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Prevalence of psychotic-like experiences among Afghan migrant children and adolescents: examining the predictive role of childhood trauma, mindfulness, and cognitive flexibility

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Abstract

Background Psychotic-like experiences (PLEs) are subclinical phenomena that reflect mental health vulnerabilities in high-risk populations, such as migrant children and adolescents. This study aims to estimate the PLEs and their correlates in Afghan migrant children and adolescents.

Methods This cross-sectional study assessed the prevalence of psychotic-like experiences (PLEs) among 770 Afghan migrant students living in Mashhad city of Iran, using the Prodromal Questionnaire-Brief Child Version (PQ-BC). The Cognitive Flexibility Inventory (CFI), Child and Adolescent Mindfulness Measure (CAMM), and Childhood Trauma Questionnaire (CTQ) were employed in univariate and multivariate models to examine psychological and trauma-related correlates of PLEs.

Results The findings showed that 94% of participants reported experiencing at least one psychotic-like experience. Additionally, 34% of Afghan migrant children and adolescents met the cutoff point, and experienced significant distress. Psychotic-like symptoms were more prevalent in adolescents than in children (OR = 1.946). Emotional abuse (OR = 1.123), a subscale of childhood trauma, along with mindfulness (OR = 0.925) and cognitive flexibility (OR = 1.038), were identified as correlates of psychotic-like experiences. In aggregate, all correlates of PLEs explained 22% of the variance in the outcome variable for children and 29% for adolescents. These results contribute to a deeper understanding of the factors influencing psychotic-like experiences within migrant populations.

Conclusion These results show that PLEs are common among Afghan migrant children and adolescents, a marginalized minority group. While some theories might explain these findings, the results highlight the need for mental health services to pay closer attention to this population.

Keywords Psychotic-like experiences, Afghan, Childhood trauma, Mindfulness, Cognitive flexibility

Background

The continuum approach, which has been used across various diseases for decades [1], has influenced how psychiatric disorders are classified. Schizophrenia spectrum disorders are among the most severe, having a significant impact on individuals' lives. Research has explored

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Rezaee *et al. BMC Psychiatry*   (2025) 25:678

Page 2 of 9

a psychosis continuum, ranging from healthy individuals to those with a full psychosis diagnosis [2]. Within this continuum, psychotic-like experiences (PLEs) have become increasingly important. Although definitions vary [3], PLEs are generally understood as hallucinations and delusions that fall below clinical thresholds in severity, duration, or treatment needs, and occur in nonclinical populations [4, 5]. Follow-up studies have shown that children and adolescents who report more PLEs are more prone to developing psychiatric disorders later in life [6–8].

Prevalence estimates for PLEs vary widely. Studies estimate a prevalence of approximately 7% in both children and adults [9, 10], which is more than twice the prevalence of diagnosed psychotic disorders (approximately 3%). Among children, the PLE prevalence can reach as high as 17%, decreasing to approximately 7.5% by adolescence [11]. The proportion of individuals experiencing high levels of PLEs varies across studies, with one reporting 16% among Spanish adolescents [12] and another finding a prevalence of 54.2% using a different threshold [13].

Frequent PLEs may indicate a greater likelihood of developing psychiatric disorders, placing individuals in what is commonly referred to as the ultra-high-risk category [14]. Identifying individuals with elevated PLEs is important for several reasons. It improves our understanding of schizophrenia spectrum disorders by reducing confounding factors, such as long-term medication use. Additionally, individuals with high PLEs often exhibit maladaptive behaviors, such as substance use or lower social and educational functioning [15]. Increased PLEs are associated with a greater likelihood of developing other psychiatric disorders [16]. Given that early intervention in psychotic disorders is linked to better treatment outcomes [17], determining the factors that influence PLEs is essential.

Social factors influencing PLEs include migration [18], childhood trauma (CT) [19], student status [20], and urban living [21]. Migration can influence these factors in various ways. While some studies report lower rates of PLEs among migrants [20], others find a higher prevalence in migrant populations than in natives [22–25]. Compared to other refugee groups, refugees from the Middle East have been reported to be at greater risk for psychosis [26]. Therefore, both psychosis and PLEs are more prevalent among migrants.

