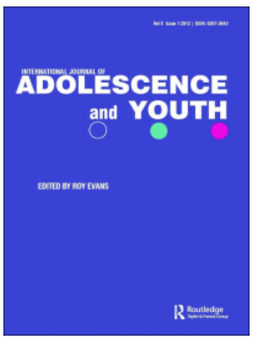

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Positive and negative psychosis risk symptoms among adolescents in Ghana

Samuel Adjorlolo [a,b] and Adote Anum [c]

[a]Department of Mental Health, School of Nursing and Midwifery, College of Health Sciences, University of Ghana, Legon, Ghana; [b]Research and Grant Institute of Ghana, Legon, Ghana; [c]Department of PsychologySchool of Social Sciences, College of Humanities, University of Ghana, Legon, Ghana

ABSTRACT

Psychotic-like experiences (PLEs) have attracted increased scholarly attention; however, there are limited empirical studies in Africa where environmental risk factors for psychosis such as maltreatment are highly prevalent. The study investigated the prevalence and characteristics of PLEs, as well as the association between PLEs and behavioural maladies among adolescents in Ghana. Data were collected from 553 adolescents (girls = 322, 58.1%) using a cross-sectional survey design. The prevalence of the positive PLEs ranges from 3.8% to 41.2, whereas, for negative PLE, the prevalence ranges from 4.9% to 13% . The PLEs dimensions were significantly associated with depressive and anxiety symptoms, as well as suicidal tendency. Cluster analysis identified three groups of participants: normative, low risk and high risk for psychosis. The psychosis risk groups significantly reported more PLEs and behavioural maladies, compared with the normative group. This preliminary study suggests that psychosis risk symptoms are prevalent in adolescents in Ghana.

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Psychosis; adolescents; depression; anxiety; suicide; Ghana; Africa

Introduction

Psychotic-like experiences (PLEs) refer to the experiences of symptoms of psychosis such as hallucinations and delusions that do not meet the clinical threshold for psychotic disorders. PLEs are reportedly very common in the general population, appearing first in adolescence and sometimes in childhood (Zavos et al., 2014). PLEs tend to disappear with age (Murray & Jones, 2012) but they have the propensity to persist overtime, leading to future psychotic disorders (Fusar-Poli et al., 2012). PLEs contribute to behavioural maladies, such as suicide, emotional disorders, substance use, and a decline in general health status (Kelleher et al., 2012; Subramaniam et al., 2014). Insight into PLEs is extremely important to identify and improve the mental wellbeing of adolescents who may be at ultra-high risk for psychotic disorders. This is particularly important in African countries where environmental risk factors of mental disorders, such as maltreatment are highly prevalent. However, there is a paucity of empirical data on PLEs in Africa (Mamah et al., 2016, 2014). Consequently, the current study is designed to contribute to the emerging literature in Africa by investigating PLEs among adolescents in Ghana, a West African country.

Empirical evidence from the international literature suggests that PLEs are prevalent in varying proportions. For example, out of the 5,910 adolescents recruited in Ireland, 13.7% reported auditory hallucinations, 10.4% reported visual hallucinations, and 775 (13.1%) reported paranoid thoughts (Dolphin et al., 2015). Among adolescents recruited from Australia, the prevalence of PLEs ranged from 3.3% for special messages to 14.0% for auditory hallucinatory experiences for a 12-month

CONTACT Samuel Adjorlolo sadjorlolo@ug.edu.gh

period (Hielscher et al., 2018). Hodgekins et al. (2018) reported a prevalence rate ranging from 3.5% to 70% among adolescents with non-psychotic mental health difficulties in the UK.

Following a scoping review of the literature on psychosis in Africa guided by the methodological framework proposed by Arksey and O'Malley (2005), Adjorlolo and Setordzi (In press) identified 11 articles, focusing on salient areas of PLEs but predominantly prevalence and correlates. The current study, in keeping with the extant literature from high-income countries and emerging studies from Africa, focused on the prevalence and characteristics of PLEs in the population. This is intended to unearth the enormity and characteristics of PLEs in the population to chart a pathway for a robust research agenda in psychosis (Mamah et al., 2012, 2016, 2013; Ndetei et al., 2012; Owoso et al., 2018). In a community study involving Kenyan participants aged 14–29 years, Mamah et al. (2012) found that 1.8% to 19.5% reported having PLEs, with an overall prevalence rate of 45.5%. Of this, 11% were classified as high risk for psychosis, whereas 15% were labelled as at risk for grandiose symptom. Ndetei et al. (2012) similarly found that 23% of Kenyan youth reported at least one PLEs, with 19% reporting that the PLEs were unrelated to sleep or drug use. The authors further classified the participants into non-psychotic, predominantly hallucinatory and multiple PLEs classes. The psychotic-risk classes had significantly more males compared with females. In a related study in children and adolescents (aged 8–19) recruited from primary and secondary schools in Kenya, the prevalence rate of individual PLEs ranges from 10.1% (persecutory ideation) to 15.3% (visual hallucination), with a lifetime prevalence of 22.1% (Mamah et al., 2013). The prevalence rate of PLEs for males and females was 18.8% and 14.2%, respectively. Males significantly endorsed items indexing visual hallucination, mind control, referential thinking and persecutory ideation more than females. Similar to the previous studies, the authors identified three classes of participants: Normative class, a class with hallucinatory experiences occurring at higher probability than other experiences and a class with all psychotic experiences occurring with high probability. Consistent with the findings of Ndetei et al. (2012), a gender-sensitivity analysis revealed that males are more likely to belong to any of the psychotic classes than females. Among school-going adolescents in Nigeria, the prevalence of prodromal symptoms of psychosis was reported at 20.9% (Okewole et al., 2015). Contrary to previous findings (Mamah et al., 2013; Ndetei et al., 2012), females were significantly more likely to screen positive for prodromal symptoms than their male counterparts (Okewole et al., 2015). In a more recent study involving 9,441 adolescents from Lagos, Nigeria, 10.5% had clinically significant PLE symptoms, with déjà vu" (35.5%) and loss of interest (29.6%) emerging as the most endorsed PLE items (Adewuya et al., 2020). In a related study from Tunisia, 51.4% of the participants reporting at least one positive PLE 'nearly-always' (Fekih-Romdhane et al., 2020).

