Child and Adolescent Mental Health

Child and Adolescent Mental Health Volume **, No. *, 2023, pp. **–** doi:10.1111/camh.12674

Psychotic-like experiences and adverse life events in young people. Does gender matter?

Samuel Adjorlolo[1,2], Victoria Awortwe[3], Adote Anum[4], Keng-Yen Huang[5,6] & Daniel Mamah[7]

[1]*Department of Mental Health, School of Nursing and Midwifery, College of Health Sciences, University of Ghana, Accra, Ghana*
[2]*Research and Grant Institute of Ghana, Accra, Ghana*
[3]*Department of Women's and Children's Health, Uppsala University, Uppsala, Sweden*
[4]*Department of Psychology, School of Social Sciences, College of Humanities, University of Ghana, Accra, Ghana*
[5]*Department of Population Health, New York University School of Medicine, New York, NY, USA*
[6]*Child and Adolescent Psychiatry, New York University School of Medicine, New York, NY, USA*
[7]*Department of Psychiatry, Washington University Medical School, St. Louis, MO, USA*

Background: Psychotic-like experiences (PLEs) and adverse life events (ALEs) are highly prevalent in sub-Saharan Africa where gendered practices are also common. There is, however, a paucity of data on how the relationship between PLEs and life adversities is influenced by gender. The current study addressed this gap. **Method:** Data were collected from 1886 school-based young people (1174 females) in Ghana, West Africa using a cross-sectional survey methodology and analyzed using Chi-square, independent *t*-test, Pearson correlation, and multivariate regression. **Results:** The results showed that victimization experiences, school stress and having a family member with mental illness were significantly associated with PLEs in both males and females. In contrast, substance misuse and experiences of head trauma correlated significantly with PLEs in females only. **Conclusion:** Life adversities constitute major risk factors for PLEs among school-based young people in Ghana, who could benefit from gender neutral and gender-sensitive intervention programming to remediate the effects of life adversities on PLEs.

Key Practitioner Message

- The experiences of psychotic-like symptoms and life adversities are common among school-going children and adolescents. However, there is limited clarity regarding whether the relationship between ALEs and PLEs is invariant across gender.
- Experiences relating to victimization, school stress, and mental illness in family predicted PLEs in males and females, while lifetime substance misuse and trauma to head predicted PLEs only in females.
- School authorities and mental health practitioners should institute systematic screening of adolescents for life and PLEs adversities in both males and females.

Keywords: Adolescents; adverse life experiences; psychosis; Africa; Ghana

Introduction

Psychotic-like experiences (PLEs) refers to the manifestation of the symptoms of psychosis such as hallucinations, delusions, and avolition that are below the clinical threshold to warrant a diagnosis of psychosis. Owing to maturational and developmental responses, young people tend to experience PLEs, relative to older population (Staines et al., 2022). While majority tend to outgrow these experiences; however, a few individuals, the so-called clinical high risk, tend to be diagnosed with psychotic disorders later in life at a rate higher than that of the general population (Adewuya, Oladipo, Imarah, Asmal, & Emsley, 2022; Fusar-Poli et al., 2012). Individuals with PLEs are at increased risk of expressing behavioral maladies such as suicidal tendencies, substance misuse, mood problems, and anxiety disorders (Adjorlolo & Anum, 2021; Fusar-Poli et al., 2012). The tendency for PLEs to convert to psychosis and the gross functional impairment associated with PLEs have served to motivate several research types and intervention initiatives for decades (Soneson et al., 2020; Staines et al., 2022).

Scholarly interest in PLEs from sub-Saharan Africa (SSA) has emerged, with existing data produced mostly from Kenya (Mamah et al., 2012, 2013, 2016; Ndetei et al., 2012; Owoso et al., 2018), Ghana (Adjorlolo & Anum, 2021; Adjorlolo, Anum, & Adjorlolo, 2021), and Nigeria (Adewuya et al., 2022; Okewole et al., 2015). Altogether, evidence suggest a high prevalence rate of PLEs (i.e. as high as 45%) among adolescents and young adults in SSA (Adjorlolo & Setordzi, 2021). Cross-

country studies have found evidence that further suggests that PLEs are highly prevalent in SSA, relative to western countries, with exceptions (see McGrath et al., 2015). For example, data from 256,445 participants from across 52 countries revealed that, the age-sex standardized lifetime PLEs prevalence rate for lower-income countries was 12.9%, compared with 8.8% in high-income countries (Nuevo et al., 2012). Among the countries from lower-income regions, Ghana registered the lowest prevalence rate (5.0%), whereas Burkina Faso ranked highest (23.6%). In another cross-country study, the highest prevalence of PLEs (64.9%–99.5%) was found among participants from Ghana, the only African country involved in the survey, compared with 37%–93.5% in the United States (Wusten et al., 2018).