Childhood trauma is an important factor in understanding PLEs. Migrant children often report higher levels of exposure to violence, trauma, and depressive symptoms [27]. A significant proportion of psychiatric disorders [28] and PLEs [29] are linked to adverse childhood experiences (ACEs). Research suggests that these traumas can impact various mechanisms, such as emotion regulation, and disruptions in these mechanisms may contribute to the development of PLEs [30–32].

Psychological variables also play a role in psychosis and PLEs. The concept of psychosis as a distortion of reality is theoretically related to mindfulness, which is defined as active, dynamic awareness of the present moment. Higher levels of mindfulness may predict milder PLE symptoms [33]. Mindfulness is potentially associated with increased activity in the prefrontal cortex, which plays a key role in emotion regulation- the mechanism discussed above [34–36]. Mindfulness, which involves focusing attention on each moment, is expected to enhance cognitive flexibility, improving responses to non-routine situations [37]. Cognitive flexibility, a component of executive function, refers to the ability to adapt thoughts or actions to changing situational demands [38]. It is considered a hallmark of intelligent cognition and behavior [39, 40]. Individuals with primary psychosis often exhibit low cognitive flexibility [41]. Cognitive performance is a key predictor of long-term changes in psychotic conditions, with impaired cognitive flexibility limiting the ability to shift between different rules and patterns [42].

Current study

This study had two primary aims. First, we aimed to estimate the prevalence of psychotic-like experiences (PLEs) among Afghan migrant children and adolescents. This group has been migrating to Iran for several decades, starting nearly fifty years ago, following the fall of the Islamic Republic of Afghanistan. Regardless of whether they have been residing in Iran for 10 or 50 years, nearly all of them are still considered migrants and continue to face restrictions in accessing various legal rights. This has created an atmosphere in which they are effectively excluded from society. This population exposed to multiple psychosocial stressors, including displacement, trauma, and limited mental health support. Second, we sought to identify key correlates of PLEs by examining the roles of childhood trauma (emotional abuse, emotional neglect, physical abuse, and physical neglect), mindfulness, and cognitive flexibility. To explore potential age-related differences in these associations, we conducted separate regression analyses for children and adolescents. Based on previous literature, we hypothesized that higher levels of childhood trauma and lower levels of mindfulness and cognitive flexibility would be associated with increased PLEs in both age groups. This study contributes to a deeper understanding of the psychological and environmental factors associated with PLEs in an underrepresented and high-risk population.

Rezaee *et al. BMC Psychiatry*   (2025) 25:678

Page 3 of 9

Methodology

Participants

The study population consisted of Afghan migrant students aged 9–18 years who were enrolled in schools during the 2023–2024 academic year in Mashhad city. Since this city is located near Afghanistan and is the second-largest city in Iran, it hosts the majority of Afghan migrants. The total sample size was 770, including 336 girls (44%) and 434 boys (56%). The sample included 197 elementary school students (26%) and 573 high school students (74%). In total, 242 participants (31%) were in the child age range (9–12 years), and 528 participants (69%) were in the adolescent age range (13–18 years). Additionally, 676 participants (88%) were either born in Iran or were second- or third-generation migrants, whereas 94 participants (12%) were first-generation migrants. The mean age for girls was 13.89 years, and for boys, it was 13.20 years. The overall mean age of the participants was 13.54 years (SD = 1.94).