These preliminary studies suggest that PLEs are prevalent in Africa and that participants can be categorized into normative and at-risk groups based on the endorsement of PLEs. This notwithstanding the inconsistencies regarding gender and PLEs, the lack of studies from other sub-Saharan African countries to enhance sub-regional and cross-cultural discussions on PLEs calls for additional studies. Lastly, another major limitation in the existing literature relates to the overwhelming emphasis on positive PLEs to the neglect of negative PLEs. Presently, there are no empirical data regarding the prevalence and characteristics of negative PLEs in African samples. This observation provides additional impetus for more studies to elucidate the characteristics of PLEs in Africa. The current study is designed to add to the emerging literature on PLEs in Africa by investigating the prevalence, characteristics of and association of PLEs with symptoms of anxiety, depression, suicidal tendency and mental wellbeing in adolescents in Ghana.

Methods

Participants

Data were collected as part of a study designed to examine adolescents' mental health in Ghana. The study design and methodology have been described elsewhere (Adjorlolo, 2019; Anum et al., 2019).

Briefly, data were obtained from a total of 553 senior high school students. Ghana's educational system operates on a 6-3-3-4 system (i.e. primary school – 6 years, junior high school – 3 years, senior high school – 3 years and university bachelor's degree – 4 years). English is the official language of instruction at the various levels of education. The average age of the participants was 16.85 years (SD = 1.32). The majority were girls (n = 322, 58.1%) and more than half of the participants have not sought help for emotional or psychological problems from non-professional mental health service providers or have not smoked or misused alcohol (89.5%).

Study measures

Community Assessment of Psychic Experiences (CAPE) (Stefanis et al., 2004) was used to assess PLEs. The Positive (20 items) and Negative (14 items) subscales of the CAPE were used in the study. The items are rated using a 4-point Likert scale ranging from 0 (never) to 3 (nearly always). A total score is obtained by summing the scores on each subscale, with total scores ranging from 0 to 60 and 0 to 42 for Positive and Negative subscales, respectively. Higher scores indicate more positive or negative PLEs. The CAPE Positive subscale reportedly comprised four dimensions: Persecutory ideation, Grandiose thinking, Hallucinatory experiences and Self-referential thinking, whereas the Negative subscale has a tripartite structure consisting of Social withdrawal, Affective flattening, and Avolition (Barragan et al., 2011; Mark & Toulopoulou, 2016; Ziermans, 2013). As one of the widely used measures of PLEs in community samples, the CAPE has demonstrated acceptable validity and reliability (Mark & Toulopoulou, 2016; Stefanis et al., 2004). In the current study, Cronbach's alphas of .78 and .76 were recorded for the positive and negative subscales of CAPE, respectively.

Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001) is a 9-item self-report questionnaire that was administered to assess for depressive symptoms among the participants. The PHQ-9 are rated on a 4-point Likert scale ranging from 'not at all' (0) to 'nearly every day' (3), with higher scores indicating more depressive symptoms. Sample items include 'Little interest or pleasure in doing things' and 'Trouble concentrating on things, such as reading the newspaper or watching television'. Confirmatory factor analysis (CFA) and multi-group CFA support a one-factor structure of the PHQ-9 that was invariant across gender for the current sample, with internal consistency (Cronbach's Alpha) of .71 (Anum et al., 2019).

Generalized Anxiety Disorder (GAD; Spitzer et al., 2006) scale is a 7-item scale administered to assess the symptoms of anxiety in the participants. Sample item includes 'feeling nervous, anxious or on edge' and becoming easily annoyed or irritable". The GAD-7 items are rated on a 4-point Likert scale, ranging from 0 (not at all) to 3 (nearly always). Total score on the GAD-7 is obtained by summing the individual items and it ranges from 0 to 27. Higher scores indicate more symptoms of generalized anxiety. CFA on the current sample supports a unidimensional structure of the GAD-7 that was invariant across gender (Adjorlolo, 2019). The Cronbach's alpha of the GAD-7 was .069.

Suicidal Behavior Questionnaire-Revised (SBQ-R) (Osman et al., 2001) was administered to screen for suicidal tendencies. The four items of the SBQ-R are rated on Likert scales as follows: item 1 = 1–4; item 2 = 1–5; item 3 = 1–3; and item 4 = 0–6. The SBQ-R total score ranges from 3 to 18, with higher scores suggesting greater risk for suicidal tendencies. Sample items include: 'Have you ever thought about or attempted to kill yourself?' The result of a multi-group confirmatory factor analysis using the present sample supported a unidimensional structure of the SBQ-R that was invariant for boys and girls (Adjorlolo et al., 2020). The Cronbach's alpha reported was 0.78.