To contribute to the emerging literature on PLEs in SSA, the current study investigated the nexus between adverse life events (ALEs) and PLEs within a gendered framework. The study was motivated by the high preponderance of ALEs in SSA and the prominence of gendered behavioral pattern, which is often rooted in socialization processes in several SSA countries, including Ghana. The study also responded to recent calls for researchers to adopt a gendered lens to explicate psychopathological behaviors in SSA (Adjorlolo, Adu-Poku, Andoh-Arthur, Botchway, & Mlyakado, 2017; Adjorlolo, Anum, & Huang, 2022).

Operationalized as actual or perceived threat to an individual's physical or psychological well-being (Richardson, Carr, Netuveli, & Sacker, 2020), ALEs have been found to contribute to PLEs among young people in SSA. Among Kenyan youth, Ndetei et al. (2012) found that 80% of the participants who endorsed one or more psychotic symptoms had a history of substance abuse. In a similar study from Kenya, adversities originating from the family such as relationship difficulties, death, poor health status, and separation correlated significantly with PLEs (Mamah et al., 2016). Similar findings have emerged from data collected from senior high school students in Nigeria, with 53% of the participants with prodromal symptoms of psychosis reporting a lifetime experience of adverse events, including bullying and alcohol use (Okewole et al., 2015). In a recent study from Ghana, Adjorlolo and Anum (2021) found that adolescents designated as clinical high-risk, based on their PLEs profiles, had a history of substance abuse.

The foregoing notwithstanding, there is limited clarity regarding whether the relationship between ALEs and PLEs is invariant across gender. That is, there is a paucity of empirical data on whether the nature of the relationship between ALEs and PLEs is the same or different for males and females. This observation invokes discussions about exposure and response to adverse events by males and females. Indeed, both genders may be exposed to the same or different set of adverse events. This was demonstrated by Adjorlolo et al. (2022) in their study with young people from Ghana in which they reported that substance misuse and head trauma experiences were significantly elevated in males, relative to females. In contrast, the authors found that neighborhood stress, exposure to victimization, school stress, and adversities due to the presence of mental illness in the family were experienced equally by males and females. Critical to the discussion is how individuals respond to adversities. More importantly, males and females may respond differently to the same set of adverse events based on their inherent biological and sociocultural vulnerabilities. For example, females are reportedly endowed with a ruminative response style and higher levels of the affiliative hormone oxytocin that potentiate the development of internalizing behaviors such as PLEs (Harkness et al., 2010). Males, on the other hand, are exposed to increased brain gene expression that precipitate the development of schizophrenia (Chen, Cao, Meyer-Lindenberg, & Schwarz, 2018). Socioculturally, substance abuse practices among males in most SSA countries, including Ghana, are largely tolerated, whereas females who use substances are seen as deviants, uncivilized, and uncultured (Nketiah-Amponsah, Afful-Mensah, & Ampaw, 2018). This cultural-sponsored discriminatory practices can negatively affect the disclosure and help-seeking behaviors among females, a development that can culminate into devastating and long-term incremental effect of substance misuse for females, perhaps more than males.

Unfortunately, research efforts explicating gender differences in PLEs have tended to yield inconsistent findings. While some studies found that females endorsed more PLEs compared to their male counterparts, other results revealed that males reported more PLEs than females (Stainton et al., 2021). Studies focusing on specific domains of PLEs show that males and females appear to endorse different aspects of PLEs. For examples, females endorsed hallucinations and persecutory ideation domains of positive PLEs more than males (Ronald et al., 2014; Scott et al., 2008). The evidence base in SSA is also uncertain due largely to limited studies although initial studies involving Ghanaian (Adjorlolo & Anum, 2021) and Kenyan adolescents (Mamah, Mutiso, & Ndetei, 2021) found no gender difference, whereas another study from Kenyan found PLEs to be more common in males (Ndetei et al., 2012).