Study design

In this study, we collected data form 799 participants. During data entry, 29 incomplete or potentially inaccurate responses from the migrant questionnaires were also excluded. This resulted in a final sample size of 770. Of these, 403 participants completed the questionnaires online, while 367 completed them on paper. Predictor variables were gathered only through the online form. A formal power analysis was not conducted prior to data collection. However, based on Cochran's formula for estimating proportions in large populations, a minimum sample size of 385 would have been sufficient to estimate the prevalence of PLEs with 95% confidence. The final sample exceeded this requirement, providing robust statistical power for both prevalence estimation and regression analyses involving multiple predictors. After necessary permissions was obtained from the education department, data collection involved visiting schools with high concentrations of migrant students. The questionnaires were completed either in person or uploaded to the students' class groups online. The researcher was present in the classrooms while the forms were being filled out to explain any items that students might have trouble understanding. Owing to the uneven distribution of migrant students across city areas and access limitations, sampling was nonrandom and convenience-based. Data collection took place throughout the fall of 2023.

Instruments

Background characteristics, including age, sex (boy or girl), education level (grades six to twelve), and country of birth, were collected using a demographic questionnaire.

To assess PLEs, the Prodromal Questionnaire-Brief Child Version (PQ-BC) was administered. This child-friendly, 21-item questionnaire includes "yes" or "no" responses, with follow-up questions measuring distress presence and intensity on a 5-point scale from "not at all" to "very much" [43]. This instrument measures positive symptoms of psychotic experiences. The PQ-BC has demonstrated structural validity and strong psychometric properties for measuring PLEs, with total scores ranging from 0–21 and distress scores ranging from 21–105. Cutoff scores established for adolescents in previous studies [12] were used, distinguishing normal from at-risk groups on basis of a frequency score of 6 or higher and a distress score of 29 or higher [44]. The reliability coefficient, based on the Cronbach's alpha test, was calculated to be 0.87.

The Cognitive Flexibility Inventory (CFI), served to assess cognitive flexibility [45]. This 20-item measure yields scores ranging from 20 to 140, with higher scores indicating greater flexibility. The CFI demonstrates concurrent validity with the Beck Depression Inventory ($r = 0.39$) and convergent validity with the Martin and Rubin Cognitive Flexibility Scale ($r = 0.75$). In the Persian version, internal consistency was reported to be 0.90 [46]. In the current sample, internal consistency for CFI was acceptable (Cronbach's $\alpha = 0.706$).

Mindfulness was measured with the Child and Adolescent Mindfulness Measure (CAMM), a 25-item scale, which ranges from "always" to "never" and produces total scores ranging from 0 to 100 [47]. Higher CAMM scores reflect better mindfulness and acceptance. The CAMM is negatively correlated with physical complaints, and internalizing and externalizing symptoms, and positively correlated with quality of life. The Persian version's internal consistency was 0.81 [48]. For the current data, Cronbach's alpha was calculated as 0.754.

Childhood trauma was assessed using the Childhood Trauma Questionnaire (CTQ-SF), a 28-item measure assessing five trauma subscales: emotional neglect, physical neglect, emotional abuse, physical abuse, and sexual abuse [49]. Each subscale includes five items rated on a 5-point scale from "never" to "very often." In the Persian version, internal consistency coefficients for the subscales range from 0.75 to 0.77 [50]. Due to the sensitiveness of the question about sexual content in this culture and the response of the subjects in the classroom, the sexual abuse subscale questions were removed from the

Rezaee *et al. BMC Psychiatry*   (2025) 25:678

Page 4 of 9

questionnaire. Reliability analysis for our sample yielded a Cronbach's alpha of 0.772.

Statistical analysis

Analyses were conducted using SPSS-24 (SPSS, Inc., Chicago, IL, USA). The prevalence of responses to each item on the PQ-BC was reported. The participants were then classified into healthy and high-risk (HR) groups based on PLEs, using established cutoff scores [44] and categorized by demographic characteristics. Prevalence rates for HR individuals were analyzed across all classifications. Logistic regression was subsequently conducted to assess the association of each demographic group with PLEs.

We conducted univariate and multivariate logistic regression analyses to identify predictors of frequent PLEs. The univariate analysis reported unadjusted odds ratios, whereas the multivariate analysis provided adjusted odds ratios, controlling for potential confounding factors. These analyses examined the relationships between PLEs and emotional neglect, emotional abuse, physical neglect, physical abuse, mindfulness, and cognitive flexibility.