World Health Organization well-being index (WHO-5) is a 5-item rating scale used to assess participants' subjective well-being (Topp et al., 2015). The WHO-5 items are positively phrased to indicate positive mental wellbeing. A sample item is 'my daily life is filled with things that interest me'. The items are scored from 5 (all the time) to 0 (none of the time), with a total score ranging from 0 (absence of wellbeing) to 25 (maximal well-being). A Cronbach's alpha of 0.70 was observed for the present sample.

Other variables: We also measure lifetime alcohol use or smoking (i.e. substance use) among the participants by asking the question; have you ever smoked or used alcohol? Based on previous studies suggesting that spiritualists (e.g. pastors, Iman, traditionalists) are the first point of contact for seeking help for mental health and emotional problems (Burns & Tomita, 2015; Ibrahim et al., 2016), we assessed help-seeking by asking the participants whether they had sought help from spiritualists for emotional or mental health reasons. The response options to these items were dichotomized to reflect 'Never' (0) and at least once (1). We also collected data on the sex and age of participants.

Research design and procedure

The study adopted a cross-sectional survey design to gather data from the participants at a single time point using a self-report methodology. Data were collected from senior high school students using a multi-stage sampling. First, Eastern region was randomly selected from the 10 regions of Ghana.[1] Next, a district in the Eastern region and a senior high school in the district were randomly selected. Following the selection of the school, we sought permission from the management of the school and collected data from the second and third-year students who were in school at the time of data collection. We approached the participants in their respective classes and invited them to participate in the study. The participants were briefed on the study's objectives and their responsibilities. Ethical issues such as confidentiality, anonymity and withdrawal from the study without suffering any consequences were explained and strictly adhered too. The participants were given the opportunity to ask questions about the study, which the research team responded too. Those who expressed interest and willingness to participate in the study were given a pack of questionnaires containing the measures described above. Data were collected in the respective classrooms of the participants in the form of group assessment. The same instructions were given to the participants to complete the questionnaire. For example, they were told that the questionnaires are not exam questions and so there are no right or wrong answers and that they should respond to the study items as it applies to them. The total student population at the time of the data collection was 650. A total of 553 participants took part in the study. The study has received institutional ethics approval.

Data analytic strategy

Data were analysed with SPSS Version 23 (IBM.corp). Missing data analysis revealed that the data was missing completely at random (Little's Chi-Square > .05). Consequently, an expectation maximization algorithm was used to impute the missing data points. A two-tailed statistical significance was set at 0.05, unless otherwise indicated. A series of statistical analyses were performed. First, the prevalence of PLEs in the sample and across gender was determined based on the endorsement of the highest response options for the PLEs items (i.e. 'Nearly always'). Chi square (χ^2) analysis was conducted to determine gender difference in the prevalence of PLEs. Bivariate correlations between continuous variables were examined using Pearson correlation. Simultaneous multiple linear regression was conducted to investigate the association between PLEs and symptoms of depression and anxiety, suicidal tendency and mental wellbeing. The PLEs subdomains, as measured by the CAPE, were used as the predictor variables. Cluster analysis, using the k-means procedure, was conducted to develop and understand cluster membership based on participant scores in PLEs, symptoms of depression, anxiety, suicidal tendency and mental wellbeing.

Results

Prevalence of positive and negative PLEs

Table 1 and Table 2 present the prevalence of each of the CAPE positive and negative items, respectively, segregated by gender. First, it was evident that all the participants endorsed at least

Table 1. Prevalence, gender difference and chi-square results for CAPE positive items.

Positive Psychotic-Like Experiences	Total Sample, N = 553		Boys, n = 221		Girls, n = 322		χ^2
	≤ Often	Nearly always	≤ Often	Nearly always	≤ Often	Nearly always	
	%	%	%	%	%	%	
Persecutory ideation							
Hints/double meaning	96.2	3.8	95.7	4.3	96.6	3.4	.31, ns
People look at you oddly	81.6	18.4	79.7	20.3	82.9	17.1	.95, ns
People not what they seem	85.7	14.3	86.1	13.9	85.4	14.6	.06, ns
Conspiracy against you	89.7	10.3	86.6	13.4	91.9	8.1	4.16*
Persecuted in some way	91.9	8.1	90.5	9.5	92.9	7.1	1.02, ns
Grandiose thinking							
*Destined to be very important	58.8	41.2	57.6	42.4	59.6	40.4	.23, ns
*Special or unusual person	75.6	24.4	75.8	24.2	75.5	24.5	.01, ns
Hallucinatory experiences							
Hear voices talking to each other	92.4	7.6	91.3	8.7	93.2	6.8	.64, ns
See things other people cannot	93.5	6.5	94.4	5.6	92.9	7.1	.51, ns
Hear voices when you are alone	90.8	9.2	90.5	9.5	91	9	.04, ns
Other people hear thoughts	87.5	12.5	87	13	87.9	12.1	.09, ns
Thoughts being echoed back	89.3	10.7	89.2	10.8	89.4	10.6	.01, ns
Double replaced acquaintance	88.2	11.8	90	10	87	13	1.24, ns
Control of some force or power	81.9	18.1	81	19	82.6	17.4	.25, ns
Telepathy	89.2	10.8	89.2	10.8	89.1	10.9	.01, ns
Thoughts are not your own	94	6	93.1	6.9	94.7	5.3	.65, ns
Witchcraft, voodoo or the occult	93.1	6.9	93.9	6.1	92.5	7.5	.41, ns
Thoughts taken away	93.3	6.7	95.2	4.8	91.9	8.1	2.36, ns
Self-referential thinking							
Special messages through TV	89.5	10.5	90.9	9.1	88.5	11.5	.83, ns
Thoughts influenced by devices	86.1	13.9	79.2	20.8	91	9	15.56**

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

one positive and negative PLEs. Second, the prevalence of the highly frequent responses ('nearly always') for the positive PLEs ranges from 3.8% (i.e. Hints/double meaning) to 41.2% (i.e. destined to be very important) in the total sample. The prevalence rate of the positive PLEs is not statistically different between boys and girls, except for 'Conspiracy against you' and 'Thoughts influenced by devices (endorsed more by boys)'. With respect to the negative PLEs, the prevalence of highly frequent responses ('nearly always') ranges from 4.9% (Mind is empty) to 13% (Not much of a talker with others) in the total sample. Boys and girls do not differ significantly in their endorsement of the negative PLEs.

