotional feelings, but they also described physical ones (11). Dreby (38) found that some mothers described losing weight and even becoming physically ill after migrating to the United States and leaving their children in their country of origin. Some studies have also documented mothers describing not being able to sleep thinking about their children and the conditions they might be living under; they wonder whether the conditions have changed at all since they left and whether their sacrifice has been worthwhile (21, 29, 38). A couple of studies (29, 41) found that mothers have a sense of loss and grief after leaving their children in their country of origin. Although not very common, one study (37) found that 22% of women were so depressed they had difficulty carrying out their daily activities and 10% of women did not find meaning in their lives without their children. Overall, findings from qualitative studies demonstrate that transnational motherhood may exacerbate feelings of sadness and guilt, particularly during the first years after migrating to a new country.

DISCUSSION

This scoping review of 17 quantitative, qualitative and mixed-methods studies indicates that transnational mothers experience emotional distress when they move to a host country and have to leave their children in their countries of origin. This emotional distress among transnational mothers ranges from being sad to experiencing depressive symptoms that interfere with their daily tasks. However, from the six quantitative studies found and reviewed, it is not possible to unequivocally argue that transnational motherhood is associated with higher symptoms of depression. Out of these 6 studies, three demonstrated that transnational mothers had higher levels of depressive symptoms (16, 29, 31) and three did not find a statistically significant association (30, 32, 33). It is important to highlight that these studies were heterogenous in terms of recruitment approaches (e.g., birthing units, health care settings, schools), measurement tools (e.g., CESD, PHQ-4, PHQ-9), and sample sizes, which contributed to mixed results.

Findings from mixed-methods and qualitative studies found that transnational mothers are negatively impacted by the separation from their children. Feelings of emotional distress included descriptions of constant sadness, crying spells, hopelessness, helplessness, guilt, difficulty sleeping, sense of loss, and depression. Taken together, the findings from this scoping review suggest that transnational mothers struggle emotionally when they leave their children in their country of origin, but the literature, particularly quantitative, is still in its infancy to make definitive conclusions regarding the relationship between transnational motherhood and depressive symptoms. Future epidemiological studies should include an assessment of transnational motherhood in order to have a better understanding of its prevalence of and how the length of separation and the reunification process impact family dynamics in the long-term. Having a better understanding of the prevalence of transnational motherhood would constitute the first step in determining ways to identify, reach and engage transnational mothers, if deemed appropriate.

Future studies should also investigate moderating factors that may exacerbate or mitigate the effect of transnational motherhood on depressive symptoms. For instance, it would be important to determine whether immigration status and proximity to the country of origin could exacerbate or ameliorate depressive symptoms and emotional distress. Immigration status is one of the most important constructs to understand in transnational motherhood given that depending on the status of the mother, the process of reunification with her children in the host country could be faster or slower (40). Proximity to country is yet another important construct to investigate because mothers that live relatively closer to their children (e.g., United States and Mexico) might be able to interact with them more and/or more often given that they would not have to worry about issues such as having different time zones (39). Having constant communication would in turn help them cope with the separation more effectively (5, 40).

As more research continues advancing the field of transnational motherhood, it is necessary to support

transnational mothers and their families in the meantime. One way to support them is by identifying the coping mechanisms they use to deal with their emotional distress. For instance, many studies have shown that sending remittances back to the country of origin sparks feelings of happiness and fulfillment (28). Being able to send gifts and remittances to their children makes women feel empowered and it reminds them that their sacrifice has been worth the effort of separating from their children (5, 28, 40, 41). Recent research on remittances among Latinx immigrants further suggests that sending remittances to the home country is associated with lower odds of depression and psychological distress (43, 44). Specifically, these studies found a 20% reduction in the odds of depression (45) and 19% decrease in the odds of psychological distress (44) among Latin American immigrants who sent more remittances.

Another coping mechanism that transnational mothers use to feel close and connected to their children is having constant communication with them (5, 40). Facilitating communication between transnational mothers and their children is through the use of information communication technologies (ICTs) such as phones, computers, and video-calls (39, 46). Previous research has demonstrated that transnational families remain in contact and even feel close with one other when using ICTs (39, 46). A qualitative study of 52 Filipina mothers living in the United Kingdom found that through the use of ICTs, transnational mothers were able to monitor their children from a distance by having routine video calls every morning (29). Also, ICTs have increased communication levels among transnational families since consistent interaction makes it more difficult for those living abroad to hide the difficulties they are facing (39). This constant interaction and even the conflict that transnational families encounter may make the experience of being a mother more "realistic" (39). ICTs have also been used as tools in family therapy (46). For instance, Bacigalupe and Lambe (46) describe the way in which they used ICTs in family therapy to treat behavioral problems among Guatemalan children who had recently migrated to the US. From the assessment, it was clear that the children missed their aunt and grandmother, who were still in Guatemala, and who had raised the children until they were brought to the US (46). The family then started meeting through video calls and issues of school conflict and expectations about school were addressed with all the family members (46). The aforementioned studies demonstrate that it can be possible and effective to include ICTs when working with transnational families.

Overall, this scoping review demonstrates there is qualitative evidence suggesting there is a link between transnational motherhood and depressive symptoms and emotional distress; however, there is a paucity of quantitative research to supports this evidence. In order to promote this research area, it is important to increase *interdisciplinary research* on the lives of mothers and families. Researchers in the social sciences engage with conceptualizations of depressive symptoms as described by women participants in their qualitative studies and these are not always part of epidemiological studies. There is a need to work outside the boundaries of disciplines in order to fully grasp how depression and other mental health concerns are discussed across cultures. In depth interviews and ethnographic approaches are valuable tools to further understand how women make sense of motherhood, womanhood and their role as caregivers in both their countries of origin and the host country. Also, studies that make connections across borders may be revealing in terms of how mental health is discussed and defined "here" and "there." These studies could potentially identify the emotional attachments that transcend national borders, which in turn could inform the development of culturally appropriate measurement tools that can accurately identify depressive symptoms and other mental health symptoms among transnational mothers.

STRENGTHS AND LIMITATIONS

This study has a number of strengths that should be considered. First, to our knowledge this is the first study focusing exclusively on summarizing the literature available on depressive symptoms and emotional distress among transnational mothers. This review follows a systematized process that ensures replicability, as well as the inclusion of quantitative, qualitative, and mixed-methods studies that capture the breadth and depth of the current literature available in the field. Nevertheless, this study also has some limitations. First, this study did not include book chapters or dissertations available in the topic of transnational motherhood, which limited the amount of information included and reviewed. Second, this study mostly focused on depressive symptoms; however, there are other conditions, such as anxiety, post-traumatic stress disorder, and alcohol misuse, which usually coexist with the aforementioned symptoms and should be investigated. Finally, this study predominantly focused on the experiences of mothers given that there is a very limited amount of research conducted on transnational motherhood. However, it is necessary that future studies focus on understanding the emotional sequelae that paternal separation has on fathers. Some of the studies included in this review also included the experience of fathers (11, 31–36, 38), and they suggest that fathers also experience emotional distress, which may co-occur with alcohol misuse (35, 36).

CONCLUSION

Despite the scarce amount of research available on the mental health needs of transnational mothers, the current literature seems to suggest that transnational mothers experience significant emotional distress after migrating to host countries. Results from quantitative studies provide inconclusive information regarding the association between depressive symptoms and transnational motherhood. Findings from mixed-methods and qualitative studies indicate that transnational mothers experience emotional distress that is consistent with symptoms of major depression. The paucity of literature on the mental health needs of transnational mothers indicates the critical need to continue investigating and identifying their needs.

AUTHOR CONTRIBUTIONS

MP-L conceived the study, conducted the initial article search, screened full articles, and drafted the manuscript. LY helped conducting the study, screening the titles, abstracts and full articles, contributed to writing the methods and the results section, and provided in-depth feedback on the manuscript. AY contributed to writing the introduction and organizing the results section. GO identified additional studies as an expert in the topic, contributed to the discussion section, and provided in-depth feedback on the manuscript. All authors discussed the results and approved the final manuscript.

ACKNOWLEDGMENTS

We would like to thank Dr. Mary Keegan Eamon who provided an immense amount of feedback on several drafts of the manuscript.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2021.574100/full#supplementary-material

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

frontiers in Public Health

POLICY AND PRACTICE REVIEWS
published: 03 August 2021
doi: 10.3389/fpubh.2021.676000

Refugee Mental Health, Global Health Policy, and the Syrian Crisis

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The most recent global refugee figures are staggering, with over 82.4 million people forcibly displaced and 26.4 million registered refugees. The ongoing conflict in Syria is a major contributor. After a decade of violence and destabilization, over 13.4 million Syrians have been displaced, including 6.7 million internally displaced persons and 6.7 million refugees registered in other countries. Beyond the immediate political and economic challenges, an essential component of any response to this humanitarian crisis must be health-related, including policies and interventions specific to mental health. This policy and practice review addresses refugee mental health in the context of the Syrian crisis, providing an update and overview of the current situation while exploring new initiatives in mental health research and global health policy that can help strengthen and expand services. Relevant global health policy frameworks are first briefly introduced, followed by a short summary of recent research on refugee mental health. We then provide an update on the current status of research, service provision, and health policy in the leading destinations for Syrians who have been forcibly displaced. This starts within Syria and then turns to Turkey, Lebanon, Jordan, and Germany. Finally, several general recommendations are discussed, including the pressing need for more data at each phase of migration, the expansion of integrated mental health services, and the explicit inclusion and prioritization of refugee mental health in national and global health policy.

Keywords: refugees, refugee mental health, mental health, global health, global mental health, global health policy, health policy, Syria

OPEN ACCESS

Edited by:
Margarita Alegria, Massachusetts General Hospital and Harvard Medical School, United States

Reviewed by:
Shekhar Saxena, Harvard University, United States
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Public Health

Received: *04 March 2021*
Accepted: *23 June 2021*
Published: *03 August 2021*

Citation:
Cratsley K, Brooks MA and Mackey TK (2021) Refugee Mental Health, Global Health Policy, and the Syrian Crisis. Front. Public Health 9:676000. doi: 10.3389/fpubh.2021.676000

INTRODUCTION

The most recent global refugee figures are staggering, with 82.4 million people forcibly displaced and 26.4 million registered refugees (1). The ongoing conflict in Syria is a major contributor. After a decade of violence and destabilization, over 13.4 million Syrians have been displaced, including 6.7 million internally displaced persons (IDPs) and 6.7 million refugees registered in other countries (1) (**Table 1**). Beyond the immediate political and economic challenges, the Syrian conflict has created a public health crisis and thus an essential component of any response to this ongoing humanitarian emergency must be health-related (2–4). This includes policies and interventions specific to mental health, given the unique and often acute mental health needs of IDPs, refugees, and asylum seekers. Compounding all of this is the COVID-19 pandemic, which has created additional mental health risks for this already vulnerable population (5), with the United Nations High Commissioner for Refugees (UNHCR) recently

TABLE 1 | Global refugee crisis.

Forcibly Displaced	82.4 million
Registered Refugees	26.4 million
Leading Countries of Origin	
Syria	6.7 million
Venezuela	4.0 million
Afghanistan	2.6 million
South Sudan	2.2 million
Myanmar	1.1 million
Leading Host Countries	
Turkey	3.7 million
Colombia	1.7 million
Pakistan	1.4 million
Uganda	1.4 million
Germany	1.2 million

UNHCR Global Trends: Forced Displacement in 2020.

emphasizing that the pandemic has led to "widespread despair" among refugees (6)[1].

Although research on refugee mental health has only recently gained momentum, the emerging evidence describes high rates of mental disorder associated with trauma, stress, and cultural isolation due to forced migration, often met by a lack of adequate resources (7–10). While the available evidence on the mental health of Syrian refugees and IDPs remains incomplete and fragmentary, reports from multilateral agencies and NGOs point to high prevalence rates and a glaring scarcity of mental health services within countries impacted by the crisis (11, 12). This applies to the conflict zone within Syria, as well as the primary transit and destination countries in the Eastern Mediterranean region. There are also concerns about the burden of mental disorder and service accessibility in the European, Asian-Pacific, and North American countries where many Syrians have sought refuge or resettled (13).

This article provides an update and overview of refugee mental health in the context of the Syrian crisis, exploring opportunities for further research and strengthened health governance that can help drive the expansion of services. We first offer a brief background on relevant global health policy, followed by a short summary of recent research on refugee mental health. We then provide a selective analysis of the current status of research on refugee mental health, service provision, and health policy in several of the primary destinations for forcibly displaced Syrians. This starts with Syria itself and then turns to the leading destination countries of Turkey, Lebanon, Jordan, and Germany, examining the available evidence in order to draw out a set of provisional recommendations. Based on this review, we suggest that there is a pressing need for more data at each phase of migration, that fully integrated mental health services are a humanitarian necessity, and that refugee mental health must be explicitly included and prioritized in national and global health policy.

[1]In the following, unless otherwise noted, the term "refugee" is used inclusively to refer to registered and non-registered refugees, asylum seekers, internally displaced persons, and displaced stateless persons.

GLOBAL MENTAL HEALTH POLICY

Mental health has recently taken on greater prominence within global health policy, in large part due to the policy instruments, technical guidance, and status reports of the World Health Organization (WHO). Many of these initiatives have direct relevance for refugees (**Table 2**). The WHO's groundbreaking *Mental Health Action Plan 2013–2020* (14), now extended to 2030 (19), adopts a rights-based approach to advancing universal health coverage, prioritizing improvements in health governance, the integration of services, promotion and prevention, and information systems. The *Mental Health Gap Action Programme* (mhGAP) provides planners, policymakers, and donors with a set of programs for scaling up services in low- and middle-income countries (LMICs) (20). The *mhGAP Humanitarian Intervention Guide* (mhGAP-HIG) was adapted and created to provide first-line management recommendations for non-specialist providers in humanitarian emergencies where access to specialists and standard treatment options are limited (21). And most recently, the WHO launched the *Special Initiative for Mental Health (2019–2023*) with the goal of expanding access to mental health services in twelve priority countries through new funding measures (22).

These initiatives have been highly influential and are particularly applicable to refugee mental health, as the majority of refugees invariably face challenges associated with scarce and inaccessible services. The WHO has built on this work by focusing on the specific needs of refugees in its development of technical guidance for refugee mental health provision in Europe (23). The WHO has also proposed a *Global Action Plan on Promoting the Health of Refugees and Migrants, 2019–2023* (18), which focuses on improving health services for this vulnerable population. It centers around several key priorities, including general health promotion, continuity of care, mainstreaming refugee health, the social determinants of health, monitoring and information systems, and health communication. The *Global Action Plan*, however, has not yet been formally adopted by the WHO or its member states.

The broader challenge is that there has been insufficient progress toward actually meeting the WHO's goals in global mental health. While on the national level most of the countries impacted by the refugee crisis have policy and legislation covering mental health services, there are enduring problems with insufficient funding and implementation, as evidenced by the WHO's own dedicated reporting mechanism (24) and its commissioned reports on refugee health and mental health (25–27). These deficiencies hinder the development, expansion, and allocation of mental health services for refugees, in LMICs and high-income countries alike. Despite the WHO's sustained efforts to support and provide services to refugees, including in Syria as well as a number of destination countries, a great deal more needs to be done.