Finally, multivariate linear regression was conducted to assess the frequency scores of the PQ-BC, with the specified predictors analyzed separately for children and adolescents.

Results

Prevalence and demographic correlates

Firstly, by using cutoff values established in prior studies [12, 44] 257 participants (33.4%) were identified as reporting frequent PLEs. The prevalence of participants above the cutoff, categorized by their demographic characteristics, is shown in Table 1. The participants were grouped by gender, age, and migrant generation. The migrant generation distinguished between first-generation migrants, who immigrated and settled during their lifetime, and later-generation migrants, who were born in the destination country and did not experience migration directly.

While differences in predicting frequent PLEs were marginal for sex (OR = 0.906; 95% CI = 0.669–1.226) and migrant generation (OR = 0.916; 95% CI = 0.582–1.441), the significant difference was observed for age (OR = 1.650; 95% CI = 1.178–2.312) in predicting PLEs.

Of 770 participants 94.3% had at least one PLEAs age group (children vs. adolescents) was the only significant variable in Table 1, the prevalence of each PLE item was reported separately for the two groups, along with the *p*-values for group differences. Children and adolescents reported different prevalence rate for some items (Table 2). Significant differences were found in the

Table 1 Demographic characteristics according to the risk status of psychotic-like experience (PLE) (*n*= 770)

Characteristic	Healthy %	HR %	OR (95%CI)
Sex			
Boy (*n*=434)	65.7	34.3	Reference
Girl (*n*=336)	67.9	32.1	0.906
			(0.669-1.226)
Age			
Children (*n*=242)	74	26	**Reference**
Adolescents (*n*=528)	63.3	36.7	**1.650****
			(1.178-2.312)
Migration generation			
later generations (*n*=676)	66.9	33.1	Reference
First generation (*n*=94)	64.9	35.1	0.916
			(0.582-1.441)

Bold indicates statistical significance; *p*≤.05 **p≤.01 *Abbreviations*: *HR* high-risk, *OR* odds ratio, *CI* confidence interval

prevalence of PLE items 8, 13, 14, 17, and 18 between children and adolescents.

Correlates of PLEs

All the predictors were able to predict PLEs in the univariate analysis. The factor most strongly associated with risk status was physical abuse (OR = 1.281; 95%CI = 1.192–1.375), followed by emotional abuse (OR = 1.203; 95%CI = 1.151–1.257), physical neglect (OR = 1.107; 95%CI = 1.050–1.167), emotional neglect (OR = 1.077; 95%CI = 1.038–1.117) and cognitive flexibility (OR = 1.038; 95%CI = 1.026–1.064). The only negative predictor in the first analysis was mindfulness (OR = 0.903; 95% = 0.876–0.929).

Among all the subscales of childhood trauma, only emotional abuse predicted PLEs in the multivariate regression (OR = 1.123; 95%CI = 1.034–1.221). It was also the strongest positive predictor when confounding variables were controlled. Mindfulness (OR = 0.925; 95%CI = 0.896–0.954) and cognitive flexibility (OR = 1.038; 95%CI = 1.017–1.060) were significant negative and positive predictors, respectively. These findings were consistent in both analyses (Table 3).

Frequency scores of the PQ-BC and multivariate linear regression

Multivariate linear regression models were used to examine the relationships between the PQ-BC frequency scores and emotional abuse, emotional neglect, physical neglect, physical abuse, mindfulness, and cognitive flexibility. Since children and adolescents presented different