Associations among the study variables

The result of the Pearson correlation is summarized in Table 3. As can be seen, the positive dimensions of PLEs were positively and significantly correlated (all *ps* < .001). Similar findings were observed for the negative dimensions of PLEs. Second, with the exception of 'Grandiose thinking' dimension of positive PLEs, the results showed a significant positive association between the positive and negative PLEs dimensions (all *ps* < .001). Lastly, the PLEs dimensions, except the 'Grandiose thinking', correlated significantly with the symptoms of depression and anxiety, suicidal tendency and mental wellbeing (all *ps* < .001).

Simultaneous multiple linear regression was used to examine the association between the PLEs dimensions as predictors and other study variables as outcome (e.g. symptoms of depression). Separate analyses were conducted for the positive and negative PLEs dimensions. Because 'Grandiose thinking' dimension of positive PLEs did not correlate significantly with the outcome variables, it was excluded from subsequent analyses. Age and gender were also excluded since they showed no statistically significant influence on PLEs. As can be seen in Table 4, PLEs showed varied

Table 2. Prevalence, gender difference and chi-square results for CAPE negative items.

	Total Sample, N = 553		Boys, n =		Girls, n =		
Negative Psychotic-Like Experiences	≤ Often	Nearly always	≤ Often	Nearly always	≤ Often	Nearly always	X^2
	%	%	%	%	%	%	
Social withdrawal							
Not much of a talker with others	87	13	87.9	12.1	86.3	13.7	.28, ns
Not a very animated person	92.9	7.1	94.4	5.6	91.9	8.1	1.23, ns
Lacking in spontaneity	92.2	7.8	93.5	6.5	91.3	8.7	.91, ns
Affective flattening							
Feelings lack in intensity	92.9	7.1	95.2	4.8	91.3	8.7	3.18, ns
Emotions are blunted	93.9	6.1	95.2	4.8	92.9	7.1	1.32, ns
No emotions at important events	91.7	8.3	93.9	6.1	90.1	9.9	2.65, ns
Avolition							
Never get things done	95.3	4.7	95.2	4.8	95.3	4.7	.01, ns
Neglecting appearance/hygiene	93.7	6.3	93.5	6.5	93.8	6.2	.02, ns
Lacking in motivation	88.6	11.4	89.2	10.8	88.2	11.8	.13, ns
Lacking in energy	94.9	5.1	95.7	4.3	94.4	5.6	.45, ns
Spending days doing nothing	91.5	8.5	90	10	92.5	7.5	1.08, ns
Mind is empty	95.1	4.9	97	3	93.8	6.2	2.93, ns
Few hobbies or interests	90.1	9.9	90.9	9.1	89.4	10.6	.32, ns
No interest to be with others	93.3	6.7	94.4	5.6	92.5	7.5	.72, ns

associations with the outcome variables. For example, 'persecutory ideation' dimension was significantly associated with symptoms of depression and anxiety, suicidal tendency but not with mental wellbeing. The 'Self-referential thinking', on the other hand, did not demonstrate significant association with depression, anxiety symptoms, suicidal tendency and mental wellbeing. The negative PLEs dimensions were significantly associated with depression and anxiety symptoms and suicidal tendency. However, only the 'avolition' dimension correlated significantly with mental wellbeing. The same pattern of results was obtained after controlling for substance use and help-seeking for mental health problems or substance use (results are available upon request).

Table 3. Descriptive statistics, Cronbach's alpha and correlations for study variables.

	1	2	3	4	5	6	7	8	9	10	11	12
Positive CAPE												
1. Persecutory ideation	1											
2. Grandiose thinking	.17*	1										
3. Hallucinatory experiences	.41*	.24*	1									
4. Self – referential thinking	.24*	.18*	.31*	1								
5. Total Positive	.69*	.46*	.89*	.53*	1							
Negative Cape												
6. Social Withdrawal	.25*	.03	.33*	.20*	.34*	1						
7. Affective flattening	.25*	.06	.35*	.18*	.35*	.33*	1					
8. Avolition	.33*	.05	.39*	.17*	.40*	.45*	.46*	1				
9. Total Negative	.36*	.06	.45*	.22*	.46*	.69*	.70*	.91*	1			
10. **Depressive symptoms**	.36*	.01	.34*	.18*	.37*	.36*	.34*	.43*	.49*	1		
11. **Anxiety symptoms**	.35*	.03	.34*	.17*	.38*	.36*	.37*	.40*	.48*	.67*	1	
12. **Suicidal tendency**	.27*	.03	.24*	.15*	.28*	.22*	.22*	.27*	.31*	.38*	.40*	1
13. **Mental wellbeing**	−.16*	−.01	−.21*	−.08	−.20*	−.18*	−.16*	−.26*	−.27*	−.36*	−.35*	−.21*

*p < .001

Cluster membership of participants

The participants were clustered based on their scores on the PLEs dimensions (except grandiose thinking dimensions), symptoms of depression and anxiety, suicidal tendency and mental wellbeing

Table 4. Regression coefficients of positive and negative psychotic-like experiences on depression, anxiety suicidal tendency and mental wellbeing.