The United Nations (UN) and UNHCR have of course been heavily involved in developing responses to the global refugee crisis and the Syrian conflict. This includes initiatives specific to mental health. The UN's *2030 Agenda for Sustainable Development* (15) foregrounds the issue of migration, particularly

TABLE 2 | Policy frameworks relevant to refugee mental health.

WHO Mental Health Action Plan for 2013–2030 (14)
Objective 1: Strengthen effective leadership and governance for mental health
• Target 1.1: 80% of countries will have developed or updated their policies/plans for mental health
• Target 1.2: 50% of countries will have developed or updated their laws for mental health
Objective 2: Provide comprehensive, integrated mental health, and social care services in community-based settings
• Target 2: Service coverage for severe mental disorders will have increased by 20%
Objective 3: Implement strategies for promotion and prevention in mental health
• Target 3.1: 80% of countries will have at least two national promotion and prevention programs
• Target 3.2: Rate of suicide will be reduced by 10%
Objective 4: Strengthen information systems, evidence, and research for mental health
Target 4: 80% of countries will routinely collect and report mental health indicators every 2 years
UN 2030 Agenda for Sustainable Development (15)
Goal 3: Ensure healthy lives and promote well-being for all at all ages
• Target 3.4: By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being
• Indicator 3.4.2: Suicide mortality rate
Goal 10: Reduce inequality within and among countries
• Target 10.7: Facilitate orderly, safe and responsible migration and mobility of people, including through implementation of planned and well-managed migration policies
• Indicator 10.7.2: Countries that have implemented well-managed migration policies
UN Global Compact for Safe, Orderly and Regular Migration (16)
Objective 15: Provide access to basic services for migrants
UN Global Compact on Refugees (17)
Area 2.3: Expand health systems to facilitate access by refugees
WHO Promoting the Health of Refugees and Migrants: Draft Global Action Plan, 2019–2023 (18)
Priority 1. Promote the health of refugees and migrants through a mix of public health interventions
Priority 2. Promote continuity and quality of essential health care
Priority 3. Advocate the mainstreaming of refugee and migrant health into global, regional and country agendas
Priority 4. Enhance capacity to tackle the social determinants of health and accelerate progress toward SDGs
Priority 5. Strengthen health monitoring and health information systems
Priority 6. Support measures to improve evidence-based health communication and counter misperceptions about migrant and refugee health

the human rights of migrants, and now includes mental health within its one health-related sustainable development goal as part of a broader target (SDG 3.4: "reducing premature mortality from non-communicable diseases through the prevention, treatment, and promotion of mental health and well-being").

Consistent with SDG 10.7 ("facilitate orderly safe, regular and responsible migration…"), the UN recently adopted the *Global Compact for Safe, Orderly and Regularly Migration* (16) and the *Global Compact on Refugees* (17). Though not binding conventions, rather a closely related pair of cooperative frameworks, the former pact includes a commitment to providing "basic services" to migrants (objective 15), and the latter an expansion of health and mental health services accessible to refugees (area in need of support 2.3). These linked *Compacts* are grounded in the original 1951 *Convention Relating to the Status of Refugees* (28) and its 1967 *Protocol* (29), which require member states to guarantee refugees equal access to services. They are also consistent with the UNHCR's more recent call for countries to fully integrate refugees into their national health systems (30).

The UNHCR, for its part, has consistently supported a range of mental health services in many countries impacted by the ongoing refugee crisis (31), as well as commissioned reports on refugee mental health in key countries, including Syria (32). It has also developed its own technical guidance for mental health and psychosocial support (MHPSS) in humanitarian settings (33), working in conjunction with the WHO (34), and maintains a regularly updated MHPSS *Emergency Handbook* (35).

The longstanding concern, such initiatives notwithstanding, is that global health policy frequently runs the risk of leaving out important considerations that could otherwise help direct funding and support on-the-ground programming in global mental health. For a start, the SDGs only adopted a target with language specific to mental health after persistent advocacy on the part of civil society groups and academics (36); there are also lingering questions regarding the lack of coherence between the SDGs and other policy instruments in global mental health (37). The SDG framework has also come under criticism for insufficiently addressing the health of those impacted by conflict (38), and for failing to include refugee data in the regular reviews provided by member states (39). In addition, the UN's recent compacts on migration and refugees have been questioned for failing to sufficiently prioritize health (40). As the new Lancet Migration collaboration has emphasized (41), issues at the intersection of health and migration are far too often a secondary consideration and need to be explicitly included and prioritized in global health policymaking going forward. The same can be said for refugee mental health.

FORCED MIGRATION AND MENTAL HEALTH

Reviews of research on the mental health of populations forcibly displaced by conflict have confirmed a substantial burden of mental disorder, although they have also consistently noted the lack of quality data and the marked heterogeneity of methodology and prevalence rates across studies. This variability has held even when systematic reviews have narrowed their focus and inclusion criteria. Early examples of such analyses include a review of studies comparing refugee and non-refugee populations, with refugees at moderately greater risk of mental disorder (42), and a review of research on refugees resettled in high income countries, suggesting much higher rates of post-traumatic stress disorder (PTSD) in refugees than in matched samples (43). Other reviews have found wide variations in prevalence rates, largely due to methodological factors (44), including those that have looked

at the available data on longer term outcomes for refugees (45) and in settings of protracted conflict (46). Pooled estimates of prevalence have gradually become available. For example, a recent meta-analysis of international studies on refugees found high rates of PTSD (31.46%; 95% CI 24.43–38.5%), depression (31.5%; 95% CI 22.64–40.38%), and anxiety (11%; 95% CI 6.75–15.43%) (47), and a meta-analysis of research in Germany found similar rates of PTSD (29.9%; 95% CI 20.8–38.7%) and depressive symptoms (39.8%; 95% CI 29.8–50.1%) (48).

Amongst the many factors that complicate research in this area, perhaps most significant are the different phases of migration. Studies have typically focused either on the three phases of premigration, migration, and postmigration (49), or a five-phase approach that includes the following: pre-departure, travel, interception, destination, and return (50). But neither model is easily applied to the various risk factors associated with refugee mental health. Mental disorders are often the product of multiple factors across a variable time course, including preexisting genetic vulnerabilities as well as any number of social and environmental factors, consistent with the broader recognition of the social determinants of mental health (51). Forced migration affects many different types of people and is associated with a wide range of social stressors, ranging from the traumas of war to the difficulties associated with resettlement (52). Understanding exactly how these disparate risk factors combine to impact mental health during forced migration in specific populations is thus an ongoing methodological challenge.

That said, the different phases of migration have been increasingly linked to specific risk factors, especially as more is learned about the psychosocial stressors encountered during the postmigration—or destination—phase (53). A recent systematic review of the literature, paying particular attention to the complexity of resettlement in high income countries, has proposed an alternative model comprised of five phases: before travel, active travel, initial settlement in a host country, attempts at social integration, and any changes to immigration status (54). At each stage refugees appear to be susceptible to relatively specific types of risks; in addition, as this particular review suggests, they may also benefit from certain protective factors. Continued research on the different phases of migration, then, holds the promise of contributing to the development of more effective interventions and therapeutic techniques appropriate to this vulnerable population.

The premigration—or predeparture—phase typically involves a range of social and economic hardships, such as lost educational and occupational opportunities, as well as varying degrees of traumatic experience, including violence and torture. The data available on pre-migration tend to come from research on the long-term effects of trauma. For example, meta-analyses have found that the experience of torture and other forms of severe trauma, especially *cumulative* exposure, is predictive of higher rates of post-traumatic stress disorder (PTSD) and depression in refugees and displaced persons (44). According to recently updated WHO estimates, the burden of mental disorder in conflict settings is substantial, with high prevalence rates (22.1%; 95% UI 18.8–25.7%) across a range of conditions (55).

The migration phase encompasses the period of active travel, when individuals are between their place of origin and another location. This period of migration brings additional challenges, such as general fear and uncertainty as well as the harsh, often dangerous conditions of cross-border travel. Perhaps unsurprisingly, there is a dearth of literature on this phase, given the difficulties attendant to researching such a dynamic period within the broader process of migration. What work there is has largely relied upon surveys that include retrospective inquiries about stressful and traumatic experiences throughout the process of migration. For example, one study of refugees at various sites in Greece—entry points, camps, and informal sites—documented frequent reports of violent events experienced during the process of migration (over half of the sample was made up of Syrians) (56).

The interception phase refers to periods of temporary detention or interim residence, including time spent in refugee camps. Several studies have found that placement in detention centers is associated with poor mental health. For example, longer detentions have been associated with worse outcomes for detained refugees in Australia, leading to increased risk of PTSD and depression (57). Systematic reviews of the mental health of detained asylum seekers provide similar results, although the data is somewhat more equivocal (58, 59). The academic literature on mental health within refugee camps remains sparse, but a large survey of mental health service users in 90 camps across 15 LMICs indicates an increased risk of severe mental disorder—including psychotic disorders—in these settings (60). One study of Syrian refugees in a camp within the Attica region of Greece found high rates of depression, with female gender, having children, and longer stays in detention associated with increased risk (61). The gray literature is more extensive. Reports from NGOs, such as the International Medical Corps (IMC), have described high rates of depression and psychotic disorders in interim refugee camps in Turkey, Jordan, Lebanon, and Syria (11). Similar findings have been reported from an IMC survey of refugee camps in Greece (62), and a recent report from the International Rescue Committee (IRC) has called attention to the psychological distress caused by extended detention in refugee camps in Greece (63).

The postmigration—or destination—phase is the period during which refugees settle either temporarily or for the long-term in their intended location, most often in urban settings within host countries (it is also occasionally used to describe extended periods in refugee camps). This phase is the most accessible to research and can provide insight into prior stages of migration and the risks inherent to the process of applying for permanent refugee status and/or formal resettlement. Despite significant variation across studies, once again, systematic reviews have found that refugees resettled in both LMICs and high incomes countries have high rates of PTSD and depression in comparison to host populations (43, 64, 65). Many reviews have also identified postmigration social stressors that appear to moderate mental health outcomes. Such variables include financial hardship and socio-economic status, unstable housing, social isolation and loneliness, bigotry and discrimination, residency status, length of the asylum process,

and cultural and linguistic barriers to integration (43–45, 66–69).

These findings underscore the complex challenges of resettlement. While reaching a destination country may provide some sense of stability, there are pronounced risks associated with this phase of migration (70). This includes the possibility of severe and chronic disorder, as the literature has slowly revealed. A number of studies describing the mental health difficulties faced by refugees from different countries of origin now living in Western countries—such as Australia and Sweden—reveal increased risks for psychotic disorders (71), prolonged grief (72), and suicide (73, 74). This is consistent with evidence of a general association between migration and psychosis, as there appears to be a dose-response relationship between number of social adversities—across the phases of pre-migration and post-migration—and psychosis (75). A detailed accounting of migration risk will require more research, though there has been significant progress. For instance, one increasingly influential model emphasizes the role of premigration trauma in the emergence of PTSD during the first 5 years of resettlement, followed by increased risk of depression resulting from difficulties in social integration and health care access after 5 years in the host country (76).

Regardless of phase of migration, the groups most vulnerable to mental health risks are women and children (77). Refugee women experience added vulnerabilities and stressors, including sexual, physical, and psychological abuse (78, 79), which contribute to greater risk for severe mental health conditions (80). Refugee women are also at a greater risk for intimate partner violence (81), which is also associated with risk of mental disorder (82). Reviews have confirmed the harmful effects that conflicts and forced migration can have on children and adolescents, as well as their caregivers (9, 83). In fact, a younger age at time of migration may put refugees at greater risk of mental health difficulties (7), and there appears to be a dose-response relationship between trauma exposure and severity of PTSD in children (84). In addition, data have described a disproportionate number of unaccompanied refugee children in psychiatric hospitals in destination countries (85). A growing evidence base more generally points to the need for increased efforts to address the mental health of refugee children going through the process of resettlement (86–90).

In terms of therapeutic interventions, for refugees of all ages and backgrounds, much is still not known. Consistent with the general lack of data, research on interventions for refugee mental health has been slow to develop (91). Reviews of the available evidence have found that cognitive behavioral therapies are the most empirically supported psychosocial treatments for PTSD in refugees (92–94). There are also promising new research programs underway. Of particular note is an initiative that is deploying components of the WHO's mhGAP package to support the expansion of mental health services for Syrian refugees in European and the Middle Eastern countries. Under the auspices of the STRENGTHS program, based out of VU University Amsterdam, a relatively adaptable psychological intervention delivered by non-specialists—as a form of task-shifting—is currently being tested in different formats in a range of settings (95). This includes research on an internet-based version of the intervention in Germany, Sweden, and Egypt (96), and peer-based delivery in the Netherlands (97).

TABLE 3 | Forcibly displaced Syrians.

Internally Displaced	6.7 million
Displaced Across Borders	6.7 million
Leading Host Countries	
Turkey	3.6 million
Lebanon	0.87 million
Jordan	0.66 million
Germany	0.61 million

Registered refugees only.
UNHCR Global Trends: Forced Displacement in 2020.
UNHCR Refugee Data Finder.

SYRIA

Much of what is known about mental health in conflict settings and forced migration applies to the ongoing crisis within Syria. Approximately 6.7 million Syrians have been internally displaced, with an additional 6.7 million displaced across borders (1) (**Table 3**). The conflict has created a public health emergency for those who continue to reside in the country, including the internally displaced (98), as well as those who have fled as refugees. This has had devastating effects on the mental health of Syrians, creating an increased disease burden while compromising the country's capacity to provide health and mental health services. Targeted attacks on hospitals and medical professionals have severely impacted health provision (99–101); early in the conflict this included direct bombardment of psychiatric hospitals in Aleppo (102). Such attacks, widely reported in the popular press and the gray literature (103–105), have made their way into the research literature (106, 107), including powerful first-hand accounts of the impact on both providers and patients (108). The COVID-19 pandemic has further taxed remaining health services and exacerbated vulnerabilities among those forcibly displaced (109), contributing to the growing burden of mental disorder (110).

There is a limited amount of quality data available, but existing evidence points to widespread worsening of preexisting mental disorders and the emergence of new disorders due to exposure to violence and displacement (32, 111–114). Relatively early in the crisis it was estimated that more than 2 million people were suffering from depression and anxiety and over 350,000 from severe forms of mental disorder (115). Other research has estimated 2.2 million cases of PTSD and 1.1 million cases of depression (with a depression rate of 13.3%) (116); another study found high rates of PTSD (31.8%) in internally displaced Syrians (117). NGOs working in Syria have also described high rates of depression and anxiety (11), and case studies of displaced Syrians with mental health conditions have started to appear, from both within Syrian and other countries (118, 119). The unresolved nature of the conflict has created prolonged exposure to stressful and traumatic experiences (120), which suggests that psychiatric

morbidity can only have steadily increased over time. Indeed, a recent large online survey found high rates of PTSD (36.9%) (121), and another recent survey from the NGO Syria Relief found PTSD in the near entirety of a sample of IDPs in the Idlib governorate (12).

Children and families, especially women and girls, have been disproportionately impacted (113, 122). A survey of caregiver reports from refugee camps in northern Syria has suggested that nearly half of displaced children exhibit the symptoms of emotional and behavioral disorders (123), and a school-based study in Damascus and Latakia reported high rates of PTSD (35%), depression (32%), and anxiety (29%) (124). One recent large study found very high rates of PTSD (53%) in schoolchildren in Damascus (125), and a small case file review of children in schools around Idlib described a range of mental health difficulties (126). Women have been found to be at increased risk of a number of vulnerabilities, including depressive symptoms (127) as well as sexual and gender-based violence and barriers to health care (128, 129).