Rezaee *et al. BMC Psychiatry*   (2025) 25:678

Page 5 of 9

Table 2 Prevalence of psychotic-like experiences

Items	Children (yes) prevalence %	Adolescents (yes) prevalence %	Total (yes) prevalence %	P-Value	Items	Children (yes) prevalence %	Adolescents (yes) prevalence %	Total (yes) prevalence %	P-Value
1	14	16.1	15.5	0.465	12	54.1	49.2	50.8	0.208
2	53.3	45.4	47.8	0.38	13	25.6	44.5	38.6	**0.000****
3	24.4	26.5	25.8	0.53	14	37.6	46.4	43.6	**0.022***
4	20.7	28.6	26.1	0.2	15	51.2	58.5	56.2	0.059
5	17.4	17.2	17.3	0.967	16	17.8	19.5	19	0.568
6	52.5	59.8	57.5	0.055	17	28.9	43.4	38.8	**0.000****
7	21.5	26.5	24.9	0.134	18	47.1	54.7	52.3	**0.049***
8	55.8	68	64.2	**0.001****	19	22.7	25.8	24.8	0.366
9	44.2	47	46.1	0.477	20	26	32	30.1	0.093
10	33.9	38.8	37.3	0.188	21	50.4	58.1	55.7	0.1
11	44.2	49.2	47.7	0.195					

Bold indicates statistical significance; *$p \leq .05$ **$p \leq .01$

Table 3 Childhood trauma and psychological correlates of psychotic-like experiences and risk status

Predictor	Healthy Mean (SD) n: 513	HR Mean (SD) n: 257	OR (95%CI)	aOR (95%CI)
Emotional abuse	6.92 / -3.039	9.84 / -4.977	**1.203 (1.151-1.257)****	**1.123 (1.034-1.221)****
Emotional neglect	9.68 / -4.055	11.02 / -4.399	**1.077 (1.038-1.117)****	1.004 (0.933-1.081)
Physical abuse	5.76 / -1.694	7.35 / -3.577	**1.281 (1.192-1.375)****	1.022 (0.890-1.174)
Physical neglect	7.74 / -2.777	8.31 / -3.007	**1.107 (1.050-1.167)****	1.004 (0.907-1.110)
Mindfulness	59.94 / -7.962	52.98 / -8.711	**0.903 (0.876-0.929)****	**0.925 (0.896-0.954)****
Cognitive flexibility	94.78 / -12.067	101.11 / -11.95	**1.045 (1.026-1.064)****	**1.038 (1.017-1.060)****

Bold indicates statistical significance; $p \leq .05$ **$p \leq .01$ *Abbreviations*: *SD* standard error, *HR* high-risk, *OR* odds ratio, *CI* confidence interval, *aOR* adjusted odds ratio, *R2* R square

prevalence rates of PLEs, analyses were conducted separately for each group.

In the model for children, the largest beta coefficient was for emotional abuse (B=0.369), which was statistically significant. None of the other subscales of childhood trauma were significantly associated with PLEs. Together, these factors explained 22% of the variance in PLEs.

In the adolescents' model, the same variables were again significant predictors of the outcome. Emotional abuse had the highest beta coefficient among all items (B=0.375), with a slightly stronger association in this group. Overall, these factors explained 29% of the variance in the PLEs (Table 4).

Discussion

This study aimed primarily to assess the prevalence of psychotic-like experiences (PLEs) among Afghan migrant children and adolescents residing in Iran, with a secondary focus on evaluating correlates of PLEs. These findings indicate a very high prevalence of PLEs in this population, which is consistent with the findings of a similar study, which conducted a comparable evaluation in Afghanistan [51]. Significant differences in PLE incidence were observed across age and education groups.

The high prevalence rate observed in this study is challenging to interpret. For comparison, a comparable study reported a high-risk group prevalence of 16% among

Rezaee *et al. BMC Psychiatry*   (2025) 25:678

Page 6 of 9

Table 4 Multivariate linear regression models for predicting psychotic-like experiences

Children				
Predictor	**B**	**SE**	**Sig.**	**R^2**
Emotional abuse	0.369	0.164	**0.027**	**0.221**
Emotional neglect	0.09	0.151	0.552	
Physical abuse	0.061	0.29	0.833	
Physical neglect	-0.166	0.178	0.352	
Mindfulness	-0.14	0.053	**0.01**	
Cognitive flexibility	0.088	0.032	**0.007**	
Adolescents				
Predictor	**B**	**SE**	**Sig.**	**R^2**
Emotional abuse	0.375	0.092	**0**	**0.29**
Emotional neglect	-0.018	0.079	0.819	
Physical abuse	0.034	0.138	0.805	
Physical neglect	-0.065	0.116	0.575	
Mindfulness	-0.121	0.033	**0**	
Cognitive flexibility	0.072	0.024	**0.003**	