Variable	Depression Symptoms			Anxiety Symptoms			Suicidal Tendency			Mental Wellbeing		
	B	SE	t	B	SE	t	B	SE	t	B	SE	t
Positive CAPE Subscales												
Constant	2.02	.55	3.66*	1.77	.46	3.87*	2.18	.36	6.15*	19.63	.66	29.60*
Persecutory ideation	.52	.09	6.07*	.42	.07	5.84*	.25	.20	4.48*	−.19	.10	−1.82
Hallucinatory experiences	.24	.05	4.85*	.21	.04	5.19*	.10	.03	3.02*	−.22	.06	−3.75*
Self – referential thinking	.17	.14	1.15	.09	.12	.71	.13	.09	1.35	.02	.17	.09
	R^2 = .17 F(3,549) = 38.46, p < .001			R^2 = .17 F(3,549) = 37.89, p < .001			R^2 = .10 F(3,549) = 169.53, p < .001			R^2 = .05 F(3,549) = 9.65, p < .001		
Negative CAPE Subscales												
Constant	2.70	.41	6.57*	2.33	.34	6.81*	2.86	.28	10.36	19.42	.51	38.19*
Social Withdrawal	.49	.11	4.43*	.41	.09	4.41*	.18	.08	2.43*	−.21	.14	−1.52
Affective flattening	.42	.11	3.68*	.44	.09	4.68*	.18	.08	2.30*	−.11	.14	−.76
Avolition	.36	.06	6.07*	.25	.05	5.15*	.14	.04	3.47*	−32	.07	−4.35*
	R^2 = .24 F(3,549) = 56.65, p < .001			R^2 = .23 F(3,549) = 55.52, p < .001			R^2 = .09 F(3,549) = 163.40, p < .001			R^2 = .27 F(3,550) = 56.65, p < .001		

*p < .001

using a k-means cluster procedure. The results are summarized in Table 5. Three clusters were identified, with the range of sample size for each cluster making for relatively equivalent sample sizes. Participants in cluster one (n = 227; Low risk) appeared to be at low risk for psychosis, depressive and anxiety symptoms, suicidal tendency and low mental wellbeing. The participants in cluster two (n = 116, High risk) appeared to have scored high on PLEs, depression and anxiety symptoms, suicidal tendency and have poor mental wellbeing. The participants in this cluster are, therefore, at heightened risk of psychosis, depressive, anxiety and suicidal tendency. The participants in the last cluster (n = 210, Normative) appeared to score low on the measures of PLEs, symptoms of depression and anxiety and suicidal tendency but relatively high on mental wellbeing. These individuals appear to be mentally and psychologically healthy. Univariate ANOVAs indicated that

Table 5. Characteristics of 3 groups of adolescents derived from cluster analysis of scores on study variables (n = 553).

Variables	1.Low risk (n = 227) M (SD)	2. High risk (n = 116) M (SD)	3. Normative (n = 210) M (SD)	F-test	Post-hoc
Positive CAPE Subscales					
Persecutory ideation	5.48 (2.04)	7.56 (2.30)	4.00 (2.06)	108.06**	**2 > 1**; 2 > 3**; 1 > 3***
Hallucinatory experiences	10.43 (3.64)	13.11 (4.10)	6.73 (3.61)	119.14**	**2 > 1**; 2 > 3**; 1 > 3****
Self – referential thinking	2.37 (1.39)	2.83 (1.49)	1.60 (1.24)	34.54**	**2 > 1*; 2 > 3**; 1 > 3****
Negative CAPE Subscales					
Social Withdrawal	3.25 (1.64)	4.17 (1.88)	1.38 (1.14)	146.81**	**2 > 1**; 2 > 3**; 1 > 3****
Affective flattening	3.00 (1.63)	4.27 (1.75)	1.33 (1.18)	154.44**	**2 > 1**; 2 > 3**; 1 > 3****
Avolition	6.91 (2.92)	10. 50 (3.64)	3.95 (2.50)	187.72**	**2 > 1**; 2 > 3**; 1 > 3****
Depressive symptoms	7.37 (3.74)	13. 72 (3.94)	3.95 (2.51)	267.97**	**2 > 1**; 2 > 3**; 1 > 3****
Anxiety symptoms	6.60 (3.19)	10.88 (3.27)	3. 29 (2.77)	233.57**	**2 > 1**; 2 > 3**; 1 > 3****
Suicidal Tendency	4.59 (2.78)	6.86 (4.25)	3.66 (1.76)	385.71**	**2 > 1**; 2 > 3**; 1 > 3****
Mental wellbeing	17. 30 (4.83)	12. 04 (5.11)	18. 10 (5.42)	57.00**	**1 > 2**; 3 > 2****

k-Means cluster analysis was used to generate clusters. Analysis of variance was used to compare means.

the clustered groups differed significantly in all the variables (all ps < .001). Post hoc analysis was done using Bonferroni procedure. Significantly, participants classified into the high-risk cluster reported more positive PLEs (e.g. persecution ideation), negative PLEs (e.g. social withdrawal), symptoms of depression and anxiety and poor mental wellbeing of those in low-risk and normative clusters. Participants in low-risk clusters also registered more PLEs, symptoms of depression and anxiety and poor mental wellbeing, relative to those in the normative cluster.