There continues to be limited research from within Syria, especially regarding access to MHPSS, indicative of ongoing, extreme insecurity in the country. A major contributor to the public health emergency in Syria is service scarcity due to damaged healthcare infrastructure, including mental health services. Prior to the conflict, the country benefited from a relatively effective health care system (101). It is also notable that Syria has a relatively new national mental health strategy, from 2014, not to mention dedicated mental health legislation (11, 24). But given the ongoing conflict, these policies remain only partially implemented. Efforts have been made to rebuild and strengthen the devastated healthcare system, but the ongoing challenges are difficult to overstate. Only 48% of public hospitals and 48% of private hospitals are fully functional, with half of all health professionals still residing outside the country (130).

The public psychiatric hospitals that were initially closed or had their capacity significantly limited due to the conflict are now functional (130). However, the mental health workforce remains diminished. Figures from the WHO on Syria's mental health capacity include 1,931 mental health professionals, with 0.37 psychiatrist, 1.07 nurses, 1.07 psychologists, and 0.08 social workers per 100,000 population (24). This staffing shortage represents a weakened capacity for case management and treatment by specialized mental health care providers while the burden of mental disorder increases. Furthermore, there is a lack of community based mental health services, making it difficult for services to reach those living outside of large cities.

In response to acute mental health coverage shortages, there have been efforts by multilateral agencies and local and international NGOs to help rebuild and expand service capacity. The WHO has supported the delivery of mental health services in more than 150 primary and secondary health centers in 11 different governorates, staffed by over 1,000 WHO-trained non-specialist general practitioners, 2,000 health workers, and more than 60 psychologists (131). New psychiatric inpatient units have been set up by the WHO in general hospitals in the cities of Damascus, Hama, and Latakia, and more than 100,000 people were estimated to have received mental health consultations in 2016 (excluding those not tracked by the WHO system). The WHO has also supported community-based initiatives, including mental health services in community centers in Aleppo, the distribution of mental health manuals in inaccessible areas, and the development of a school-based instructional package. By 2018, the WHO was reporting that over 400 primary health centers and community centers were providing MHPSS services (132). The WHO has also been working on a project to deploy mobile psychological clinics in northern Syria to address the needs of IDPs who live in remote areas where traditional inpatient and outpatient services are not available (133). Similarly, UNHCR has supported 130 Community and Satellite Centers throughout the country which provide MHPSS services, in large part through a trained volunteer workforce (134).

Many international and local NGOs have contributed to this important work [for reports on some of these initiatives, see (135–137)]. This includes Syrian NGOs, largely operating from outside the country, such as the Syrian Association for Mental Health, the Union of Syrian Medical Care and Relief Organizations, and the Syrian American Medical Society, as well as charities such as Al-Sham and Balsam (138). Despite these efforts, the need for mental health services in Syria continues to massively outstrip available resources. A large number of Syrians with mental health conditions receive no treatment at all, and the pandemic is further aggravating the situation. With the seeming intractability of the Syrian conflict, novel service-level and policy-based interventions need to be considered in order to improve public health conditions within the country, including services for the internally displaced, as well as to improve health and mental health coverage for refugees who transit to other countries.

DESTINATION COUNTRIES

Given the number of people forcibly displaced from Syria, and the association between refugee status and mental health difficulties, it is necessary to evaluate the resources available to Syrians who leave the country. Many of the challenges described in the literature on refugee mental health afflict Syrian refugees traveling to and residing in other countries. Syrian refugees living both in camps and amongst the general population in transit and destination countries suffer from high rates of mental distress and disorder. Mental health difficulties have been identified as the third greatest health need for Syrians displaced to neighboring countries in the region, behind communicable diseases and women's health (139). A review of Syrians in neighboring countries found high prevalence rates of mental disorder, and also included data on individual risk factors, singling-out traumatic experiences and a prior history of mental disorder, as well as reviewing research on access to MHPSS, identifying financial costs and socio-cultural factors as key barriers (140). And a recent systematic review of research on Syrians in countries spread out across both the Middle East and Europe found weighted prevalence rates of PTSD (23.4–83.4%), depression (20–44.1%), and anxiety (19.3–31.8%) (141).

As previously noted, methodological differences account for a great deal of the heterogeneity across studies, but research on refugee mental health more generally also reveals significant variation between destination countries (45), as culture and context appear to play a significant role (112, 114). There are some noticeable demographic trends, which underscores the importance of ecological validity in research on refugees. For instance, those arriving in Europe tend to be young men [e.g., (48)]. But variation is also seen more generally in service availability, access, and usage. Research on mental health consultations in primary care centers within refugee camps across several countries and regions has revealed a wide variation in rates of visits and types of disorder (60). The specific destination of forcibly displaced people may significantly impact prevalence, morbidity, and service utilization, in addition to the role of the particular social, cultural, and economic backgrounds of refugees.

This section, then, provides a brief overview of the status of refugee mental health research, service availability, and relevant health policy in several key destination countries, with a specific focus on Syrian refugees. This starts with the leading destinations in the region, Turkey, Lebanon, and Jordan, and then extends to the country that has received the largest influx of refugees traveling across Europe, Germany. This selective approach is guided by the available evidence in order to explore broader responses in service provision and health policy and governance. There are other countries in the Middle East and Europe that should be the focus of similar analyses. According to UNHCR estimates, Iraq (247,305), Egypt (132,748), and other North African countries (31,657) have been major destinations for Syrian refugees and asylum seekers (142). In Europe, other notable destination countries include Sweden (114,609), Austria (54,903), and the Netherlands (22,447) (143). In North America, Syrians have been resettled over the last 5 years in Canada (44,620) and the United States (21,725) (144, 145).

Turkey

Even with its own ongoing political upheaval, Turkey continues to be the main destination for Syrian refugees, with over 3.6 million registered (146). Approximately 98% of refugees reside in urban and rural areas across the country, while <2% live in the seven remaining "temporary accommodation centers" (147). Consistent with broader estimates, research specific to Syrian refugees in Turkey describes high prevalence rates of mental disorders. For example, a study among Syrians living in a tent city found that more than a third had PTSD (148); another estimated extremely high rates of PTSD (83.4%) and depression (37.4%) in a refugee camp (149). A WHO household survey across 15 provinces revealed reports of severe or extreme depressive feelings in 17% of adult respondents (150). In Istanbul, a recent survey found high rates of PTSD (19.6%), depression (34.7%), and anxiety (36.1%) (151). This study is consistent with other research in that it identifies several key predictive variables, some of which concern aspects of post-displacement. These include: female gender, prior trauma, financial challenges, and ongoing needs for social support, as well as a perceived lack of safety, legal protection, and justice. There is also evidence of high rates (23.7%) of mental disorder in children and adolescents in Istanbul (152).

There have been reports that mental health services are difficult for refugees to access in Turkey (11, 153). In a separate analysis of the same sample of Syrian refugees in Istanbul just mentioned, it was revealed that the vast majority of individuals who screened positive for mental disorders did not seek treatment (154). Respondents to the survey mentioned a range of barriers, including treatment costs, stigma, lack of knowledge of the health system, and the belief that symptoms would resolve over time. These findings highlight the need for community based MHPSS programs that can address these barriers and reduce the treatment gap.

Nothing on the legislative or policy level bars healthcare access. Registered refugees have the legal right to make use of the country's universal health care system under the "Temporary Protection Regulation," although there are practical barriers such as delays in enrollment, during which one is ineligible for anything other than emergency services, as well as obstacles related to travel, language, and basic understanding of the national health scheme [all of which impact Syrian refugees (155–158)]. There is an official national mental health policy, though no dedicated legislation is in place (24). Indicative of the broader challenge of implementation, the national policy calls for increased commitment to community-based and integrated services. But neither of these goals has yet to be met in Turkey, as in most countries (24).

The WHO has partnered with the Ministry of Health and multiple international donors to provide health services to displaced Syrians. As part of Turkey's Refugee Health Programme, over 180 Migrant Health Centers have been supported throughout the country, which are also the site for training Syrian health workers with the goal of integrating them into the national health system (150, 153, 159). Surveys suggest that Syrian refugees primarily rely upon hospitals for their health needs, but there are plans to continue to expand the number of refugee health centers so as to increase access and utilization (150). The WHO also operates cross-border health services in northwest Syria out of a field office in Gaziantep (153). This includes maintaining a medical supply chain, deploying mobile clinics, and offering primary health care services in WHO-supported facilities. Few of these facilities offer mental health services, and there is a staffing shortage of psychiatrists and other mental health professionals. In response, the WHO has trained non-specialist health workers and community outreach workers with the mhGAP program.

Lebanon

The situation in Lebanon is not dissimilar, although the country faces a very particular set of challenges due to recent political unrest, an economic crisis, and longstanding support of a large population of Palestinian refugees. The complexity of the health system also brings with it special challenges. There are now ∼1.5 million Syrian refugees—both registered and unregistered—residing in Lebanon, not to mention 35,000 Lebanese nationals and 34,000 Palestinian refugees who have all fled Syria since the start of the conflict (132, 160). The majority of Syrian refugees

reside throughout the country in informal settlements, often under poor conditions in tent cities situated within already impoverished communities. Lebanon has never signed on to the 1951 *Refugee Convention* and so no formal camps have been established, although limited social and health-related protections are granted to refugees based upon an agreement with UNHCR (161). Such arrangements have left refugees in a precarious position within the country, creating challenges to the health system (162, 163), including mental health programming (164, 165). The recent explosion in Beirut, which damaged several hospitals and stores of medical supplies, only worsened this state of affairs (166).

There are numerous reports of a substantial burden of mental disorder, particularly PTSD, in the Syrian refugee population in Lebanon, both from the gray literature and academic research. For example, studies have found high rates of PTSD in Syrian refugees (167, 168). Since the start of the Syrian conflict, there appear to have been significant increases in rates of depression (169) and psychiatric hospitalization (170). Research has also started to focus on the impact of trauma and living conditions on refugee families: Syrian women exposed to war and conflict-related events tend to suffer from psychological distress which can, in turn, lead to negative parenting and psychosocial difficulties in their children (171). These findings highlight the intergenerational impact of war, conflict, and displacement. There is also emerging evidence confirming the deleterious effects on health and mental health of the substandard living conditions endured by Syrian refugees in the informal tent cities scattered across the country (172).

The health system in Lebanon has been overburdened by the sheer scale of the influx of refugees, although a number of initiatives between the Ministry of Public Health (MoPH) and its international partners have tried to bolster service provision. Due to the highly privatized nature of the preexisting health system, the needs of refugees have been primarily served through hospitals and clinics funded and operated by the WHO, UNHCR, and various NGOs (173). Following the start of the Syrian crisis, the Lebanese government worked with UNHCR to initiate a humanitarian response plan (174), and the MoPH developed a strategy for the health sector (175). These plans prioritized improved access of services for refugees, including public services provided by the Ministry of Social Affairs, predominantly centered around the expansion and support of public health centers (PHCs). Since then, the WHO has reported a number of positive developments in the work of PHCs, including the distribution of free vaccinations and the subsidized provision of medication and other essential health services (132). But despite these efforts, accessing care continues to be a problem for many Syrian refugees given the remaining financial barriers (163), especially for the treatment of non-communicable diseases (176, 177).

Many of the same challenges can be found within the mental health system in Lebanon, which until recently was predominately privatized and remains underfunded, understaffed, and largely restricted to urban centers (24, 164, 165). But here too there has been a coordinated national response to the Syrian refugee crisis, supported by multilateral agencies and NGOs. Spurred by an early report from the UNHCR (178), the MoPH convened a task force with UNHCR and the WHO to help guide MHPSS expansion, as well as initiating a National Mental Health Programme in conjunction with UNHCR, WHO, UNICEF, and IMC (179, 180). Ultimately a new national mental health plan was adopted in 2015 (181), with a commitment to improve services for displaced populations, including Syrian refugees. While not fully implemented (24), the WHO has reported progress on efforts to expand mental health services in PHCs, including the provision of basic MHPSS, training of staff on mhGAP materials, and the creation of a mental health data registry shared by select PHCs, private clinics, and hospitals (132).

There are also reports of innovative initiatives in health and mental health service delivery. Informal Syrian healthcare workers appear to be increasingly active in the provisioning of basic health services (182, 183). Lebanon's first early intervention in psychosis service was established out of the American University of Beirut (184). Innovations also include the use of e-mental health (telepsychiatry or telemental health) interventions, including WHO's "step-by-step" intervention package, which has been trialed with Syrian refugees—a population with marked vulnerabilities but high accessibility to smartphones and the internet (185)—with promising results (186). The COVID-19 pandemic has provided additional reasons to expand such services in Lebanon (187). For its part, the MoPH, which has often been encouraged to take a stronger leadership role in health governance (162), continues to push ahead with national-level plans, including MHPSS-specific responses to both the COVID-19 pandemic (188) and the explosion last summer in Beirut (189). These recent events may in fact represent an opportunity to build upon the existing collaborative governance model in order to further advance reforms to the mental health system in Lebanon (190).

Jordan

In many ways Jordan's health system is fairly robust and better situated to address refugee mental health than many other countries, but here too there are ongoing challenges. It has been the destination for 1.36 million Syrian refugees—registered and unregistered—with 90% living outside camps in urban areas and ∼140,000 in the two camps of Za'atari and Azraq (191). Similar to other destination countries, high rates of mental distress and disorder have been reported in the Syrian refugee population, with particular impact on children and adolescents (11, 192, 193). For example, a small study of Syrian children described feelings of loneliness and depression in a quarter of a sample of respondents (194), while a school-based study in the cities of Mafraq, Sahab, Ramtha, and Zarqa found moderate to severe PTSD in a substantial portion of the sample (31%), with higher rates in girls (195). There is also relevant research on adult Syrian refugees: a review of the available data found high rates of mental health difficulties across several studies (32.9%) (196). More recent studies recorded high levels of perceived stress and the presence of depressive and anxiety symptoms in Amman (197), as well as prolonged grief—associated with severe mental disorder—in the Azraq refugee camp, associated with severe mental disorder (198).

The government of Jordan developed a comprehensive strategy in response to the Syrian crisis that included a focus on strengthening the health sector (191, 199). An emphasis was placed on ensuring equitable access to health services so that registered Syrian refugees, outside of the camps, could access the full range of primary and secondary services offered by the public health system. Within mental health, the response plan was consistent with the preexisting national mental health policy (200) in its prioritization of the integration of mental health in primary care and the expansion of MHPSS. There have been challenges to the full implementation of the country's health and mental health policy, however.

In particular, various obstacles have dramatically impacted access and service usage. According to some estimates, more than half of Syrian refugees that need medication or other health services cannot access such services (201). A widely reported increase in co-payment fees created a financial barrier to treatment (193, 202, 203), and surveys found that the financial costs of health services are a problem for Syrian refugees (204). The government increased the subsidy on health services for refugees in 2019, but there have been indications that Syrian refugees were largely unaware of this change (205). These challenges related to primary healthcare access inevitably impact mental health service provision. Different forms of mental health interventions are increasingly available, both in inpatient and outpatient settings, but there have been significant gaps in coverage for refugees. The government of Jordan has started various social services initiatives to address these types of challenges, such as cash transfer programs for families, with some reported success (132).