The present study

Decades of research, situated in the stress vulnerability models, have suggested that exposure to ALEs is a major risk factor for psychopathological behaviors in children and adolescents (Tiet et al., 1998). This has largely been supported by earlier studies from SSA that reported significant impact of ALEs on PLEs (e.g. Mamah et al., 2016). Similarly, gender differences in the expression of psychotic symptoms are an important area of investigation; however, the evidence base is weak owing to the contradictory and inconsistent results reported in Western countries (Stainton et al., 2021) and the limited evidence base in SSA. The focus on gender is of interest due to the age-long debate regarding whether gender significantly influence mental health outcomes as well as recent calls for a gendered framework to understand psychopathological behaviors in SSA (Adjorlolo et al., 2017, 2022). As stated previously, males and females may be similar or differ in their exposure to life adversities, but how this could impact their mental well-being has been inconclusive. In the dataset analyzed for this paper, we reported elsewhere (Adjorlolo et al., 2022) that males significantly abused substances (22.3% vs. 13.5%) and experienced head trauma (36.3% vs. 31.7%) more than females ($p < .05$). There was no gender difference in victimization experience, having a family member with mental illness and school stress. However, it is

not clear whether the differences and similarities in the experience of life adversities across gender have any influence on the expression of subthreshold psychotic symptoms. Besides, previous studies have focused overwhelmingly on positive PLEs with little attention to negative PLEs (Adjorlolo et al., 2021; Adjorlolo & Anum, 2021; Adjorlolo & Setordzi, 2021). Meanwhile, negative symptoms constitute essential features of psychosis, accounting for a significant percentage of the long-term disability and poor functional outcomes reported among persons with psychotic disorders (Correll & Schooler, 2020). The foregoing calls for an increased focus on negative PLEs in psychosis research. Taken together, the major caveat in the literature, particularly from SSA, relates to whether the relationship between ALEs and negative and positive PLEs is invariant across gender. To address this gap, the study investigated gender difference in the relationship between ALEs and PLEs among young people in Ghana, a SSA country.

Method

Design and data collection procedure

The study design has been reported elsewhere (Adjorlolo et al., 2022). Briefly, data were collected from senior high school (SHS) students who have spent at least 12 years of education in Ghana using a cross-sectional survey. English is the official language of instruction at the various levels of education in Ghana. The schools included in the study were recruited from rural or peri-urban areas where socialization practices and activities are centered predominantly on gender. The rural areas directly contrast urban areas/cities where acculturation and economic struggles have largely changed/diminished gendered behavioral tendencies. Over 90% of the students came from the administrative areas in which the schools were located. The selected schools were mixed in terms of gender (i.e. comprise males and females), giving us the opportunity to investigate gender differences in ALEs and PLEs. Questionnaires were administered to the participants in their respective classes after ethical issues were discussed. Only those who consented to participate in the study were handed a pack of questionnaires. Once completed, the questionnaires were handed over to the research team in each class. The Noguchi Memorial Institute for Medical Research Institutional Review Board of the University of Ghana granted ethical approval for the study (NMIMR-IRB CPN 012/19-20).

Study measures

Adverse life experiences. Seven adverse events culled from personal, home, and community/neighborhood domains were included as follow: life time substance use behavior (*Have you ever smoked or used alcohol?*), traumatic experiences (*I was involved in an accident or someone hit my head with an object or an object fell on my head*), violence victimization (*How often you been physically attacked or beaten in the last 12 months*), school-level stress (*How much stress do you usually feel because of school activities such as attending classes?*), disorganized neighborhood (*People in my neighborhood do not respect rules and laws*; People *do not care about what goes on in the neighborhood*), and family history of mental disorders (*Do you know a relative or family member who suffers from mental illness?*). The responses to the items were mostly categorical (i.e. Yes or No). To study dose effect, a summary score was also created for analysis.

Community Assessment of Psychic Experiences-CAPE (Stefanis et al., 2004) was used to assess for psychotic-like experiences (PLEs). The CAPE measures both positive (20 items) and negative (14 items) PLEs which are rated using a four-point Likert scale ranging from 0 (never) to 3 (nearly always), with total scores ranging from 0 to 60 and 0 to 42 for positive and negative subscales, respectively. The CAPE's positive subscale comprised four subscales (e.g. persecutory ideation and self-referential thinking), whereas the negative subscale has a tripartite structure (e.g. social withdrawal and avolition) (Barragan et al., 2011; Mark & Toulopoulou, 2016). Among Ghanaian adolescents, the CAPE has demonstrated evidence for dimensional representation of psychotic experiences (Adjorlolo et al., 2021). In the current study, Cronbach's alphas of .73 and .80 were recorded for the positive and negative subscales, respectively.