Further analysis revealed a significant association between cluster membership and substance use, χ^2 (2) = 24. 11, p < .001, indicating that participants who have used substances at least once in their lives are more likely to belong to high-risk cluster ($z = 4$, $p < .001$) and are less likely to be in normative cluster ($z = -2.3$, $p < .001$). Similar result was obtained for help seeking for mental health problems, χ^2 (2) = 24. 11, p < .001. Specifically, participants who have reportedly sought help for mental health problems at least once are more likely to belong to the high-risk cluster ($z = 4$, $p < .001$). Gender did not influence cluster membership (p ≥ .05).

Discussions

The current study has added to the emerging literature with respect to the prevalence and characteristics of PLEs among adolescents in Ghana. First, consistent with previous studies from Africa (Mamah et al., 2013; Ndetei et al., 2012; Okewole et al., 2015), this study found that the participants endorsed at least one PLEs. The prevalence of positive and negative PLEs ranged from 3.8% to 41.2% and 4.9% to 13% in the total sample, respectively. When segregated by sex, the prevalence of positive and negative PLEs ranges from 4.3% to 42.4% and 3% to 12.1% for boys, and for girls, the prevalence rate ranges from 5.3% to 40.4% and 4.7% to 13.7%, respectively. The findings reported here largely corroborate a previous study in Kenya where 45.5% of the youth reported lifetime positive PLEs (Mamah et al., 2012). It also supports the studies conducted in the United States where 10% to 50% of students who participated in the study reportedly experienced positive PLEs (Loewy et al., 2007; McGorry et al., 1995). However, the study contradicts the findings of studies conducted in Australia where hallucinations were reported by 8.4% of adolescents (Scott et al., 2009), as well as the findings of community and population-based studies that reported prevalence estimates between 5% and 12% (Johns et al., 2004; Saha et al., 2011).

The most occurring positive PLEs reported by the participants are those conveying the notion of grandiose thinking, similar to what has been reported by previous studies from Kenya (Mamah et al., 2012). For example, 41.2% of the participants endorsed the item indicating that they are destined for greatness, whereas 24.4% endorsed the experience of being a special or unusual person. Interestingly, the pattern of endorsement of grandiose thinking was largely similar for boys and girls. It appears that in Ghana and perhaps other African countries, people have the implicit assumption of being destined to be great. Stated alternatively, grandiosity may be a common phenomenon in societies like that of Ghana, where because of poverty and limited opportunities for growth, people expressed interest in and seemingly talked about becoming or being great (Stompe et al., 2006). This challenges the endorsement of grandiosity as an index of PLEs. This reasoning, however, remains a speculation in the absence of empirical studies. Moreover, because grandiosity and egocentrism are very common in adolescents, their endorsement could be higher than expected (McGlashan et al., 2010).

The study had found that the participants endorsed more positive PLEs (41.2%) than the negative PLEs (13%). This partly supports the age-long observation that positive PLEs are common in the general population, perhaps more than negative PLEs (Bentall et al., 2007). Another important observation relates to gender difference in the endorsement of PLEs. In general, with the exception of the positive experiences relating to 'conspiracy' and thought influenced by device" in which boys scored significantly higher, gender exhibited no statistically significant effect on the remaining positive PLEs and all the negative PLEs. The finding partly support and contradict existing studies from Africa (Mamah et al., 2012, 2016, 2013) and other western countries (Sharma et al., 1999). The

inconsistencies could be due to the observation that PLEs are normative in development and, therefore, could be experienced by both genders at the same or different magnitude (Mamah et al., 2012). The finding, therefore, raises the possibility that both males and females were exposed to the same or similar risk factors of PLEs, such as malnutrition, child labour, child maltreatment and abuse that are reportedly common in Ghana and other African countries at the same or similar magnitude (Adjorlolo et al., 2017; Mamah et al., 2016; Okewole et al., 2015; Owoso et al., 2018).

The pertinence of illuminating the relationship between psychosis and other mental health problems or emotional conditions has been well articulated (Kelleher et al., 2012; Subramaniam et al., 2014). Given the small attention granted to PLEs and other mental health problems in Africa (Sankoh et al., 2018; Ssewamala et al., 2018), the present study contributed to the literature by exploring the association between PLEs and depression and anxiety symptoms, suicidal tendency and mental wellbeing. First, it was observed that negative PLEs dimensions were significantly related to the symptoms of depression, anxiety and suicidal tendency. Second, with the exception of the 'Grandiose thinking' dimension, all the remaining PLEs dimensions correlated individually with mental health problems. More importantly, the 'Persecutory ideation' and 'Hallucinatory experiences' dimensions of the positive PLEs increased the risk for the experience of symptoms of depression, anxiety and suicidal tendency in a simultaneous multiple linear regression. The findings support existing studies that highlight hallucinations and delusions as essential and critical elements of PLEs (Birchwood et al., 2005). The overarching importance of hallucinatory experiences and delusions in PLEs can be explained by the two dominant yet opposing views in the literature. Indeed, the study design (i.e. cross-sectional) which does not permit the establishment of causality makes the two views attractive for discussion. For example, the findings support the theoretical position suggesting that misinterpretation of normal events as threatening could lead to distress, which in turn could contribute to the experience and vicious maintenance of depression, anxiety and other emotional problems (Morrison, 2001). It also feeds into the post-psychotic depression (PPD) framework in which it is theorized that depression and other emotional problems are products of psychotic experiences (Birchwood et al., 2005, 2007; Iqbal et al., 2000). In contrast, it could be argued that the symptoms of anxiety, depression and suicidal tendencies predate the development of PLEs (Garety et al., 2001; Hartley et al., 2013). As suggested by Bentall et al. (1994), delusions emanate from efforts to protect oneself from low self-esteem and depression that is due to differences in perceptions of the real and ideal self. Regardless of the theoretical stand, the study contributes to the fundamental issue resonating in the literature: PLEs and emotional problems are significantly correlated and that depression and other mental health problems are abound in the subclinical phase of psychosis (an der Heiden et al., 2016).