Germany

Germany has been the destination for many forced migrants, including 605,338 Syrian refugees now registered in the country (143). When large numbers of refugees started crossing into Europe in 2015, several German cities were key landing sites; for example, a great deal of strain was placed on health and social services in Munich (206). Early research initiatives soon began, including work on the mental health of refugees in Dresden (207). Subsequent research has had specific relevance to Syrian refugees. For example, two small studies in the state of North Rhine-Westphalia that focused on refugee children, both Syrian and Iraqi, found elevated rates of depression, anxiety, attention deficits, and withdrawal in relation to comparison samples (208). There is an ongoing study of adult Syrian refugees in Erlangen that found diagnosable conditions in a third of the sample (209); a recent follow-up with half of the original participants confirmed that these rates have remained substantial over time (210). High prevalence rates have also been reported in Halle (211). As previously mentioned, a meta-analysis has confirmed high prevalence rates in studies within Germany of refugees and asylum seekers from many different countries of origin (48). And a recent review of postmigration contextual factors has identified a range of risk factors, such unresolved asylum status, separation from family, and discrimination (212).

Addressing the burden of mental disorder has been difficult given legal restrictions on the provision of health services to refugees. By the terms of Germany's Asylum Seekers Benefits Act (213), new arrivals can only access "essential" health services for their first 15 months. Such services are typically restricted to acute conditions, effectively excluding any number of physical and mental illnesses. The law thus represents a significant barrier to accessing health and mental health services, which has led to sustained criticism (214). The UN has issued a report critical of this policy and coverage position (215), as did a group of academics and civil society organizations (216), characterizing it as a failure to protect the right to health that requires immediate reform. The German government issued a formal reply to the UN (217), maintaining that the law does ensure access to basic health care. This past year the government also issued a new global health strategy (218), although this too has come under criticism for failing to include any consideration of issues relating to migration (219).

Beyond the initial period of resettlement, refugees ultimately can gain the right to enroll in Germany's universal health care system, but even then it is not always easily accessed or utilized. Struggles with language, unemployment, and acculturation can represent significant obstacles for refugees to access and benefit from mental health interventions (220). Comprehensive data has been slow to become available, but there has been a clear need for enhanced service development specific to refugee mental health, particularly the provision of psychosocial therapies for trauma-related disorders (7). Recently, consistent with the growth of research on refugee mental health more generally, Germany has been the source of promising research on new service models and therapeutic interventions that could be scaled-up as a response to the longstanding access problems.

The Charité University Hospital in Berlin has been at the center of efforts to design, research, and implement mental health services for refugees. They have partnered with NGOs to provide services in Jordan, and in Berlin offer treatments from a specialist outpatient clinic for refugees (221). There are also a number of other research-based initiatives underway, including the development of a new screening tool (222), interventions for children (223), and multidisciplinary treatment packages for adults (224). The RefuKey initiative attempts to lower barriers to treatment through the provision of culturally appropriate interventions; research on the model has included Syrian refugees (225). There is also large, multicenter study of collaborative care model, tailored for Syrian refugees, that has just started being investigated (226). All of these treatment models, if proven effective, could serve as the basis for scaled-up interventions in similar high-income settings.

DISCUSSION AND RECOMMENDATIONS

In order to address the problems associated with inadequate mental health services for Syrian refugees, as well as the internally displaced within Syria, a range of responses need to be considered. Here we focus the discussion on a set of provisional recommendations in several key areas; namely, future research priorities, capacity building and health systems strengthening, and national and global health policy (**Table 4**).

TABLE 4 | General Recommendations.

Research Priorities
Enhance data collection
Track mental health correlates and outcomes throughout the migration process, collecting disaggregated data on gender, age, and family status
Develop culturally specific mental health instruments
Adapt assessment measures to refugee populations, including culturally specific idioms of distress and mental disorder
Expand research on therapeutic interventions
Research mental health interventions designed for forcibly displaced populations, with a focus on women and children
Capacity Building and Health Systems Strengthening
Increase funding from regional and international donors
Target underfunded mental health services for refugee populations to promote equitable access across destination countries
Improve social and economic conditions
Provide interventions that address socio-economic factors among the forcibly displaced, along with increased resources for local communities
Integrate psychiatric care with broader health and human services
Increase availability of psychiatric care and remove barriers to diagnosis and treatment, while providing clinically effective and culturally sensitive services
National and Global Health Policy
Ensure equal access to health services for migrants
Make health policies and health system implementation compliant with the UN's 1951 *Refugee Convention* and consistent with its recent *Compacts*
Increase international pressure on the Syrian regime
Monitor, reduce, and prevent targeted attacks on healthcare facilities and medical personnel
Strengthen global governance
Leverage policy instruments to influence international donors, national health ministries, and program implementers

Research Priorities

There is a pressing need for more data. Research has only just started to examine the nature of mental health problems in refugee populations, and a number of questions remain unanswered that, with additional clarification, could help guide the expansion and improvement of relevant services [also, see (2, 227)]. For a start, given the variability in existing findings, future research should aim for more rigor and consistency, including a longitudinal focus on the impact of protracted conflict on both refugees and the internally displaced (45, 46, 64). Part of this should include disaggregated data that better reflect the role of gender, age, and family status (228), as well as a new focus not just on mental health risks but also on potential protective factors (54). For example, there is interesting new research on post-traumatic growth in refugees, including data suggesting that higher levels of education are associated with more positive psychological and social changes following trauma in adult Syrian refugees in Istanbul (229).

It is important to note that instruments used to measure mental health are largely based on Western notions and do not include culture-specific idioms of distress and conceptions of mental disorder (45, 64). A process of cultural adaptation and testing of mental health screening tools is needed when working with refugees to ensure reliability and validity of mental health symptoms being measured (230). In addition, there is need for increased attention to variations in individual responses to trauma. Consistent with research on the significance of events that follow on, after the fact, from violence, armed conflict, or natural disaster, the classical conception of PTSD does not appear to sufficiently account for the role of social and contextual factors in humanitarian crises (119, 231, 232).

The complex relationship between preexisting vulnerabilities and exposure to stress and trauma, across the various phases of migration, remains one of the most challenging research questions. Clearer and more conclusive evidence would not just help with clinical diagnosis and treatment, but it could ultimately assist with the structuring of service provision. It would inform our understanding of the patterns of variation that have started to emerge from the existing data, thus opening up the possibility of more targeted interventions. For instance, there are significant between-country differences in the prevalence rates of various disorders, service use by gender, and the percentage of children in treatment (11, 45). Again, this will require a better understanding of the role of social and cultural variables at each stage of displacement, with many of these variables also mediated by the policy environment (e.g., type of national health system; healthcare access specific to refugees; financial costs; etc.). Generation of more robust data that takes into account the complete pathway of forced displacement can help in the development of interventions—and health systems—that are responsive to the causes of distinct profiles in prevalence and service utilization.

What would inform these kinds of consideration is improved tracking and measurement of mental health correlates and outcomes throughout the migration process. There is no shortage of organizations involved that could strengthen their data collection systems to better feature mental health variables. For example, partnerships between the UNHCR and other agencies such as the IOM and WHO could recommend that member states commit to sharing much needed epidemiological and health systems data relating to Syrian refugees in a common, transparent data schema. Greater access to cross-border data could enable better health outcome and system research, which could, in turn, inform the design of future interventions and the identification of key challenges that transit and destination countries could collectively prioritize.

All that said, the barriers to research in humanitarian settings are substantial, and the topic of mental health—which faces the challenges of underdiagnosis and stigma—in relation to the Syrian crisis is no different. It is difficult to carry out studies in this context; hence the interest in research from a distance—e.g., epidemiological modeling (116). Research may also hinder immediate relief efforts, while offering no guarantee that it will lead to effective interventions, particularly when adequate funding to carry out these interventions is not available. Increased engagement with local populations through principles of community-based participatory research can help address

some of these concerns, potentially leading to more sustainable and effective interventions (233). This implies that health data partnerships should extend well-beyond multilateral agencies, including NGOs, community groups, and other health and humanitarian stakeholders.

The research on therapeutic interventions for forcibly displaced populations remains in its early stages, although progress is starting to be made. As mentioned, several continuing research programs should soon provide more substantial evidence of the effectiveness of various psychosocial treatments. Some of this work specifically involves Syrian refugees. Of particular note is the STRENGTHS program currently being trialed in a number of different settings (95). But there is clearly room for much more research in this area. Others have sounded calls for research in high income countries to focus on several particular issues, including task-shifting approaches that rely upon peer-led interventions, telepsychiatry and e-mental health interventions, and more basic science investigating the neurobiological mechanisms involved in the treatment of PTSD (91). There is also a need for more work on developing effective interventions for displaced women and children (9, 93).

Capacity Building and Health Systems Strengthening

Much of the work required to rebuild and expand the health system within Syria will ultimately be political in nature, taking up issues that fall outside the scope of the present discussion. Most immediately, putting an end to the targeted attacks on healthcare facilities and medical personnel demands sustained international pressure. But there are other aspects of this work at the service level that are directly relevant to issues discussed here. Improving the provision of mental health services in refugee camps, especially in the northwest of the country, is highly dependent upon the continuing operations of multilateral organizations and NGOs in Syrian and neighboring countries. The WHO's cross-border work from Turkey is a good example of this. New, innovative responses are also necessary, for instance, modeled on initiatives such as the Brotherhood Medical Center, a privately funded clinic in the border town of Atimah which provides maternal and child services (234, 235).

In the leading destination countries, there are any number of ways of expanding and enhancing mental health services that should be under consideration. This starts with increased funding from international donors. Health services for refugee populations remain heavily reliant on the continued support of public and private funders, particularly in countries such as Lebanon. The influence of multilateral agencies such as the WHO is vital, but there has also been an increased awareness of the need to better coordinate the funding and provision of humanitarian programs across all of the organizations involved (236). These efforts need to be led by national health ministries in order to build strong and sustainable health systems, especially in the wake of humanitarian crises. This can help ensure that national health systems respond effectively to incoming refugees, given the domestic policy backdrop and the particularities of the country and culture. But key transit and destination countries should not do this alone; they should be supported by multilateral partners—as well as high-income countries that currently do not admit adequate numbers of refugees—in order to establish coordinated global governance that is responsive to refugee health and humanitarian needs more generally. The bottom line is that the financing of health services for refugees should come at both the national and supranational levels; there are a number of innovative funding mechanisms that need to be considered (237).

As repeatedly emphasized, social variables are key to refugee mental health and therefore appropriate interventions should be central to all service provision. Many of the contributors to poor mental health increasingly appear to be social and economic, such as poverty, unemployment, and discrimination, all exacerbated by war, conflict, and displacement. These variables are modifiable and thus appropriate socio-economic interventions should be incorporated into, or at least aligned with, mental health (49, 238). Cash transfer programs are an example of this type of approach (at use in destination countries such as Turkey, Lebanon, and Jordan). Efforts to improve basic living conditions are likely to improve health and mental health outcomes; this is particularly important when refugees all too often subsist under horrible conditions often without even the most basic amenities (172). There is another side to this as well, which is the tense dynamic that often develops between local populations and refugees. Ensuring that the local population has sufficient access to social services, economic support, and health services can help ameliorate what is otherwise a difficult situation given limited resources (239).

The importance of postmigration social factors also strongly suggests that health and mental health programming should prioritize service configurations that are fully integrated. In order for mental health services to be effective they must be linked to other health services, as well as community resources when possible, such as social services. Such a configuration has the potential to make interventions more accessible, given the broader reach of integrated services, as well as the possibility to circumvent the stigma frequently attached specifically to mental health services. But the fact remains that most countries have not successfully implemented integrated mental health provision, even when it is dictated by national and global health policy (24). The emphasis on integrated care also suggests that basic psychosocial interventions, as well as substance abuse treatment (240, 241), should be part of the clinical treatment package, and that community-based care is essential. This will require additional training of staff, especially in child psychiatry (242), as well as the continued development of non-specialist, task-shifting initiatives. Emphasis should be placed on tailoring clinical interventions to the cultural and contextual particulars of specific refugee populations, such as resettled Syrian refugees (243). To support this, more should be done to increase community participation in both the design and implementation of health services for the forcibly displaced (244).

The need to better integrate psychiatric care with broader health and human services is a continuing challenge for all health systems, including those in high income countries where Syrian refugees have been resettled. The challenges of fragmented services, and overall scarcity, also apply, although to a somewhat

lesser extent. Where basic mental health systems are in place, the challenges tend to center on the removal of barriers to diagnosis and treatment and the provision of more clinically effective and culturally sensitive services. For instance, even where services are readily available there can be significant delays in the process of enrolling in health systems, a problem that can be problematic for refugees requiring immediate mental health care following the stressful and traumatic experiences associated with migration. The literature makes it clear that the mental health needs of refugees in high income countries require social support in various forms, such as promoting social integration, reducing barriers to treatment, especially financial, and increasing engagement with services through improved cultural competence on the part of practitioners (245).

National and Global Health Policy

On the policy front, there are clear opportunities for improved governance. The guiding principle throughout should be a commitment to ensuring equal access to health services for migrants of all types. In practice, this means making national health policies, and health system implementation, compliant with the UN's 1951 *Refugee Convention* and consistent with its recent *Compacts*. This will take sustained advocacy and negotiation on the national, regional, and global level. A key challenge will be effective policy implementation and the monitoring of commitments, as health services remain out of reach for many refugees even in countries with universal health coverage in their constitution or national legislation. And of course, just as refugee health remains a challenging area in which to press for accelerated and substantial progress, a narrower focus on refugee *mental* health has in many ways proved to be even more of a challenge.

Within Syria, little progress can be made without international pressure. The debates in global health policy have centered on several key issues. The first concerns the impact of sanctions on the provision of humanitarian aid, particularly in the context of responses to the COVID-19 pandemic (246–248). Closely related, there has been concern about the restrictions placed on the work of NGOs—and the bilking of humanitarian aid—by the Syrian government (249, 250); this has led to criticisms of the potential complicity of the UN's Office for the Coordination of Humanitarian Affairs (251). Lastly, the targeted attacks on healthcare facilities and medical personnel continue to devastate health system infrastructure, despite attempts by both the UN and WHO to institute monitoring systems and establish UN "safe zones" to track and help prevent such attacks (101). Bold new responses are needed to address, and ultimately resolve, these issues, including approaches that have received less attention to date. For example, regional legal mechanisms specific to IDPs, such as the Great Lakes Pact and Kampala Convention, may serve as models for developing governance frameworks that can be applied to forced migration in Syria and neighboring countries (98).

Specific to multilateral institutions, the response of the UN and WHO needs to focus on the situation within Syrian and across destination countries, in the region and elsewhere. As noted at the outset, global health policy frameworks must begin to prioritize refugee health and mental health—explicitly and immediately—as a transnational health and humanitarian issue (41).There are some indications that mental health interventions are increasingly recognized as important components of humanitarian response (252), and the UN's *Compacts* and the WHO's *Global Action Plan* can help set constructive terms for further progress on this necessary, long-overdue shift. Future iterations of the SDGs, the most influential framework currently guiding investment in international development, should incorporate additional targets or shared indicators that measure progress toward refugee-specific mental health objectives (e.g., the provision of mental health services to refugee populations, or lowering the rate of PTSD). This is consistent with early calls to incorporate a mental health target that addresses service provision (253), as well as the more recent proposal from the Lancet Commission on Global Mental Health and Sustainable Development for a range of new mental health indicators (254).