Data analyses

Data were analyzed using SPSS version 26 (IBM Corp), with a two-tailed statistical significance set at 0.05. Gender differences in ALEs and PLEs were examined using Chi-square analysis (for categorical variables) and independent t-tests (for continuous variables). Pearson correlation was used to examine the association between the positive and negative domains of PLEs. Lastly, multiple linear regression, controlling for demographic confounders, was used to examine the association between ALEs and PLEs. The analyses were conducted separately for boys and girls.

Results

Demographic characteristics of participants

As summarized in Table S1, a total of 1886 students participated in the study, comprising 62% girls (n = 1174). About 55% of the participants had at most 3 siblings, and 42.8% performed physical activity lasting for more than 10 minutes for 1–3 days in a week. Gender did not exert a statistically significant difference on the demographic variables except for age, with boys more likely to be at least 19 years old ($p < .001$).

In terms PLEs and gender, it was observed that girls endorsed significantly more persecutory ideation and avolition experiences more than boys (all ps < .05). In contrast, boys registered significantly more grandiose thinking and self-referential experiences than girls (all ps < .05).

Correlations among the PLEs domains

The results of the association between the PLES domains were summarized in Table S2. Across the genders, significant associations were observed between the PLEs domains, except for avolition and grandiose thinking for males. The direction of the correlations is similar for both males and females. The magnitude of the correlations also appears similar across the genders. For example, the correlation between hallucination and persecutory ideation in males (r = .39) and females (r = .40) are similar. Likewise, the relationships between avolition and persecutory ideation for males (r = .33) and females (r = .34) as well as self-referential thinking and social withdrawal domains of negative PLEs for males (r = .18) and females (r = .17) are similar.

Association between adverse life experiences and psychotic-like symptoms

The results of the association between ALEs and PLEs are summarized in Table S3. Controlling for demographic confounders, the study found evidence for gender similarities and differences in the association between ALEs and psychotic-like symptoms. Victimization experiences exerted statistically significant effect on positive and negative PLEs, predicting the following subdomains in both males and females: persecutory

ideation (b = .92 vs. .81) hallucinatory experiences (b = 1.46 vs. 1.61), affective flattening (b = .54 vs. .44), and avolition (b = 1.30 vs. 1.40). Among females, victimization experiences were associated with social withdrawal (b = .73), whereas among males, it was associated with self-referential thinking (b = .35).

Lifetime use of substance such as alcohol was significantly associated with persecutory ideation experiences in both males (b = .84) and females (b = .74), whereas significant relationships were observed for hallucinatory experiences (b = 1.29), affective flattening (b = .38), and volition (b = .1.29) but only in females. Relatedly, males and females who experienced high school stress were more likely to endorse hallucinatory (b = 1.10 vs. 1.40) and avolition (b = .66 vs. 1.49) domains of positive and negative PLEs, respectively. Among females, high school stress was significantly associated with the experiences of persecutory ideation (b = .40) and social withdrawal (b = .43). Lastly, whereas having a family member with mental illness predicted hallucinatory experiences across the genders, it was significantly associated with persecutory ideation (b = .45) in females only.

In the dose analysis, generally, we found support that higher number of ALEs was associated with higher positive and negative psychosis symptoms for male and female, with exception for grandiose (no association for both male and female) and affective flattening (no association for male only).

Discussions

The current study contributed to the emerging literature in SSA regarding the association between life adversities and the experience of subliminal psychotic symptoms in males and females. First, the study found evidence for the co-occurrence of positive and negative PLEs for both males and females. The gender invariance in the similarity of the magnitude and direction of the co-occurrence of negative and positive PLEs reported in this study suggests that males and females have similar probability of developing schizophrenia/other psychotic spectrum disorders and functional impairment in later life should they experience both negative and positive psychotic experiences. This deduction is consistent with the findings of a previous study involving 4914 Israel-born individuals aged 25–34 years where it was shown that the risk for schizophrenia later in life was significantly higher among participants with co-occurrence of positive and negative psychotic symptoms (Werbeloff et al., 2015). In a related study, co-occurrence of positive and negative PLEs increased the risk for functional impairment adolescents and young adults (Dominguez, Saka, Lieb, Wittchen, & van Os, 2010).