Bold indicates statistical significance; *Abbreviations: B* unstandardized coefficients Beta, *SE* standard error, *R2* R square, *Sig.* significance

Spanish adolescents using the same instrument and cutoff point [12]. Other studies have also reported similar results that are far below our findings; see [9, 11, 52, 53]. It is worth noting that reporting PLEs should not be interpreted as a direct proxy for psychosis, as the majority of these experiences typically remit over time [10, 54, 55].

A recent survey revealed that Afghanistan to has the highest rate of psychotic experiences among a wide range of countries [51]. The high prevalence of psychotic symptoms within Afghanistan may be explained by social causation theory, which suggests that stressors such as exposure to war can lead to psychosis. However, this theory does not fully explain the high prevalence of PLEs among Afghan migrants [25]. Given that Afghans have faced prolonged exclusion from citizenship and that a new generation has been born into this marginalized status, social defeat theory may best explain our results [56]. Social defeat theory proposes that negative experiences of ostracism increase the risk of psychosis by sensitizing the mesolimbic dopamine system [57]. There is substantial literature linking schizophrenia with this kind of sensitization, with hyper-reactivity of the dopamine system, particularly in the striatum, being associated with psychotic symptoms [58].

While social defeat theory links exclusion to the dopamine system and its role in hallucinations and delusions, another concept that may explain the current findings is *the self*. The concept of self generally consists of two levels: the minimal self, also referred to as the basic or core self (e.g., owning our body and controlling actions), and

the narrative self or social self, which relates to autobiographical memory and social identity as a member of a group [59]. Both aspects of the self have a prominent place in the psychosis literature [60, 61]. One study, for instance, revealed a connection between high risk and disruption in the narrative self [62]. From our perspective, the Afghan population, whether migrant or native, faces similar challenges. Given their rapid political changes, their social characteristics are in flux and deteriorating. Individuals may experience discomfort or embarrassment about certain aspects of their identity, such as their nationality, ethnicity, accent, religious affiliation, or political status. Migrant children and adolescents, especially those who are second, third, or even fourth-generation, may experience this stigma and a fragmented or undefined sense of self.

The final part of the study aimed to predict PLEs and identify individuals at elevated risk. To achieve this, various regression models have been employed. Among the measured variables, emotional abuse, mindfulness, and cognitive flexibility were significant predictors. Notably, among the various subscales of childhood trauma assessed in this study—including physical abuse, emotional neglect, and physical neglect—only emotional abuse emerged as a significant predictor of psychotic-like experiences (PLEs) in the multivariate regression analyses. None of the other trauma subscales demonstrated a statistically significant association with PLEs, suggesting that emotional abuse may play a particularly influential role in the development of such experiences among Afghan migrant youth.

Previous research has consistently linked emotional abuse to the onset of psychosis and hallucinations [63, 64], and this study highlights the significant impact of emotional abuse on PLEs. Emotional abuse can disrupt emotion regulation [30], which is associated with both psychosis [65, 66] and PLEs [31, 32]. Emotional abuse may therefore contribute to psychotic symptoms by impairing emotion regulation and fostering unrealistic thinking [30, 31].

Another important factor identified was mindfulness, which has been linked to enhanced emotion regulation [34, 35]. Higher levels of mindfulness are associated with increased activity in the prefrontal cortex and anterior cingulate cortex (ACC), areas essential for emotion regulation. The ACC, in particular, supports both top-down and bottom-up processing in response to perceived emotions [36]. This improved control over processing mechanisms may help reduce PLEs by fostering a more accurate perception of the environment.