Progress on the SDGs has been slow, and there are concerns that refugees have not only failed to benefit but have been left out entirely of many of the voluntary status reports submitted by member states (39). But it remains a promising, and influential, global agenda, with the potential for making necessary adjustments in order to address neglected targets—such as refugee mental health—if more purposefully constructed. There have been proposals, for instance, to leverage the SDGs for increased attention to the needs of children (255), and refugee women (256). The WHO's *Global Action Plan* also holds promise for refugee mental health, but at this stage it still requires formal adoption, followed by sustained commitment to implementation (257). Incorporating the *Global Action Plan* into an SDG indicator for progress on refugee health might be another way to change this soft law mechanism into a more active global policy framework.

Through increased recognition of refugee mental health, all of these global policy instruments could influence donors, program implementers, and health ministries. They could also spur constructive changes in the way that refugee and asylum applications are processed. For example, the UNHCR requires health screenings, but the mental health component could be strengthened so that any premigration or pre-resettlement need for psychiatric care could be factored into the choice of transit or destination country. Proposals consistent with this include the idea of a "health passport" for refugees (258). There are some precedents for this type of approach, such as the electronic health records system used by UNRWA for Palestinian refugees in several countries (259). This would require strong protections of privacy and confidentiality, given the stigma and discrimination associated with mental disorder and the risks faced by refugees regarding the potential misuse of health data (2, 260). But if handled correctly, and considered alongside other factors such as the existence of immigrant communities from the same country of origin, this information could ensure that refugees are placed in countries or regions where appropriate mental health care is available, along with social support. In this way it would help with the initiation of treatment or, in other cases, provide for continuity of care (one of the priority areas of the WHO's *Global*

Action Plan). Such a system configuration could be adaptive to the specific needs of refugee populations, modulated to mental healthcare access or the health policy of a particular destination country. Critical to operationalizing this process is generating the needed partnerships and multimodal forms of data to match refugee populations based on their mental health needs and the appropriate phase of migration.

Improved global governance would also help influence national-level policy and implementation, especially the prioritization of refugee mental health within national mental health strategy. There are instructive examples available, as in Lebanon, where the Ministry of Public Health's new mental health plan includes refugees as an important vulnerable population requiring expanded services (181). This is necessary in a country where refugees make up a substantial portion of the population, but other countries have also moved in a similar direction. For example, soon after Syrian refugees were first welcomed to the country, Canada's Mental Health Commission issued a report specific to refugees, incorporating their potential needs into preexisting national mental health strategy (261). Problems with policy implementation for refugees nevertheless linger in most countries, but such prioritization at the national level is an important step forward in the push for increased financial commitments and service expansion in key destination countries.

The United States represents an important opportunity in this regard. Refugee resettlement dropped to historic lows in recent years, from a ceiling cap of 85,000 refugees during fiscal year 2016 to only 15,000 at the start of 2021 (262, 263). As a result, the United States is no longer the world's top country for refugee resettlement after having led the world for decades (264). A series of Executive Orders on immigration from 2017 to 2020 further slowed resettlement, which particularly affected the number of Syrian refugees coming to the country. From the years 2011 to 2019, a total of 21,725 Syrians arrived, with a high of 15,479 in 2016 and a low of 41 in 2018 (145, 265). The Biden administration made initial pledges to raise the annual refugee admission ceiling to 125,000 (266), confirmed in an Executive Order (267), although political realities have since complicated the situation (268). Rebuilding the US Refugee Admission Program may take years (266), but there are other steps the administration should consider in responding to the refugee crisis (269), including renewed and strengthened support of the WHO (270), which would signal the possibility of enhanced international leadership in this area.

Despite all of the challenges described in the preceding, particularly the problems associated with service scarcity and barriers to access, there are still important opportunities available for expanding and strengthening mental health services for refugees. The Syrian conflict should be a catalyst for these governance reforms to improve refugee mental health, as health is a fundamental human right recognized by the UN and WHO constitution. As others have emphasized, in some ways the current pandemic has provided an opportunity to revisit and revise public health systems on both a national (190) and international scale (270), including the pressing need to end longstanding neglect of the growing mental health burden (271). Now is the time for expansion and innovation in global health, guided by a strong vision of what is necessary to meet the needs of the most vulnerable. Migrant and refugee health is an important, indeed essential, part of this, and any and all developments in research, policy, and practice must grant refugee mental health a central place.

CONCLUSION

While the conflict in Syria continues to appear intractable, the resulting public health emergency needs to be addressed in innovative ways. The expansion and improvement of mental health services is immediately necessary. What data there are describe an alarming crisis, with high prevalence and morbidity associated with mental disorder among Syrian refugees, met by relatively scarce and inaccessible services. These conditions hold in all of the primary destination countries in the region, including Turkey, Lebanon, Jordan, as well as in the countries outside the region that host refugees and resettlements, such as Germany. Most of these countries have applicable national legislation and policy frameworks, with some exceptions, but they all share problems with implementation. These national-level policies and service-level implementation efforts require strengthening, and the prioritization of refugee mental health within global policy instruments can help provide necessary guidance and influence.

AUTHOR CONTRIBUTIONS

KC, MAB, and TKM each made substantial contributions to the conceptualization, drafting, and revision of the manuscript. All the authors read and approved the final manuscript.

ACKNOWLEDGMENTS

The authors would like to thank the reviewers as well as Hani Alhomsh, Mirjam Faissner, and Ulrich Koch for helpful comments on earlier drafts of the article.

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

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frontiers in Psychiatry

CLINICAL TRIAL
published: 09 September 2021
doi: 10.3389/fpsyt.2021.664381

Mindfulness Training for Primary Care for Portuguese-Speaking Immigrants: A Pilot Study

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OPEN ACCESS

Edited by:
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Reviewed by:
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Specialty section:
This article was submitted to Public Mental Health, a section of the journal Frontiers in Psychiatry

Received: *05 February 2021*
Accepted: *04 August 2021*
Published: *09 September 2021*

Citation:
Trombka M, Creedon TB, Demarzo M, Cuoco LT, Smith L, Oxnard AC, Rozembaque AT, Hirayama MS, Moreno NB, Comeau A, Gawande R, Griswold T, Cook BL, Rocha NS and Schuman-Olivier Z (2021) Mindfulness Training for Primary Care for Portuguese-Speaking Immigrants: A Pilot Study. Front. Psychiatry 12:664381. doi: 10.3389/fpsyt.2021.664381

Background: Portuguese-speaking immigrants are a growing underserved population in the Unites States who experience high levels of psychological distress and increased vulnerability to mental health disorders such as depression and anxiety. Current evidence shows that mindfulness-based interventions (MBIs) are effective to promote physical and mental health among educated English speakers; nonetheless, the lack of diversity in the mindfulness literature is a considerable limitation. To our knowledge, the feasibility and acceptability of MBIs among Portuguese-speaking immigrants have not yet been investigated.

Methods: This single-arm pilot study ($N = 30$) explored the feasibility, acceptability, and cultural aspects of Mindfulness Training for Primary Care (MTPC)-Portuguese among Portuguese-speaking immigrants in the Boston area. MTPC is an 8-week, primary care-adapted, referral-based, insurance-reimbursable, trauma-informed MBI that is fully integrated into a healthcare system. The study also examined intervention preliminary effectiveness on mental health outcomes (depression and anxiety symptoms) and self-regulation (emotional regulation, mindfulness, self-compassion, interoceptive awareness), and initiation of health behavior was explored.

Results: Primary care providers referred 129 patients from 2018 to 2020. Main DSM-5 primary diagnoses were depression (76.3%) and anxiety disorders (6.7%). Participants ($N = 30$) attended a mean of 6.1 (SD 1.92) sessions and reported a mean of 213.7 (SD = 124.3) min of practice per week. All survey finishers would recommend the program to a friend, found the program helpful, and rated the overall program as "very good" or "excellent," and 93% would participate again, with satisfaction mean scores between 4.6 and 5 (Likert scale 0–5). Participants and group leaders provided feedback to refine MTPC-Portuguese

culturally responsiveness regarding materials language, settings, time, food, and community building. Patients exhibited reductions in depression ($d = 0.67$; $p < 0.001$) and anxiety ($d = 0.48$; $p = 0.011$) symptoms, as well as enhanced emotional regulation ($d = 0.45$; $p = 0.009$), and among survey finishers, 50% initiated health behavior change through action plan initiation.

Conclusion: This pilot study suggests that MTPC-Portuguese is feasible, acceptable, and culturally appropriate among Portuguese-speaking patients in the Boston area. Furthermore, the intervention might potentially decrease depression and anxiety symptoms, facilitate health behavior change, and improve emotional regulation. MTPC-Portuguese investigation with larger samples in controlled studies is warranted to support its dissemination and implementation in the healthcare system.

Clinical Trial Registration: Identifier: NCT04268355.

Keywords: mindfulness, Portuguese, immigrants, depression, anxiety, self-regulation, health behavior, primary care

INTRODUCTION

Immigrants in the United States (U.S.) are at a high risk of developing mental health disorders and experiencing mental healthcare inequalities and disparities (1–4). Portuguese is the seventh most widely spoken language in the world and over 540,000 foreign-born Portuguese-speaking individuals, sharing a language, a common history, and cultural traditions, live in the U.S. (5, 6). Massachusetts is the state with the largest Portuguese-speaking population, of whom 42% were born in Brazil, 28% in Portugal, 18% in Cape Verde, and 12% in the Azores (7). Boston is the top concentration area for Brazilian immigrants with 51,000 people (1.1% of the area population) (8).

Portuguese-speaking immigrants (PSI) experience high levels of psychological distress, depression, and anxiety (9–15). Unhealthy behaviors such as smoking and the lack of exercise and cancer screening are more prevalent when compared to other U.S residents (9). Socioeconomic disadvantages, language barriers, separation from family and friends, uninsurance and inadequate access to healthcare, discrimination, and fear of deportation are factors that contribute to health disparities (7, 11, 12, 16–18). Immigrants from Brazil work mostly with construction, house cleaning, and food services, being exposed to chemical, ergonomic, physical, and psychosocial job hazards (19). Research conducted with Brazilian immigrants in Massachusetts found that around one-third (35.3%) present significant depressive symptoms that are correlated with low income, lack of proficiency in English, being unmarried, and having a poor self-perception of health (10).

The literature demonstrates that mindfulness-based interventions (MBIs) are effective for improving physical and mental health outcomes, including depression and anxiety; reducing harmful health behaviors; and catalyzing chronic disease self-management and health behavior change (20–27). Meta-analytic data support the efficacy of MBIs to improve mental health and quality of life in primary care settings—the main gateway for patients in a healthcare system (28). As primary care settings are more accessible and less associated with social stigma around mental healthcare, it might be an ideal location for offering early intervention among immigrants (29). Furthermore, the group-based models make MBIs potentially more affordable and scalable for immigrants with financial constraints.

There is still a paucity of cultural and ethnoracial diversity among participants and group leaders in the MBI literature. The vast majority of MBIs have been studied in highly educated, English-speaking, and economically advantaged populations, leading to criticism of the low external validity of these interventions, especially in contexts of cultural and socioeconomic diversity (26, 30, 31). Developing a research base, while respecting cultural traditions from PSI, as well as other minorities such as African- and indigenous Americans, is needed (32, 33). To our knowledge, the feasibility and acceptability of MBIs among PSI in the U.S. have not yet been investigated.

Mindfulness Training for Primary Care (MTPC) is an 8-week, primary care-adapted, referral-based, insurance-reimbursable, trauma-informed, mindfulness-based intervention that is fully integrated into a healthcare system. This pilot study aimed to evaluate the feasibility and acceptability of a linguistic and cultural adaptation of MTPC for Portuguese speakers (MTPC-Portuguese). Additionally, we explored the preliminary effectiveness of the intervention on mental health outcomes (depression and anxiety symptoms), self-regulation (emotional regulation, mindfulness, self-compassion, interoceptive awareness), and the initiation of health behavior change among PSI.

MATERIALS AND METHODS

Participants and Settings

We recruited adults between 18 and 70 years of age who received primary care within a participating primary care patient-centered medical home (PCMH) and who indicated Portuguese as their

Abbreviations: MT, Marcelo Trombka; TC, Timothy B. Creedon; MD, Marcelo Demarzo; LC, Letícia T. Cuoco; AO, Alexandra C. Oxnard; AR, Alana T. Rozembaque; MH, Marcio S. Hirayama; NM, Natalia B. Moreno; RW, Richa Gawande; TG, Todd Griswold; NR, Neusa S. Rocha; ZSO, Zev Schuman-Olivier.

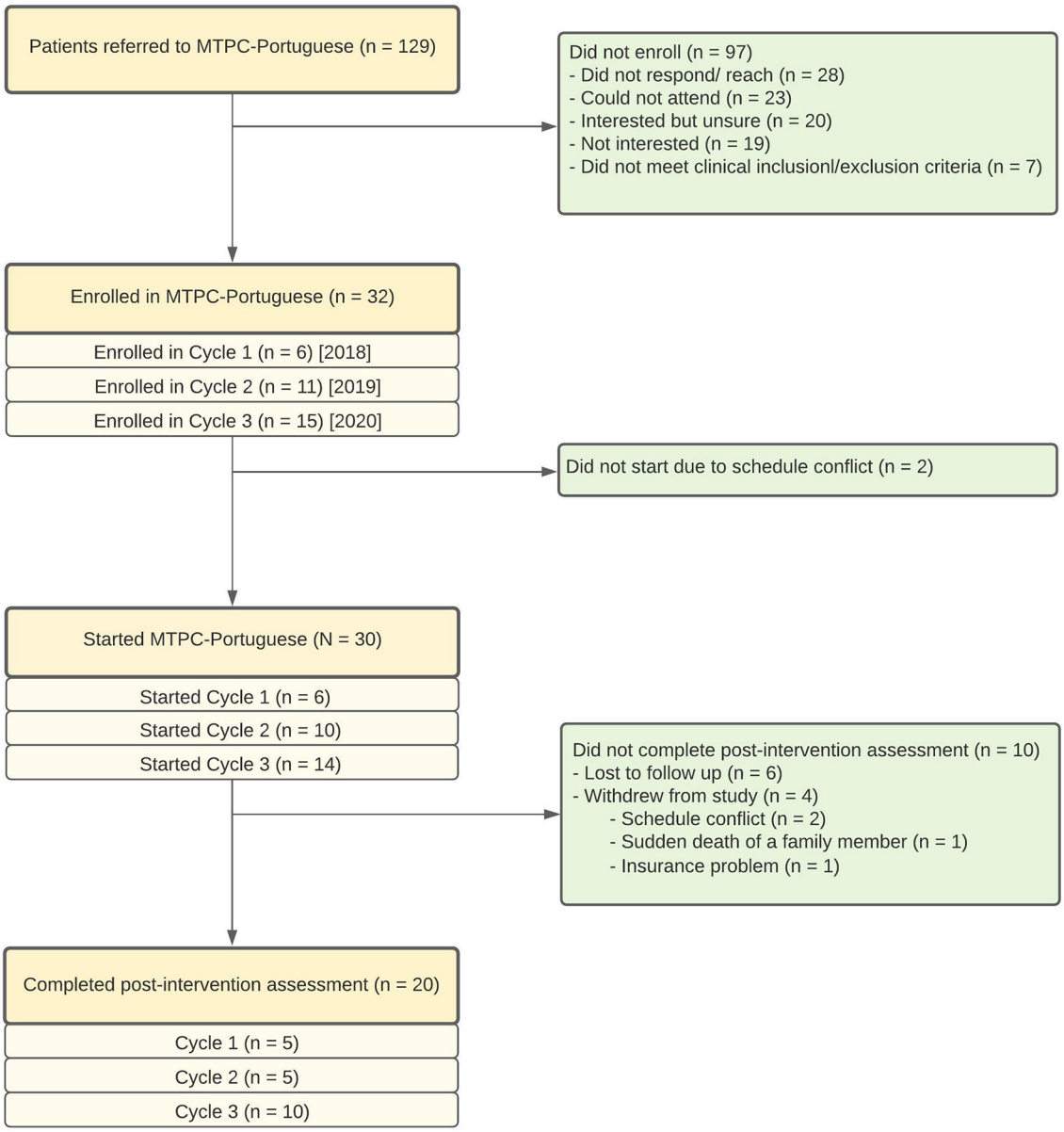

FIGURE 1 | Flow diagram of the participants.

primary language in the electronic health record or as part of the referral to the MTPC program (recruitment process described elsewhere) (25, 34). All participants had a DSM-5 diagnosis of anxiety, depression, or stress-related disorder and had Portuguese fluency at sixth grade reading level. Exclusion criteria were the presence of symptoms of psychosis, thought disorder, and/or severe mental illness including schizophrenia, schizoaffective disorder, bipolar I disorder, current severe episode of major depressive disorder, active moderate–severe substance use disorder, cognitive impairment, high risk of imminent hospitalization (including current suicidal ideation or an inpatient admission or psychiatric emergency department visit in the last 6 months), third-trimester pregnancy, or an insurance payer that did not cover group medical visits.