Research has theorized that exposure to life adversities has the tendency to increase emotional reactivity that can potentiate psychotic symptoms (Seidu et al., 2020). Studies conducted in high-income countries have provided initial support for the above observation by noting that victimization and stress exacerbate the insidious onset of PLEs among adolescents of the general population (DeVylder et al., 2016; Mackie, Castellanos-Ryan, & Conrod, 2011). Similar observations have been made by emerging studies from SSA (Adjorlolo & Anum, 2021; Mamah et al., 2016; Okewole et al., 2015). While previous studies have focused overwhelmingly on positive psychotic symptoms, our study has broadened the discussion by focusing on both negative and positive psychotic experiences, taking into consideration gender. We found evidence for both gender similarities and differences in the relationship between ALEs and PLEs. First, it was observed that, males and females who have been victimized and reported high school-level stress were significantly more likely to experience both negative and positive psychosis symptoms. Likewise, the effect of mental illness in the family on PLEs was prominent, predicting the experience of negative and positive psychosis symptoms in males and in females. This observation is largely consistent with Fekadu, Mihiretu, Craig, and Fekadu (2019) who in their review noted a multidimensional impact of mental illness on family members' (e.g. parents, children, and adolescents) psychological, mental, and physical well-being. Although the exact mechanism underpinning this finding was not explored in this study, it is hypothesized that adolescents are likely to perceive mental illness in the family as stressful, either because of the frequent interactions with family members with mental illness or the negative expressions by members in the neighborhood or communities due to the high stigma associated with mental illness (Fekadu et al., 2019; Santos & Cardoso, 2015). The finding similarly highlights genetic susceptibility to mental illness such that participants whose family members have mental illness are also prone to developing mental disorders, hence the high endorsement of PLEs.

In terms of gender difference, females with a history of substance misuse and trauma to the head have elevated risk for PLEs. This relationship was not observed for males, although substance misuse and head trauma experiences were very common among boys owing to biological predisposition (e.g. high testosterone) that increase risky behaviors and aggression (Van Bokhoven et al., 2006). Moreover, as discussed previously, historically, substance misuse has been associated with the male gender (Opland, Winters, & Stinchfield, 1995; Whaley, Hayes, & Smith, 2016). Although Ghanaian cultures mostly prohibit substance use among adolescents (Nketiah-Amponsah et al., 2018), boys who use substance are treated quite leniently than girls whose actions are generally seen to deviate from cultural norms and gender expectation. This could prevent adolescent girls from receiving help, thereby increasing the likelihood that the long-term and incremental effect of substance misuse could be devastating for girls, perhaps more than boys, including increasing their risk for PLEs. Second, given that the above ALEs do not occur frequently in girls, we hypothesized that girls are more likely to have a lower threshold for their effects which in this study was PLEs.

Implications for screening and early interventions in school settings

School settings are attractive for promoting adolescent mental health mainly because a high proportion of mental health issues appear first and foremost among young people, majority of whom are in school where they spend a significant amount of their time. The school environment in SSA is still collating relevant research to inform measures to deliver school mental health services. The study findings have added to the existing evidence to help support school mental health intervention and health promotion programming in

Ghana. Because of the increased morbidity associated with the presence of co-occurring symptoms, an integrated screening that comprise both negative and positive PLEs measures should be adopted for both males and females. Granting attention to negative PLEs is important because it is a central feature in psychotic disorders but also other mental health disorders (Andreasen, 1987; Lyne et al., 2012). This could help identify individuals at risk not only for psychotic disorders but also other mental disorders. Screening for PLEs should also incorporate assessment for experiences of life adversities owing to their preponderance in Ghana and more importantly because of their profound effects on PLEs. Both males and females should be screened for school-level stress, victimization experiences and a history of family member with mental illness. Those who scored high on these ALEs could be screened for both positive and negative PLEs to inform early intervention decision-making and planning. For example, school stress, family member with mental illness, and victimization experiences were significantly associated with hallucinatory experiences in this study. Thus, interventions targeting hallucinatory experiences should aim to address multiplicity of ALEs affecting both males and females. The study found that females who scored high on head trauma experiences and substance misuse histories have elevated risk for experiencing both negative and positive PLEs. Therefore, a gender-sensitive screening for ALEs should target head trauma experiences and substance misuse histories in females.

The study is limited by the adoption of cross-sectional, retrospective design and a self-report methodology, coupled with the possibility for recall bias and inaccurate (under or over) reporting of experiences. The use of single items for complex experiences could also be limiting, just as the findings could not be extended to young persons with dissimilar background from those who participated in the study. Notwithstanding these limitations, the evidence generated by the study would benefit discourse on school mental health in Ghana and other SSA countries, while providing the foundation for additional research into the PLEs risk profiles as a function of exposure to life adversities.