Research has established that PLEs exist in a continuum in the general population; however, there is also the possibility that the participants can be grouped be categorized into meaningful clusters (Mamah et al., 2013; Ndetei et al., 2012). Using cluster analysis, we identified three subgroups of participants based on their PLEs profile: low risk, high risk and normative. Participants in the high risk cluster significantly endorsed both negative and positive dimensions of PLEs and also reported more symptoms of depression, anxiety, suicidal tendency and poor mental wellbeing, relative to those in the normative cluster. Similar trend has been reported for participants in the low-risk cluster. The finding support previous categorization of participants from Kenya into predominantly two different clusters: normative and psychotic-risk, although the risk clusters were labelled differently (e.g. grandiose and hallucinatory) as a reflection of the content of the PLEs measures utilized (Mamah et al., 2012, 2016, 2013). In this study, more than half of the participants were classified into at-risk groups, contrary to the findings of studies from Kenya (Mamah et al., 2012, 2016, 2013). This difference could be accounted for by the varying demographic characteristics of the study participants (e.g. youth versus adolescents) and the use of different measures to assess for PLEs. For example, compared with adolescents, older participants are more likely to outgrow most of the experiences labelled as PLEs, a development that is likely to be reflected in low endorsement of items indexing PLEs (Murray & Jones, 2012).

Notwithstanding the foregoing, this and previous studies from Kenya and Nigeria have shown that the psychosis risk is present in African adolescents and/or youth. Although participants endorsing PLEs have a greater chance of developing future psychotic illness (Fusar-Poli et al., 2013), the findings reported in this study suggest that the risk is elevated for those who have used substance at least once in their lifetime and those who have sought help for mental health reasons. While the link between substance use and risk for psychotic disorders has been established (Crockford & Addington, 2017), seeking help for emotional problem could also be a crucial indicator to gauge an individual's mental health status in a context where help-seeking for mental health problems is generally poor. That is, people mostly seek help when their mental states and wellbeing have deteriorated or is fast deteriorating (Fosu, 1995). These individuals should, therefore, be given the needed attention and support, including providing a comprehensive mental health assessment.

Limitations and recommendations for future studies

The findings of the study should be examined in light of the following limitations. Although self-report measures are easy to administer, they do not provide any mechanisms to verify the participants' responses. It is therefore possible that the participants under or over-reported their experiences. The CAPE has not been validated in Ghana, raising the question of whether and the extent to which the underlying dimensions of PLEs indexed by the CAPE are represented in Ghanaian samples. Moreover, because the school environment somewhat protects against behavioural maladies and psychopathologies, the findings reported here may not be applicable to adolescents who drop out of school, as well as those with dissimilar background characteristics from those who participated in the study. The use of cross-sectional design has made it impossible to determine the socio-cultural factors contributing to PLEs.

Future studies, including longitudinal studies, that recruit relatively large sample size and address the aforementioned limitations would help increase understanding of PLEs in Ghana. Another topical issue for research is the distress associated with PLEs and the extent to which PLEs impair functionality. Furthermore, in view of the ongoing debate regarding the role of anxiety, depression and other emotional problems in the aetiology of psychosis (Bentall et al., 2007), it would be interesting and crucial to empirically examine whether anxiety and depressive symptoms represent separate experiences that occur along PLEs, or whether they are part of the intrinsic nature of PLEs.

Lastly, decades of research have revealed that sociocultural factors have significant influence on the expression and endorsement of different behavioural tendencies, including psychopathologies (Kirmayer & Ryder, 2016; Westermeyer & Janca, 1997). More specifically, the overt sociocultural differences between sub-Saharan African and Western cultures can generate variations in PLEs largely because the interpretation and meanings of events and experiences are largely influenced by cultural values, beliefs and attitudes. This observation highlights the sociocultural context in which PLEs manifest as an important consideration in discourses relating to PLEs, their clinical relevance and mitigation strategies (Bauer et al., 2011). In cultures, including those in Ghana, where supernatural and divine forces are invoked to account for unexplainable sensory experiences that occur in the form of vision or dream, these experiences may not necessarily be regarded as PLEs or interpreted as experiences that warrant support from mental health professionals (Larøi et al., 2014; Olugbile et al., 2009). Across African countries, there is a strong belief in the existence and activities of witches, ancestral spirits, sorcerers, and other demonic in relation to wreaking havocs such as sudden, unexplained traumatic events, including death and mental illness (Adjorlolo et al., 2018). Thus, for subscribers of the Christian faith in Ghana, one of the primary motives for going to church is to fortify themselves against the spirit of wickedness and demonology. This extreme orientation towards religion as an apposition to removable evil where sometimes family members and close relations are regarded as 'evils' and crucibles of wickedness could affect the relevance of PLEs items that convey the idea that someone has or is harbouring a clandestine motive to cause harm. Therefore, future studies examining whether the PLEs, as indexed by CAPE and other

measures, would be considered as a sign of current and future psychopathological behaviours to uncover developments that are unique to the African setting.