Mindfulness Training for Primary Care (MTPC) (25)-Portuguese was delivered in 8 weekly 2-h evening sessions over three cycles from 2018 to 2020 (**Figure 1**). Sessions were held from 6 to 8 p.m. in a community room in the building that housed one of the PCMH sites of the health system, as well as the Portuguese Mental Health Clinic. The 2020 recruitment cycle was disrupted by the COVID-19 nation-wide pandemic shutdown. The two evening groups and the all-day session of that 2020 cycle were offered interactively *via* an online *Google Meets* videoconference platform used by the healthcare system.

While the primary physiologic aim for that 2020 recruitment cycle group (NCT04268355) was disrupted due to the inability to have in-person study visits, the main secondary clinical aims, mechanistic survey battery, and the intervention methods otherwise remained consistent across all three cycles, which represent the focus of this paper. All procedures performed were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants involved in the study which was approved by the CHA (Cambridge Health Alliance) Institutional Review Board (#1002/8/14).

Procedures

A single-arm pre- and post-evaluation open trial was employed and measures were collected at baseline (week 0) and at post-intervention (weeks 8–9) using the online REDCap electronic data capture system (35). As part of the institutional change process (36, 37) resulting from integrating mindfulness within the health system (25), primary care providers (PCPs) and mental health providers were educated about this opportunity, the referral process and inclusion/exclusion criteria through emails, grand round presentations, and in-person presentations at all-staff meetings. Printed flyers were displayed in Portuguese and English at PCMHs informing potential patients to contact their PCP or mental health provider about eligibility, as well as a reminder was sent to PCPs and mental health teams. Interested primary care patients were referred by their PCP or mental health provider *via* a customized referral order in the electronic health record in which primary and secondary referral diagnoses were indicated. A convenience sample was used, and providers were encouraged to refer patients who had comorbid mental and physical conditions who had an interest in mindfulness and mind–body approaches to managing their chronic illness, or who were interested in a group-based approach to managing depression, anxiety, or stress. All referrals underwent a preliminary chart review by a study coordinator. A board-certified psychiatrist reviewed diagnosis and eligibility if the preliminary chart review was unclear (TG). To assess clinical appropriateness and confirm diagnosis for insurance billing, patients were required to have a behavioral health evaluation with a CHA provider within the past 6 months and may have received additional mental health treatment based on the stepped care model of the system (38). Behavioral health evaluations were held in Portuguese when the mental health provider spoke Portuguese or with the support of a CHA English-Portuguese medical interpreter when not.

Eligible individuals were invited to an orientation group session coordinated by members of the research staff that spoke Portuguese (MT, LC, AO, AR, NM). During the session, detailed information about the study and time to ask questions were provided, culturally accepted food was offered, informed consent was signed, and baseline measures were collected. This session also included a conceptual/experiential mindfulness introduction and inquiry by the Portuguese-MTPC facilitator (AO, MT), and digital (39)/community mindfulness resources in Portuguese and English were shared to enhance patient motivation and practice opportunities. During the intervention, participants received a biweekly engagement call to provide study staff support (i.e., logistical, emotional, mindfulness-practice encouragement) and reduce attrition. Recruitment and engagement calls were conducted by research staff who were Portuguese speakers (LC, AR, NM, MT). Sessions were audio-recorded, and 10% were reviewed by trained observers for adherence and competency, preventing drift. All Portuguese-MTPC groups were billed as group medical visits.

Translation of Materials

MTPC-Portuguese is a first phase primarily linguistic MTPC cultural adaptation developed in order to provide MTPC access to PSI. MTPC materials were translated by two Portuguese native speakers and mindfulness experts fluent in English (MH, MD) together with a primary care physician and experienced mindfulness facilitator who co-developed the MTPC curriculum and was previously trained and worked as an English-Portuguese medical interpreter (AO). Research materials were translated by research staff Portuguese native speakers (MH, MT, LC, AR) in combination with CHA translation services and revised by at least one other Portuguese native speaker from the research staff.

Group Leaders

Cycles 1 and 2 were led by a primary care physician and mindfulness group leader who co-developed the MTPC curriculum, had lived in Brazil, and was previously trained and worked as an English-Portuguese medical interpreter (AO), leading groups since 2012. Cycle 3 was co-led in pairs by the aforementioned primary care physician with a psychiatrist and mindfulness group leader (MT) who is a Portuguese native speaker leading groups since 2015. Both group leaders were qualified in the Center for Mindfulness and Compassion at CHA/Harvard Medical School, led over 25 mindfulness groups, and regularly lead at least one new group per semester and weekly 45–60 min mindfulness maintenance sessions.

Intervention

MTPC builds upon the transdiagnostic approach developed in mindfulness-based stress reduction (MBSR) (40) and combines training in evidence-based targeted mindfulness skills from other MBPs (41–44) with elements from mindfulness-based cognitive therapy (MBCT) (44) and approaches to behavior change adapted from cognitive behavioral therapy (45), relapse prevention (46), and motivational enhancement (47). MTPC is typically offered in 8 weekly 2-h sessions with a 7-h all-day optional session and a recommended 30–45 min of daily home practice with online recordings. MTPC was designed to be trauma-informed (48, 49) through, for example, availability of choice in guided practices; language during meditations that emphasizes freedom, choice, self-compassion, and self-care; and explicit modules during MTPC group leader training on trauma adaptations and the ubiquity of traumatic experiences. Foundational sessions 1–4 fostered awareness of body sensations,

TABLE 1 | Mindfulness training for primary care (MTPC) core curriculum content.

Sessions*	Goals	Practices/activities	Homework
1. Discovering mindfulness and autopilot	Developing mindfulness and noticing health behaviors (sessions 1–4)	Intention setting Standing mindful movement Raising exercise Body scan	Body scan Tracking autopilot in 10 ways STOP-ACHE-GO (S-A-G)
2. Perception, interpretation, and beginner's mind		Body scan Friend walking down the street (automatic thinking/emotions exercise, negativity/threat bias) Curiosity about health habits—journal Awareness of sounds, posture, and breathing	Body scan Notice autopilot triggering cues S-A-G
3. Finding freedom through feeling tone		Sitting body scan with feeling tones Mindful movement Understanding the feeling tone by observing the diamond of experience Mindful savoring	Mindful movements Body scan Diamond of experience for pleasant and unpleasant events Mindful savoring
4. Staying present with pain and stress; allowing what is		Sitting with discomfort Understanding our experience of stress on the body Mindful walking 3-min S-A-G breathing space	Sitting meditation Mindful walking, 3-min S-A-G breathing space Noticing warning signs S-A-G
5. Kindness and coping	Compassion and preparing for behavior change (sessions 5–8)	Kindness meditation 3-min S-A-G self-compassion break Journal about health challenge Giving and receiving compassion meditation	Sitting meditation Kindness meditation S-A-G How can I best take care of myself?
6. Accessing core values, aspiration, and change		Sitting meditation Using mindfulness to access core values S-A-G breathing space with grounding values and gratitude	Sitting meditation, kindness meditation giving, and receiving compassion meditation S-A-G Gratitude journal
7. Living well through wise action		SMART action plan video/ behavior change action plan creation Urge surfing with S-A-G Sitting meditation	Sitting meditation, kindness meditation giving, and receiving compassion meditation S-A-G Start behavior change action plan
8. Connection, communication, and community		Kind mind meditation Noticing interdependence/Who has a stake in your well-being Community resources	Incorporate mindfulness into daily life

**Every session incorporates the following 3 threads, which develop and deepen over the 8 weeks. Thread 1: the role of behavior change in living well. Thread 2: development of interpersonal mindfulness. Thread 3: warmth, kindness, compassion, and the experience of common humanity. A 7-hour silent all-day optional session is offered on a weekend between weeks 5–8.*

breathing, autopilot and stress responses, and skills for relating to discomfort. Sessions 5–8 included MTPC-incorporated core practices adapted from MBCT (44) and mindful self-compassion (MSC) (43). The STOP-ACHE-GO practice (see **Supplementary Material**) invites participants to bring awareness to processes that are gradually introduced over the program with a new letter of the acronym. A thread focused on "Living Well" with chronic illness was woven throughout most sessions and included harnessing mindfulness and chronic illness self-management (50) to support health behavior change as a way of living well.

Since ambivalence is often rooted in a conflict of values, and behavior change emerges from becoming aware of the discrepancy between deeply held values and current behavior (51), MTPC avoids promoting any specific values, but uses mindfulness practice to provide a safe and illuminating container for the identification of one's own deeply held values through an adapted values clarification card sort process (52), followed by encouragement to identify which important personal values are associated with living well. Finally, MTPC includes a short-term action planning process aimed at behavior change related to health maintenance or chronic illness self-management using the SMART model (53). **Table 1** describes the MTPC curriculum themes, goals, and activities.

Measures

Participants completed a baseline survey for sociodemographic variables, including gender, age, country of origin, race, income, marital status, and education.

Feasibility, Acceptability, and Cultural Aspects

The recruitment process, MTPC-Portuguese sessions attendance, and dropout rate were evaluated. Participants were invited to record daily practice/resource variables weekly until week 8 on a REDCap link, including formal practice (e.g., body scan), informal practice (i.e., breathing space, mindful walking,

mindful eating, body awareness, gratitude, informal kindness, self-compassion break), and use of mindfulness resources (e.g., online recordings).

The *MTPC-Portuguese Satisfaction Survey* (available as **Supplementary Material**) is an 18-item survey containing two parts. First is a series of 12 questions scored on a five-point Likert scale from 1 (*Strongly Disagree/Poor*) to 5 (*Strongly Agree/Excellent*), with statements such as "*I would recommend this program to a friend*," "*I found this program helpful*," "*I would be willing to participate in this program again*," or "*Overall rating of the program*." Next is a series of six open-ended questions in which patients enter a written response to statements such as "*The most important thing I learned during this program*" or "*My favorite part of the program*." The MTPC-Portuguese Suggestion Survey containing the four following questions was included in cycle 3 requesting suggestions to improve cultural responsiveness in case of negative answers. (1) "*Was the language presented in the didactic or audiovisual content material not clear enough or inappropriate to your cultural perspective? Consider metaphors, vignettes, poems, sayings and symbols utilized*" (cognitive); (2) "*In any proposed activity, was there any message communicated that does not fit your norms, values, or cultural traditions that may have created resistance during the program?*" (affective); (3)"*Are the program structure and content delivery in the sessions, as well as the formal and informal home practices are applicable to your daily life experience?*" (relevance); (4) "*In order to make the program more accessible to your culture, do you have any other suggestions for changes not covered in the previous questions?*" A semistructured 35-min interview with group leaders following the Suggestion Survey was conducted and recorded by a research staff member (LC) and discussed with the research team (MD, LC, RG, NR, ZSO) in order to assess the perspectives of leaders on cultural aspects.

Mental Health

The *Patient-Reported Outcomes Measurement Information System—Depression Short Form 8a (PROMIS-DSF)*, an eight-item scale, was used to assess patient-reported health status for depression (54). PROMIS instruments are funded by the NIH and used to reliably and validly measure patient-reported outcomes for clinical research and practice. Participants were asked to rate their experience of each item in the past 7 days on a five-point scale from 1 (*never*) to 5 (*always*) (Cronbach's $\alpha = 0.94$). The PROMIS-Depression Portuguese version demonstrates strong psychometric properties (Cronbach's $\alpha = 0.97$) (55).

The *Patient-Reported Outcomes Measurement Information System—Anxiety Short Form 8a (PROMIS-ASF)*, an eight-item scale, was used to assess patient-reported health status for anxiety (56). PROMIS instruments are funded by the NIH and used to reliably and validly measure patient-reported outcomes for clinical research and practice. Participants were asked to rate their experience of each item in the past 7 days on a five-point scale from 1 (*never*) to 5 (*always*) (Cronbach's $\alpha = 0.90$). The PROMIS-Anxiety Portuguese version exhibits strong psychometric properties (Cronbach's $\alpha = 0.96$) (55).

Self-Regulation

The *Difficulties in Emotion Regulation Scale (DERS)* is a 36-item self-report scale used to assess emotional dysregulation using a five-point Likert scale ranging from 1 (*almost never*) to 5 (*almost always*) (57). The scale assesses six aspects of emotional dysregulation: non-acceptance of emotional responses (Non-acceptance), difficulties engaging in goal-directed behavior (Goals), impulse control difficulties (Impulse), lack of emotional awareness (Awareness), limited access to emotion regulation strategies (Strategies), and lack of emotional clarity (Clarity). Subscales are summed and a lower total score represents a better outcome ($\alpha = 0.93$). The DERS Portuguese version demonstrates adequate psychometric properties ($\alpha = 0.93$) (58).

The Five *Facet Mindfulness Questionnaire (FFMQ)* is a 39-item scale used to examine five factors that represent aspects of the current empirical conception of mindfulness (59). Participants rated their degree of agreement with each of the items on a five-point Likert scale ranging from 1 (*never or very rarely true*) to 5 (*very often or always true*), with higher scores indicating higher experience of mindfulness ($\alpha = 0.93$). The FFMQ Portuguese version shows good psychometric properties ($\alpha = 0.81$) (60).