Conclusion

Psychotic disorders contribute significantly to the burden of mental health, globally. In SSA, the burden could be high owing to the profound challenges associated with the organization and delivery of mental health services. One way to address psychotic disorders is to identify individuals at risk for PLEs for early intervention, based on salient demographic factors, notably gender. This demands an understanding of the risk profile of individuals who are exposed to ALEs. The current study contributed to the literature, noting that the relationship between ALEs and PLEs can be influenced by gender. On one hand, males and females' endorsement of psychotic-like symptoms could be linked to their exposure to the same set of ALEs. On the other hand, males and females with PLEs do not share the same ALEs. This calls for a somewhat gender neutral and gender-sensitive risk profiling and intervention programming based on the domains of PLEs as well as the nature of ALEs. Based on this study, mitigating substance misuse practices and head traumatic experiences would benefit females more in terms of reducing their experiences of PLEs. In contrast, both males and females would benefit from measures to reduce school stress, victimization experiences, and stresses associated with having a family member with mental illness. This understanding is equally important in screening for ALEs and PLEs among males and females.

Acknowledgements

The authors have declared that they have no competing or potential conflicts of interest.

Ethical information

The Noguchi Memorial Institute for Medical Research Institutional Review Board of the University of Ghana granted ethical approval for the study (NMIMR-IRB CPN 012/19-20).

Correspondence

Samuel Adjorlolo, Department of Mental Health, School of Nursing and Midwifery, College of Health Sciences, University of Ghana, P. O. Box LG 43, Legon, Accra, Ghana; Email: sadjorlolo@ug.edu.gh

Supporting information

Additional Supporting Information may be found in the online version of this article:

Table S1. Study sample & descriptive results.
Table S2. Correlations among mental health and suicidal ideation measures (by gender).
Table S3. Association between adverse life experience and psychosis symptom outcomes (by gender).

References

Adewuya, A.O., Oladipo, O.E., Imarah, T., Asmal, L., & Emsley, R. (2022). The 3-year progression of clinically significant psychotic-like experiences in a general adult population in Lagos, Nigeria. *Social Psychiatry and Psychiatry Epidemiology*, *58*, 91–103.

Adjorlolo, S., Adu-Poku, S., Andoh-Arthur, J., Botchway, I., & Mlyakado, B.P. (2017). Demographic factors, childhood maltreatment and psychological functioning among university students' in Ghana: A retrospective study. *International Journal of Psychology*, *52*, 9–17.

Adjorlolo, S., & Anum, A. (2021). Positive and negative psychosis risk symptoms among adolescents in Ghana. *International Journal of Adolescence and Youth*, *26*, 307–320.

Adjorlolo, S., Anum, A., & Adjorlolo, P. (2021). Latent structure of psychotic-like experiences in adolescents: Evidence from a multi-method taxometric study of a school-based sample in Ghana. *Psychiatry Research*, *302*, 113991.

Adjorlolo, S., Anum, A., & Huang, K.-Y. (2022). Adverse life experiences and mental health of adolescents in Ghana: A gendered analysis. *International Journal of Adolescence and Youth*, *27*, 444–456.

Adjorlolo, S., & Setordzi, M. (2021). Psychosis in adolescents in Africa: A scoping review for current understanding and future directions. *Cogent Psychology*, *8*, 1949173.

Andreasen, N.C. (1987). The concept of negative symptoms: Definition, specificity, and significance. *Psychiatry and Psychobiology*, *2*, 240–249.

Barragan, M., Laurens, K.R., Navarro, J.B., & Obiols, J.E. (2011). Psychotic-like experiences and depressive symptoms in a community sample of adolescents. *European Psychiatry*, *26*, 396–401.

Chen, J., Cao, H., Meyer-Lindenberg, A., & Schwarz, E. (2018). Male increase in brain gene expression variability is linked to genetic risk for schizophrenia. *Translational Psychiatry*, *8*, 1–10.

Correll, C.U., & Schooler, N.R. (2020). Negative symptoms in schizophrenia: A review and clinical guide for recognition, assessment, and treatment. *Neuropsychiatric Disease and Treatment*, *16*, 519–534.

DeVylder, J.E., Koyanagi, A., Unick, J., Oh, H., Nam, B., & Stickley, A. (2016). Stress sensitivity and psychotic experiences in 39 low- and middle-income countries. *Schizophrenia Bulletin*, *42*, 1353–1362.