Cognitive flexibility emerged as the final correlate of PLEs, but unlike mindfulness, higher levels of cognitive flexibility were associated with an increase in

Rezaee *et al. BMC Psychiatry*   (2025) 25:678

Page 7 of 9

PLEs. Initially, cognitive flexibility—as a component of executive function—was expected to positively impact psychotic symptoms. However, the findings showed that elevated cognitive flexibility correlated with more pronounced positive psychotic symptoms. While a few studies have found a positive relationship between cognitive flexibility and psychotic experiences [67], most studies point to the opposite. This unexpected outcome might stem from factors such as age, or the possibility that cognitive flexibility serves as a coping mechanism in response to stress linked to PLEs or trauma. Given that executive functions are regulated by the prefrontal cortex (PFC), high cognitive flexibility in individuals with elevated PLEs could be explored through the dopamine hypothesis. If psychosis is seen as a spectrum, this hypothesis might suggest a gradual progression of these experiences. Further research is needed to clarify these complex relationships.

Along with the cross-sectional nature of our study, this research faced several limitations due to social constraints that limited access to a larger sample, which may impact our results. Additionally, the distinction between migrants and refugees is often unclear. Some individuals in the population are under the supervision of the UN as refugees, while others are not, despite having similar backgrounds. Importantly, children and adolescents, due to their developmental stage, may also exhibit traits that do not necessarily reflect their future personality. Furthermore, incorporating interviews and computerized tasks could improve the validity of the results.

Future research should focus on other migrant and minority groups, particularly those residing in refugee camps. Additionally, examining PLEs from a neurobiological perspective, especially with regard to areas related to the self and the mesolimbic dopamine system, could provide valuable insights. The authors would like to conclude with a personal reflection. While most studies report higher prevalence of psychotic-like experiences (PLEs) among migrants—particularly in Europe, where risk is markedly elevated among those from developing countries and/or with Black skin—there are important exceptions. No greatly increased risk has been observed among migrants in countries such as Canada and Israel. The Israeli context is particularly relevant, as migration there often signifies social inclusion rather than exclusion. [25]. Both Afghanistan and Iran share a prolonged common history as part of the Persian Empire. Interpreting migration as inclusion, rather than exclusion, could also be applied to migrants in Iran, considering their shared historical ties. This perspective may provide mental health specialists and other officials with useful insights for implementing early interventions.

Conclusion

This study highlights the high prevalence of psychotic-like experiences (PLEs) among Afghan migrant children and adolescents in Iran, emphasizing the significant role of emotional abuse as a key predictor. Our findings suggest that trauma, particularly emotional abuse, may contribute more to PLEs than other factors, while mindfulness appears to offer protective benefits. The complexity of cognitive flexibility's relationship with PLEs warrants further exploration.

The results point to the need for early interventions focusing on emotional well-being, as well as greater attention to the impact of social exclusion and a fragmented sense of self, especially among second-generation migrants. Future research should explore these issues from both psychological and neurobiological perspectives to develop more effective strategies for supporting marginalized youth.

Abbreviations

PLE	Psychotic-like Experience
PQ-BC	Prodromal Questionnaire-Brief Child Version
CFI	Cognitive Flexibility Inventory
CAMM	Child and Adolescent Mindfulness Measure
CTQ	Childhood Trauma Questionnaire
CT	Childhood Trauma
ACE	Adverse Childhood Experience
HR	High-risk
OR	Odds Ratio
aOR	Adjusted Odds Ratio
SES	Socioeconomic Status
ACC	Anterior Cingulate Cortex
HPA	Hypothalamic-pituitary-adrenal
PFC	Prefrontal Cortex

Declarations

Ethics approval and consent to participate
The study adhered to the ethical principles outlined in the Declaration of Helsinki and was approved by the Ethics Committee of Ferdowsi University of Mashhad. Informed consent for data collection and usage was obtained from all participants, as well as their parents and/or legal guardians.

Consent for publication
Not applicable.

Rezaee *et al. BMC Psychiatry*   (2025) 25:678

Page 8 of 9

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Rezaee *et al. BMC Psychiatry*   (2025) 25:678

Page 9 of 9

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