The *Self-Compassion Scale (SCS)* is a 26-item scale used to measure six components of self-compassion: self-kindness, self-judgment, common humanity, isolation, mindfulness, and overidentification (61). The items are rated on a five-point response Likert scale ranging from 1 (*almost never*) to 5 (*almost always*) ($\alpha = 0.93$). The Portuguese SCS version exhibits solid psychometric properties ($\alpha = 0.92$) (62).

The *Multidimensional Assessment of Interoceptive Awareness (MAIA)* is a 32-item self-report scale used to assess multiple aspects of interoception and interoceptive awareness (63). The six-point Likert scale (ranging from 0 to 6) assesses eight aspects of interoceptive awareness: noticing, not-distracting, not-worrying, attention regulation, emotional awareness, self-regulation, body listening, and trusting. Subscales are averaged, and a higher total score represents a better outcome ($\alpha = 0.66$ to 0.87). The MAIA Portuguese version presents good psychometric properties ($\alpha = 0.61$ to 0.87) (64).

Health Behavior Change

During study week 7, participants created a short-term action plan focused on behavior change related to health maintenance and/or self-management of chronic disease using video and written materials outlining the well-established SMART goal framework (53, 65). Participants then reported their level of action plan initiation in the *Action plan initiation (API) survey* (66), from 1 (*not at all*) to 7 (*completely*) at week 9, a 2-week time window consistent with previously published studies (66–68). Evidence of action plan initiation was defined as an API score $\geq$5.

Adverse Events

Adverse events reports (AERs) were collected using a combination of checklist and open-ended questions in the intervention period during biweekly engagement calls in Portuguese (LC, AR, NM) and at postintervention. Research staff documented any AERs occurring during group sessions.

AERs were categorized as serious or non-serious. Serious adverse events were previously defined as any adverse event that resulted in one or more of the following outcomes: death, life-threatening event, inpatient hospitalization, a congenital anomaly or birth defect, or an important medical event based upon appropriate medical judgment. AERs were classified according to the likelihood that they were related to the intervention using a Relatedness Assessment Tool.

Data Analysis

Descriptive statistics were used to evaluate baseline demographics and clinical characteristics of participants, feasibility, and acceptability. Qualitative feedback was also used to explore acceptability and cultural aspects.

To examine mental health and self-regulation variables, we conducted a repeated measures analysis using linear mixed-effects models with a fixed time parameter for 8 weeks vs. baseline and participant-specific random intercepts. Given that the study design included observation of continuous outcome measures for each participant at two time points, linear mixed models were an appropriate choice because they account for clustering (i.e., non-independence) of multiple observations per participant (69). Within-group effect sizes were calculated and expressed in terms of Cohen's *d*. We used multiple imputation by chained equations with predictive mean matching and 100 imputations to address missing outcome variable data, which ranged from 3 to 33% across all measures (70, 71). Statistical significance of pre-/post-differences was determined using the Benjamini–Hochberg false discovery rate (FDR) procedure (72), which accounts for multiple comparisons. We implemented the FDR procedure according to Cao et al. (73) in which a cutoff *p*-value is determined for a family of similar variables and analyses (family-wise error rate = 0.05) (74, 75). We designed two analysis families: mental health outcomes (depression and anxiety symptoms; two items) and self-regulation outcomes (four total scale items, six emotion regulation-specific subscale items, and eight interoceptive awareness-specific items). Independent *t*-tests and Pearson's correlations were conducted to determine if there were any differences in baseline mental health, self-regulation, and demographic variables between patients who did and did not answer the postintervention assessment. We added gender as a covariate to each mixed-effects model to test whether there were significant, independent differences in mental health and self-regulation outcomes between females and males after controlling for time.

To prevent bias during analysis, an external statistical consultant (TC) oversaw the analysis plan and decision-making and reviewed all Stata/MP 16.1 (76) results and syntax.

RESULTS

Participants ($N = 30$) were 80% female ($n = 24$) and had a median age of 52 years old, and 30% identified themselves as Black or mixed race ($n = 9$). Participants were 93.3% ($n = 28$) immigrants to the U.S. born in Brazil, while 6.7% ($n = 2$) were immigrants born in Portugal. There were no participants from other Portuguese-speaking countries. Annual income below US$20,000 was reported by 43.3% ($n = 13$) of the sample. Main DSM-5 primary diagnoses were depression (76.3%, $n = 23$) and anxiety disorders (6.7%, $n = 2$), whereas 16.7% ($n = 5$) of participants suffered from comorbid depression and anxiety disorders. Baseline demographic and clinical characteristics are described in **Table 2**.

TABLE 2 | Baseline demographic and clinical characteristics of participants.

Variable	Total ($N = 30$)	
Female, *n* (%)	24	(80.0)
Age (years), median (IQR)	52	(45-61)
Country of origin, *n* (%)		
Brazil	28	(93.3)
Portugal	2	(6.7)
Race, *n* (%)		
White	29	(63.3)
Black	3	(10.0)
Mixed	6	(20.0)
Missing	2	(6.7)
Annual income <$20,000, *n* (%)	13	(43.3)
Missing	1	(3.3)
Marital status, *n* (%)		
Single	9	(30.0)
Married/cohabitating	12	(40.0)
Divorced	7	(23.3)
Widowed	1	(3.3)
Missing	1	(3.3)
Education (years), median (IQR)[a]	14	(14-16)
Insurance type, *n* (%)		
Medicare/Medicaid	28	(93.3)
Private	1	(3.3)
Other[b]	1	(3.3)
Single DSM-5 diagnosis, *n* (%)	22	(73.3)
Primary DSM-5 diagnosis, *n* (%)		
Major depressive disorder[c]	21	(70.0)
Unspecified anxiety disorder (309.1)	2	(6.6)
Other depressive disorder[d]	2	(6.3)
Adjustment disorder[e]	1	(3.3)
PTSD (309.81)	1	(3.3)
Other[f]	3	(10.0)

[a] *Missing (n = 1).*
[b] *Compensation of workers (n = 1).*
[c] *Includes DSM-5 codes: major depressive disorder, single episode, unspecified (296.20); major depressive disorder, single episode, moderate (296.22); major depressive disorder, recurrent episode, unspecified (296.3); major depressive disorder, recurrent episode, mild (296.31); major depressive disorder, recurrent episode, moderate (296.32); major depressive disorder, recurrent episode, severe (296.33); major depressive disorder, recurrent episode, in partial remission (296.35); major depressive disorder, recurrent episode, in full remission (296.36).*
[d] *Includes DSM-5 codes: dysthymia (300.4) and unspecified depression (311).*
[e] *DSM-5 codes: adjustment disorder, with anxiety (309.24).*
[f] *Includes DSM-5 codes: somatic symptom disorder (300.82); acute stress disorder/reaction (308.3).*

TABLE 3 | Number of sessions completed by participants ($n = 30$).

Number of sessions	*N* (%)
1	30 (100.0)
2	29 (96.7)
3	28 (93.3)
4	26 (86.7)
5	23 (76.7)
6	21 (70.0)
7	16 (53.3)
8	9 (30.0)

TABLE 4 | Satisfaction scores of MTPC-Portuguese participants ($n = 15$).

Question	Mean scores (1-5)
1. I found this program helpful	4.9
2. The group was well-organized	4.9
3, The group leader(s) care about me as a person	5.0
4. I was able to participate and express myself in the group	4.8
5. The group leader(s) were authentic, honest, and real	5.0
6. I learned what I was hoping to learn	4.6
7. The group leader(s) had good timing when providing examples	5.0
8. I would be willing to participate again if I was able to do so	4.9
9. The group leader(s) were easy to understand	5.0
10. I would recommend this program to a friend	5.0
11. Overall rating of the facilitator(s)	5.0
12. Overall rating of the group	4.9

Feasibility

Over three cycles, 129 patients were referred and 32 signed informed consent (**Figure 1**). The main reasons for not enrolling were that people were unable to be reached or could not attend. Participants who initiated MTPC-Portuguese ($N = 30$) attended a mean of 6.1 (SD 1.92) sessions, 86.7% ($n = 26$) attended at least four sessions, and 70% ($n = 21$) attended at least 6 of the 8 weekly sessions (**Table 3**). Average formal practice reported by participants was 213.7 minutes (min)/week (SD = 124.3) or 30.5 min/day. Body awareness (2.46 counts/week), mindful eating (2.37 counts/week), and breathing space (1.59 counts/week) were the predominant reported informal practices, whereas MTPC online recordings, other center/facilitator online recordings, and mindfulness books/articles were the most frequent resources used, with an average of 3.09, 1.29, and 1.1 counts per week, respectively.

Post-intervention assessment was completed by 62.5% ($n = 20$) of the enrolled sample. To assess bias due to attrition, independent *t*-tests were conducted to compare participants that did and did not complete ($n = 10$) the postintervention assessment on baseline depression, anxiety, emotion regulation, mindfulness, self-compassion, and interoceptive awareness and found no differences ($p > 0.05$). Additionally, independent *t*-tests and Pearson's correlations revealed that gender, age, country of origin, race, income, marital status, and years of education were also similar between the groups ($p > 0.05$).

Acceptability

Satisfaction survey results demonstrated that 100% of responders would recommend the program to a friend, 100% found the program helpful, 93% would participate again, and 100% rated the overall program as "very good" or "excellent (4 or 5 on the Likert scale). Satisfaction survey mean scores ranged from 4.6 to 5 and are shown in **Table 4**.

Mindfulness skills and attitudes developed through the program had a positive impact on the daily life of participants. "*I learned to pay attention to present-moment feelings*" (female, 37 years old), "*Live more consciously*" (female, 30 years old), "*Cultivate non-judgement*" (female, 54 years old), "*Concentration*" (female, 62 years old), and "*Step out of the automatic pilot*" (male, 63 years old) were the responses to the most important or favorite part of the intervention questions.

A central theme highlighted in the qualitative feedback was the importance of social connectedness and feelings of common humanity provided by the group expressed in answers regarding the favorite or most helpful part of the program such as "*Meeting new people and listening to their experiences*" (female, 42 years old) and "*I realized I am not alone*"; "*making new friends*" (female, 37 years old). Another prominent aspect was the cultivation of inner compassion and acceptance, highlighted in answers to the most important part of the program like "*I learned that I have the capacity to love and forgive myself, and live well with my limitations*" (male, 61 years old) or "*The practice of being kind, caring and accepting toward myself*" (male, 53 years old). "*I learned to stay calm in difficult situations*" (female, 37 years old), "*Deal with anxiety*" (female, 35 years old), and "*Self-control*" (female, 62 years old) were the answers to the most helpful aspect of MTPC-Portuguese, indicating that new skills to deal with challenging emotions and impulsivity were fostered.

The importance of formal mindfulness and compassion/loving-kindness practices and the all-day session was demonstrated in responses to the favorite or most important part of the intervention such as "*All-day session*" (female, 54 years old), "*Body scan*" (female, 68 years old), and "*Mindful movement and compassion practices*" (female, 30 years old). Feedback received regarding the least favorite part of the program or suggestions for change centered around program length and settings like "*The program could be longer*" (female, 37 years old), "*Add 15 min per session*" (female, 30 years old), or "*An alternative space without the Health Unit public address system interruptions*" (male, 53 years old).

Cultural Aspects

Regarding cultural aspects, 100% of survey completers considered the formal and informal home practices applicable to daily life. When asked if there was any message communicated that did not fit participant norms, values, or cultural traditions that could have created resistance or if the intervention structure and content delivery in the sessions, all survey completers answered no. Portuguese-MTPC language in the didactic or

TABLE 5 | Mixed-effects analysis.

Outcome	Baseline		Week 8		Differences over time			
	Mean	(SE)	Mean	(SE)	*B*	(SE)	*p*	*d*
PROMIS-DSF[a]	58.2	(1.5)	52.1	(1.8)	−6.2	(1.6)	<0.001*	0.67
PROMIS-ASF[b]	62.7	(1.5)	58.5	(1.7)	−4.1	(1.6)	0.011*	0.48
DERS[c] total	91.7	(4.4)	81.0	(5.0)	−11.3	(4.3)	0.009*	0.45
FFMQ[d] average	3.1	(0.1)	3.3	(0.1)	0.2	(0.1)	0.115	0.35
SCS[e] average	3.2	(0.1)	3.5	(0.2)	0.3	(0.2)	0.188	0.31
MAIA[f] average	3.5	(0.1)	3.8	(0.1)	0.3	(0.2)	0.039^	0.45

[a] *Patient-Reported Outcome Measurement Information System—Depression Short Form 8a.*
[b] *Patient-Reported Outcome Measurement Information System—Anxiety Short Form 8a.*
[c] *Difficulties in Emotion Regulation Scale.*
[d] *Five Facet Mindfulness Questionnaire.*
[e] *Self-Compassion Scale.*
[f] *Multidimensional Assessment of Interoceptive Awareness.*
* *Significant after the Hochberg FDR procedure, family-wise $p < 0.05$.*
^ *Significant before the Hochberg FDR procedure.*

audiovisual content material was overall clear and appropriate, though one participant mentioned the program workbook would benefit from a review of poetry translations. One participant stated that the program content welcomes all faiths and suggested making it clearer in the recruitment process because a few of her friends who could have benefited were advised by religious leaders (Christian) not to participate.

Both group leaders reported that the Portuguese-MTPC appropriately considered cognitive, affective, and relevance aspects. However, the group leaders had a few suggestions to improve cultural responsiveness such as providing additional time, space, and resources to meet social connection necessities; including poetry and testimonials of Portuguese-speaking authors; offering traditional food from Portuguese-speaking countries; highlighting the spiritual/religious inclusiveness of the intervention (especially its compatibility with Christian beliefs); and inviting participants to watch a video at the first session that filmed a previous Portuguese-speaking MTPC group participant sharing his or her experience with the program.

Mental Health

Mixed models analysis demonstrated that MTPC-Portuguese was associated with a medium-to-large effect size in reducing depression symptoms ($d = 0.67$; $p < 0.001$) and a medium effect size in decreasing anxiety symptoms ($d = 0.48$; $p = 0.011$) (**Table 5** and **Figure 2**). The percentage of patients that scored above 55 on PROMIS-DSF and PROMIS-ASF (the cutoff strongly associated with disorder) (77, 78) at baseline was 70 and 83%, respectively. Sensitivity analyses for the mental health outcomes on this sample were conducted, and significant findings were found that were similar to the overall sample analysis. Gender was not yielded as a significant covariate for the mental health outcomes.