Dominguez, M.-D.-G., Saka, M.C., Lieb, R., Wittchen, H.-U., & van Os, J. (2010). Early expression of negative/disorganized symptoms predicting psychotic experiences and subsequent clinical psychosis: A 10-year study. *American Journal of Psychiatry*, *167*, 1075–1082.

Fekadu, W., Mihiretu, A., Craig, T.K., & Fekadu, A. (2019). Multidimensional impact of severe mental illness on family members: Systematic review. *BMJ Open*, *9*, e032391.

Fusar-Poli, P., Bonoldi, I., Yung, A.R., Borgwardt, S., Kempton, M.J., Valmaggia, L., … & McGuire, P. (2012). Predicting psychosis: Meta-analysis of transition outcomes in individuals at high clinical risk. *Archives of General Psychiatry*, *69*, 220–229.

Harkness, K.L., Alavi, N., Monroe, S.M., Slavich, G.M., Gotlib, I.H., & Bagby, R.M. (2010). Gender differences in life events prior to onset of major depressive disorder: The moderating effect of age. *Journal of Abnormal Psychology*, *119*, 791.

Lyne, J., O'Donoghue, B., Owens, E., Renwick, L., Madigan, K., Kinsella, A., … & O'Callaghan, E. (2012). Prevalence of item level negative symptoms in first episode psychosis diagnoses. *Schizophrenia Research*, *135*, 128.

Mackie, C.J., Castellanos-Ryan, N., & Conrod, P.J. (2011). Developmental trajectories of psychotic-like experiences across adolescence: Impact of victimization and substance use. *Psychological Medicine*, *41*, 47–58.

Mamah, D., Mbwayo, A., Mutiso, V., Barch, D.M., Constantino, J.N., Nsofor, T., … & Ndetei, D.M. (2012). A survey of psychosis risk symptoms in Kenya. *Comprehensive Psychiatry*, *53*, 516–524.

Mamah, D., Musau, A., Mutiso, V.N., Owoso, A., Abdallah, A.B., Cottler, L.B., … & Ndetei, D.M. (2016). Characterizing psychosis risk traits in Africa: A longitudinal study of Kenyan adolescents. *Schizophrenia Research*, *176*, 340–348.

Mamah, D., Mutiso, V.N., & Ndetei, D.M. (2021). Psychotic-like experiences among 9,564 Kenyan adolescents and young adults. *Psychiatry Research*, *302*, 113994.

Mamah, D., Owoso, A., Mbwayo, A.W., Mutiso, V.N., Muriungi, S.K., Khasakhala, L.I., … & Ndetei, D.M. (2013). Classes of psychotic experiences in Kenyan children and adolescents. *Child Psychiatry & Human Development*, *44*, 452–459.

Mark, W., & Toulopoulou, T. (2016). Psychometric properties of "community assessment of psychic experiences": review and meta-analyses. *Schizophrenia Bulletin*, *42*, 34–44.

McGrath, J.J., Saha, S., Al-Hamzawi, A., Alonso, J., Bromet, E.J., Bruffaerts, R., … & Fayyad, J. (2015). Psychotic experiences in the general population: A cross-national analysis based on 31 261 respondents from 18 countries. *JAMA Psychiatry*, *72*, 697–705.

Ndetei, D.M., Muriungi, S.K., Owoso, A., Mutiso, V.N., Mbwayo, A.W., Khasakhala, L.I., … & Mamah, D. (2012). Prevalence and characteristics of psychotic-like experiences in Kenyan youth. *Psychiatry Research*, *196*, 235–242.

Nketiah-Amponsah, E., Afful-Mensah, G., & Ampaw, S. (2018). Determinants of cigarette smoking and smoking intensity among adult males in Ghana. *BMC Public Health*, *18*, 1–10.

Nuevo, R., Chatterji, S., Verdes, E., Naidoo, N., Arango, C., & Ayuso-Mateos, J.L. (2012). The continuum of psychotic symptoms in the general population: A cross-national study. *Schizophrenia Bulletin*, *38*, 475–485.

Okewole, A.O., Awhangansi, S.S., Fasokun, M., Adeniji, A.A., Omotoso, O., & Ajogbon, D. (2015). Prodromal psychotic symptoms and psychological distress among secondary school students in Abeokuta, Nigeria. *Journal of Child & Adolescent Mental Health*, *27*, 215–225.

Opland, E.A., Winters, K.C., & Stinchfield, R.D. (1995). Examining gender differences in drug-abusing adolescents. *Psychology of Addictive Behaviors*, *9*, 167.