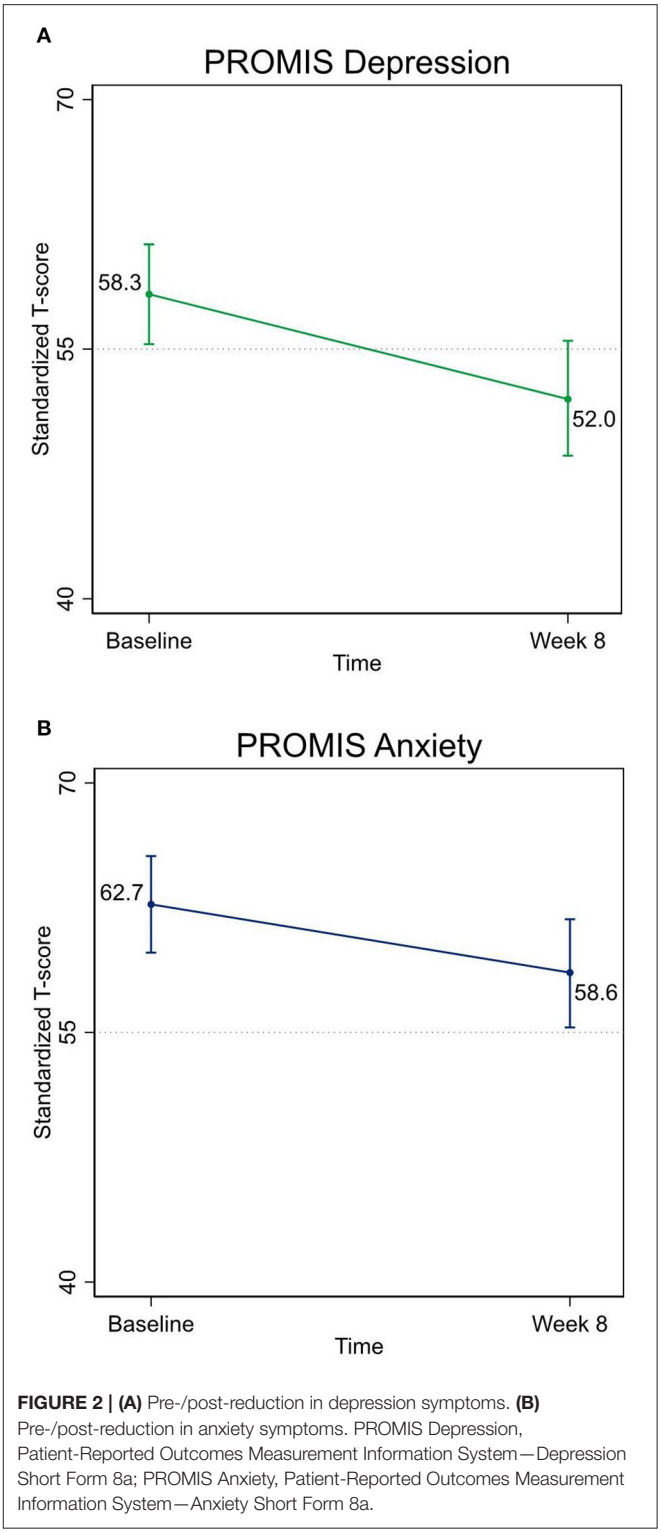

FIGURE 2 | (A) Pre-/post-reduction in depression symptoms. **(B)** Pre-/post-reduction in anxiety symptoms. PROMIS Depression, Patient-Reported Outcomes Measurement Information System—Depression Short Form 8a; PROMIS Anxiety, Patient-Reported Outcomes Measurement Information System—Anxiety Short Form 8a.

Self-Regulation

The MTPC-Portuguese intervention was also associated with a significant, small-to-medium effect size improvement in emotion regulation (total DERS score, **Table 5**: $d = 0.45$; $p = 0.009$).

Among the DERS subscales, significant decreases in the *Non-acceptance* ($d = 0.50$; $p = 0.013$) and *Strategies* ($d = 0.54$; $p = 0.004$) items appeared to drive the improvement in overall emotion regulation (see **Supplementary Material**). Though not statistically significant, there were trends toward increased mindfulness ($d = 0.35$; $p = 0.115$), self-compassion $d = 0.31$; $p = 0.188$), and interoceptive awareness ($d = 0.45$; $p = 0.039$; not significant after controlling for multiple comparisons through the false discovery rate) (**Table 5**). None of the estimates for changes in the eight individual MAIA scales were statistically significant. Gender was not yielded as a significant covariate for FFMQ, SCS, DERS, and MAIA total scores.

Health Behavior Change

Among survey finishers, 50% initiated the action plan by week 9 (API score ≥ 5). Action plans were individualized (e.g., "practice the body scan for 15 min 3 times a week," "run 3 times a week," or "go to the gym 2 times a week"). The most prevalent action plan goal category was mindfulness or self-care (58%), followed by physical exercise (17%), diet (17%), and other aspects impacting health (8%).

Adverse Events

No serious adverse events and two non-serious adverse events were reported during the study. Adverse events were unlikely related to the intervention. One participant experienced knee pain related to osteoarthritis, consulted with CHA orthopedics team, and continued in the study. Symptoms improved over the weeks of the study. Another participant experienced the sudden death of a family member and reported worsening of anxiety and depression symptoms. After consultation with the group leader, patient mental health provider, and research staff, the participant was withdrawn from the study and received specialized treatment from the CHA mental health team.

DISCUSSION

The findings from this pilot study suggest that MTPC-Portuguese is feasible, acceptable, and culturally appropriate among low-income PSI in primary care settings. Low dropout and a high attendance rate comparable to MTPC studies in English (25, 34), standard MBIs (79), and superior to other community-based MBSR studies with immigrants from Ibero-American countries (80–82) indicate the potential feasibility of the intervention and should be underlined, since low-income immigrants commonly experience attendance obstacles such as transportation cost, long working-hours, and family obligations (19, 80, 83, 84).

The high attendance rate may be attributed to a trauma-informed intervention curriculum (25) that includes a significant amount of interpersonal mindfulness and mindfulness of the body practices (i.e., body scan, mindful movement), which were well-received and easily related to cultural expectations from PSI (85). In addition, the biweekly engagement calls, location within a primary care building, and the program integration with the health system, primary care, and mental health providers likely increased acceptability and attendance. The systematic review and meta-analysis of Parsons et al. on MBSR and MBCT formal practice over 8 weeks revealed an average of 29 min/day (86), which is similar to our findings. The fact that body awareness was the leading informal practice reported also illustrates the role of the body in the sample culture and its emphasis on MTPC curriculum content (25, 85). The use of mindfulness resources offered in Portuguese to participants, particularly online recordings and books/articles, could also have contributed to program overall engagement.

Potential feasibility and acceptability were strongly endorsed by elevated satisfaction scores and by responses which underscored program curriculum that combines traditional "cool" mindfulness with "warm mindfulness" —infused with self-compassion and inner warmth—emotional regulation strategies (26, 87, 88). The cultivation of open and accepting awareness, self-compassion, and self-care skills, together with the experience of shared common humanity, social connectedness, and support from peers and group leaders, also corroborated by the high satisfaction scores on questions 3, 4, and 5 ["*The group leader(s) care about me as a person*," "*I was able to participate and express myself in the group*," and "*The group leader(s) were authentic, honest, and real*"] reported by participants, fulfills important needs of immigrants who often experience unresolved trauma, isolation, loneliness, shame, and disempowered status (11, 18, 89–91).

Valuable feedback that might be considered for MTPC-Portuguese culturally responsiveness refinement aiming to foster social connectedness, community building, and a sense of belonging and safety to share vulnerabilities are as follows: offering the program in a Portuguese-speaking community center, offering maintenance mindfulness sessions, sharing community activities regularly, providing space and time before/after the weekly session for participants to meet, providing traditional food, inviting a previous Portuguese-speaking MTPC participant to narrate his/her experience, reviewing English poetry translations, providing a supplement such as poetry from Portuguese-speaking authors, clarifying myths about mindfulness, and disclosing MTPC psychosocial science-informed features that welcome all spiritual beliefs. Even though sessions were held in the evening, many individuals reported not being able to enroll in the program due to the long weekday working schedule; therefore, offering the intervention on weekends or later in the evening could improve its accessibility. The feedback provided resonates with the culturally responsive literature on MBIs which highlights the importance of a safe and accessible space (33, 92); community-based partnerships, advisors, and resources (33, 92–96); supplementing reading material with culturally appropriate writings (93); and use of cultural-familiar and inclusive terminology avoiding terms like "meditation" (32, 33, 92, 93).

MTPC-Portuguese demonstrated a medium-to-large effect size in decreasing depression symptoms and a medium effect size in reducing anxiety symptoms, in accordance with a previous randomized controlled trial which showed that MTPC in English decreases anxiety when compared with a mindfulness low-dose comparator with significant within-group effect sizes ranging from $d = 0.43$ (depression) to $d = 0.72$ (anxiety) (34). The potential mental health benefits described herein are

aligned with a small but growing literature described by Cotter et al. (97) in a recent review of MBI research among U.S. immigrants with origins in countries from Ibero-America, largely represented by uncontrolled trials, where five of six studies found a significant reduction in depressive symptoms (82, 98–101) and five of eight studies reported a significant impact on anxiety symptomatology (80, 82, 99, 100, 102) after mindfulness training. Research conducted in Brazil also suggests salutary effects of mindfulness training on depression and anxiety (103–105), though investigation in primary care settings is needed (106, 107). Though patients with a current severe episode of major depression were excluded, the extensive prevalence of major depression disorder combined with substantial symptomatology revealed by the percentage of individuals presented with at least mild depression and anxiety (scores >55 on PROMIS-DSF and PROMIS-ASF) denotes the sample mental and emotional suffering severity and may have contributed to the magnitude of the findings.

Since lower socioeconomic status and the acculturation process among immigrants are associated with higher morbidity, mortality, and harmful health behaviors (1–3, 9, 108–110), the finding that a significant proportion of patients initiated the health behavior action plan at rates similar to MTPC studies in English (25, 34) cannot be overemphasized. Emotional regulation, mindfulness, self-compassion, and interoceptive awareness appear to be synergistic self-regulation mechanisms through which MBIs exert their salutary effects (26, 111), at least among English speakers. Emotional regulation improvement points in the same direction as previous MTPC research (25). DERS subscales of *Non-acceptance* [i.e., non-acceptance of emotional responses ("When I'm upset, I become angry at myself for feeling that way")] and *Strategies* [i.e., limited access to emotion regulation strategies (e.g., "When I'm upset, I believe there is nothing I can do to feel better")] (112) drove the enhancement in this study. Interestingly, two studies conducted in the U.S. found that MBSR increased *Strategies* and *Goals* subscales (113, 114). Our findings may offer insights on which specific emotional regulation abilities are impacted by MBIs across cultures. The trend toward mindfulness, self-compassion, and interoceptive awareness improvement, yet with a lack of statistical significance, could be a result of our small sample size and type II error, or cultural differences in which mechanisms are most active, which deserves further research.

The empirical results reported herein should be considered in the light of some limitations and the interpretations conditioned to the exploratory nature of pilot studies. The sample was composed predominantly by female patients and does not fully represent the demographics of PSI. Brazilians were overrepresented, Portuguese were underrepresented, and immigrants from the Azores and Cape Verde were not represented, limiting the generalizability of the findings (7). The last two sessions of cycle 3 intervention were held online, and the all-day session was abbreviated (7 to 4 h) and online to protect the safety of patients when the COVID-19 pandemic started. Without a control group, causality cannot be inferred and results could be attributed to other time-related variable, including the fact that some participants received additional treatment through the stepped care model of the CHA with ongoing psychopharmacology or psychotherapy (76.6 and 30% of the sample that started intervention, respectively). Effect sizes should be interpreted with caution due to the small sample size. Finally, follow-up data were not collected to illuminate daily life incorporation of mindfulness practices and benefits over time. Despite these limitations, the study has several strengths including the following: *originality*—it was the first study we are aware of that evaluated MBI feasibility, acceptability, cultural aspects, and effects on PSI; *relevance*—it meets an important need for understanding how MBIs can be better suited to a vulnerable growing minority group, and also contributes to the evidence base for the feasibility of MBIs on immigrants and low socioeconomic status populations (26, 30); and *clinical implications for public health*—it was conducted in a real-life primary care clinical context which is the most common service domain where immigrants seek healthcare (115).

In summary, the results of this pilot study suggest that an 8-week primary care and linguistically adapted MBI is potentially feasible, acceptable, and culturally appropriate for PSI. Pilot studies are necessarily the first steps in exploring interventions, and further investigation and implementation of culturally relevant adaptations to underserved minorities is pivotal to enhance engagement and mitigate health disparities in the country. This continuous process should be approached with a beginner's mind and in close collaboration with culturally appropriate community members (33, 106–109). Additionally, MTPC-Portuguese might potentially decrease depression and anxiety symptoms, improve emotional regulation, and facilitate health behavior change among the sample studied. Despite these promising results, future research should evaluate the pilot findings with larger samples in confirmatory gold standard randomized controlled trials, which will also allow the cross-cultural investigation of the mechanisms of action of MBIs. The extension of MTPC studies to diverse populations would contribute to its dissemination in the healthcare system. Finally, the increasing use of culturally relevant measures related to social connectedness, isolation, and acceptance of mindfulness in the context of faith, in addition to the use of objective health behavior (e.g., accelerometers) and physiologic and neurobiological measures (26, 112), as well as the evaluation of the impact of MBIs on resilience to cope with discrimination-related stressors, would be beneficial (113–115).

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Cambridge Health Alliance Institutional Review

Board. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

MT: co-designed and executed the study, contributed to the translation of research materials and MTPC cultural adaptation, analyzed the results, and co-wrote the manuscript. TC: analyzed the results, edited the methods and results, and critically reviewed the manuscript for important intellectual content (CRMIIC). MD and NR: co-designed and oversaw the study, contributed to MTPC cultural adaptation, and CRMIIC. LC: executed the study, contributed to the translation of research materials and MTPC cultural adaptation, reviewed data, co-wrote introduction session, and CRMIIC. LS: analyzed the results, edited the methods and results, and CRMIIC. AO: executed the study and co-designed MTPC, contributed to MTPC cultural adaptation, and CRMIIC. AR and NM: executed the study and contributed to the translation of research materials and CRMIIC. MH: contributed to translation of research materials, MTPC cultural adaptation, and CRMIIC. AC: executed the study and CRMIIC. RG: co-designed MTPC, co-designed and oversaw the study, contributed to MTPC cultural adaptation, and CRMIIC. TG: oversaw the study, co-designed MTPC, and CRMIIC. BC: contributed to MTPC cultural adaptation and CRMIIC. ZS-O: co-designed MTPC, co-designed and oversaw the study, contributed to MTPC cultural adaptation, co-wrote the manuscript, and supervised all steps. All authors contributed to the article and approved the submitted version.

FUNDING

This study was made possible through grant funding provided by a cooperative agreement supported by the NIH Common Fund Science of Behavior Change Initiative and the National Center for Complementary and Integrative Health: Mindfulness Influences on Self-Regulation: Mental and Physical Health Implications (UH2AT009145/UH3AT009145) (PI: Loucks, Project PI: ZS-O). Additional funding was provided by the Arthur Vining Davis Foundations (PI: ZS-O), the Arnold P. Gold Foundation (PI: ZS-O), Havard Catalyst Disparities Research Award (PI: Desbordes), as well as with funding from Cambridge Health Alliance. MT work was supported by CAPES Brasil–Coordenação de Aperfeiçoamento de Pessoal de Nível Superior under Grant 88882.346691–Finance Code 001 and the Center for Mindfulness and Compassion/CHA.

ACKNOWLEDGMENTS

The following individuals are acknowledged: Gaelle Desbordes, Javier Garcia-Campayo, Alexandra Brunel, Farah Samawi, My Ngoc To, Thomas Fatkin, Ana Nava, Lisa Kim, Lan Anh Pham, Michael Datko, Stephanie Cohen, Jessika Bailey, and Laura Warren.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2021.664381/full#supplementary-material

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