Owoso, A., Jansen, S., Ndetei, D., Musau, A., Mutiso, V., Mudenge, C., … & Mamah, D. (2018). A comparative study of psychotic and affective symptoms in Rwandan and Kenyan students. *Epidemiology and Psychiatric Sciences*, *27*, 157–168.

Richardson, S., Carr, E., Netuveli, G., & Sacker, A. (2020). Adverse events over the life course and later-life wellbeing and depressive symptoms in older people. *International Psychogeriatrics*, *35*, 243–257.

Ronald, A., Sieradzka, D., Cardno, A.G., Haworth, C.M., McGuire, P., & Freeman, D. (2014). Characterization of psychotic experiences in adolescence using the specific psychotic experiences questionnaire: Findings from a study of 5000 16-year-old twins. *Schizophrenia Bulletin*, *40*, 868–877.

Santos, A.F.D.O., & Cardoso, C.L. (2015). Family members of individuals suffering from mental disorders: Stress and care stressors. *Estudos de Psicologia (Campinas)*, *32*, 87–95.

Scott, J., Welham, J., Martin, G., Bor, W., Najman, J., O'Callaghan, M., … & Mcgrath, J. (2008). Demographic correlates of psychotic-like experiences in young Australian adults. *Acta Psychiatrica Scandinavica*, *118*, 230–237.

Seidu, A.A., Amu, H., Dadzie, L.K., Amoah, A., Ahinkorah, B.O., Ameyaw, E.K., … & Kissah-Korsah, K. (2020). Suicidal behaviours among in-school adolescents in Mozambique: Cross-sectional evidence of the prevalence and predictors using the Global School-Based Health Survey data. *PLoS One*, *15*, e0236448.

Soneson, E., Russo, D., Stochl, J., Heslin, M., Galante, J., Knight, C., … & Fowler, D. (2020). Psychological interventions for people with psychotic experiences: A systematic review and meta-analysis of controlled and uncontrolled effectiveness and economic studies. *Australian & New Zealand Journal of Psychiatry*, *54*, 673–695.

Staines, L., Healy, C., Coughlan, H., Clarke, M., Kelleher, I., Cotter, D., & Cannon, M. (2022). Psychotic experiences in the general population, a review; definition, risk factors, outcomes and interventions. *Psychological Medicine*, *52*, 1–12.

Stainton, A., Chisholm, K., Woodall, T., Hallett, D., Reniers, R.L., Lin, A., & Wood, S.J. (2021). Gender differences in the experience of psychotic-like experiences and their associated factors: A study of adolescents from the general population. *Schizophrenia Research*, *228*, 410–416.

Stefanis, N., Delespaul, P., Henquet, C., Bakoula, C., Stefanis, C., & Van Os, J. (2004). Early adolescent cannabis exposure and positive and negative dimensions of psychosis. *Addiction*, *99*, 1333–1341.

Tiet, Q.Q., Bird, H.R., Davies, M., Hoven, C., Cohen, P., Jensen, P.S., & Goodman, S. (1998). Adverse life events and resilience. *Journal of the American Academy of Child & Adolescent Psychiatry*, *37*, 1191–1200.

Van Bokhoven, I., Van Goozen, S.H., Van Engeland, H., Schaal, B., Arseneault, L., Séguin, J.R., … & Tremblay, R.E. (2006). Salivary testosterone and aggression, delinquency, and social dominance in a population-based longitudinal study of adolescent males. *Hormones and Behavior*, *50*, 118–125.

Werbeloff, N., Dohrenwend, B.P., Yoffe, R., van Os, J., Davidson, M., & Weiser, M. (2015). The association between negative symptoms, psychotic experiences and later schizophrenia: A population-based longitudinal study. *PLoS One*, *10*, e0119852.

Whaley, R.B., Hayes, R., & Smith, J.M. (2016). Differential reactions to school bonds, peers, and victimization in the case of

adolescent substance use: The moderating effect of sex. *Crime & Delinquency*, *62*, 1263–1285.
Wusten, C., Schlier, B., Jaya, E.S., Genetic, R., Outcome of Psychosis, I, Fonseca-Pedrero, E., … & Lincoln, T.M. (2018). Psychotic experiences and related distress: A cross-national comparison and network analysis based on 7141 participants from 13 countries. *Schizophrenia Bulletin*, *44*, 1185–1194.

Accepted for publication: 2 August 2023