Conclusions

This study has provided initial insight into psychotic risk symptoms among adolescents in Ghana. In addition to the presence of both negative and positive PLEs in the sample, the study found that some adolescents are at heightened risk for developing future psychotic illness. The findings of this and previous studies from the international literature suggest instituting measures to identify and implement interventions for adolescents who may be at high risk for developing psychosis in the future. More importantly, the distress associated with mental health problems, including PLEs, do not only undermine the development trajectory of adolescents but could affect their academic performance and progression. The foregoing calls for a robust school-based agenda dedicated to screening and providing individualized support to adolescents scoring high on PLEs is warranted. This call is particularly important in Ghana and other African countries where mental health services are not an integral component of the school-based health services, or where there are no dedicated mental health services for adolescents in different settings.

Note

1. There were 10 administrative regions at the time of data collection in 2018. However, since 2019, 6 more regions have been created, increasing the total number of regions in Ghana to 16.

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No potential conflict of interest was reported by the author(s).

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Notes on contributors

Dr. Samuel Adjorlolo (PhD) is a senior lecturer and the Head of Department of Mental Health, School of Nursing and Midwifery, University of Ghana. Dr. Adjorlolo's research focuses on mental health, specifically child and adolescent mental health, forensic mental health, and maternal mental health. Dr. Adjorlolo is a board member of Anderson Care International (USA) and an Executive Officer of the Research and Grant Institute (REGIG), a non-governmental organization dedicated to research generation, dissemination, and utilization in Ghana.

Dr. Adote Anum is a clinical psychologist and lecturer at the University of Ghana, Legon, Ghana. He has a PhD from Brock University, St. Catharines, Ontario, Canada. His research covers adolescent mental health and cross-cultural factors in cognition. He is typically interested in explanatory factors in development and measurement of cognition and intelligencein children, particularly, differences among different socioeconomic groups.

ORCID

Samuel Adjorlolo http://orcid.org/0000-0001-9308-6031
Adote Anum http://orcid.org/0000-0001-8680-9203

References

Adewuya, A. O., Wright, K., & Njokanma, F. (2020). Psychotic like experiences among Nigerian school adolescents: Findings from the Lagos schools emotional and behavioral health survey. *Early Intervention in Psychiatry*. https://doi.org/org/10.1111/eip.13032

Adjorlolo, S. (2019). Generalised anxiety disorder in adolescents in Ghana: Examination of the psychometric properties of the generalised anxiety disorder-7 scale. *African Journal of Psychological Assessment*, *1*(1), 7. https://doi.org/10.4102/ajopa.v1i0.10

Adjorlolo, S., Abdul-Nasiru, I., Chan, H. C., & Bambi, L. E. (2018). Mental health professionals' attitudes toward offenders with mental illness (insanity acquittees) in Ghana. *International Journal of Offender Therapy and Comparative Criminology*, *62*(3), 629–654. https://doi.org/10.1177/0306624X16666802

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*(1), 9–17. https://doi.org/10.1002/ijop.12248

Adjorlolo, S., Anum, A., & Amin, J. M. (2020). Validation of the Suicidal behaviors questionnaire-revised in adolescents in Ghana. *Journal of Mental Health*, 1–7. https://doi.org/10.1080/09638237.2020.1739239

Adjorlolo, S., & Setordzi, M. (In press). Psychosis in Adolescents in Africa: A Scoping Review for Current Understanding and Future Directions. *Cogent Psychology*.

an der Heiden, W., Leber, A., & Häfner, H. (2016). Negative symptoms and their association with depressive symptoms in the long-term course of schizophrenia. *European Archives of Psychiatry and Clinical Neuroscience*, *266*(5), 387–396. https://doi.org/10.1007/s00406-016-0697-2

Anum, A., Adjorlolo, S., & Kugbey, N. (2019). Depressive symptomatology in adolescents in Ghana: Examination of psychometric properties of the patient health questionnaire-9. *Journal of Affective Disorders*, *256*, 213–218. https://doi.org/10.1016/j.jad.2019.06.007

Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology*, *8*(1), 19–32. https://doi.org/10.1080/1364557032000119616

Barragan, M., Laurens, K., Navarro, J., & Obiols, J. (2011). Psychotic-like experiences and depressive symptoms in a community sample of adolescents. *European Psychiatry*, *26*(6), 396–401. https://doi.org/10.1016/j.eurpsy.2010.12.007

Bauer, S. M., Schanda, H., Karakula, H., Olajossy-Hilkesberger, L., Rudaleviciene, P., Okribelashvili, N., Ritter, K., Gscheider, S., Ritter, K., Stompe, T., & Chaudhry, H. R. (2011). Culture and the prevalence of hallucinations in schizophrenia. *Comprehensive Psychiatry*, *52*(3), 319–325. https://doi.org/10.1016/j.comppsych.2010.06.008

Bentall, R. P., Fernyhough, C., Morrison, A. P., Lewis, S., & Corcoran, R. (2007). Prospects for a cognitive-developmental account of psychotic experiences. *British Journal of Clinical Psychology*, *46*(2), 155–173. https://doi.org/10.1348/014466506X123011

Bentall, R. P., Kinderman, P., & Kaney, S. (1994). The self, attributional processes and abnormal beliefs: Towards a model of persecutory delusions. *Behaviour Research and Therapy*, *32*(3), 331–341. https://doi.org/10.1016/0005-7967(94)90131-7

Birchwood, M., Iqbal, Z., & Upthegrove, R. (2005). Psychological pathways to depression in schizophrenia. *European Archives of Psychiatry and Clinical Neuroscience*, *255*(3), 202–212. https://doi.org/10.1007/s00406-005-0588-4

Birchwood, M., Trower, P., Brunet, K., Gilbert, P., Iqbal, Z., & Jackson, C. (2007). Social anxiety and the shame of psychosis: A study in first episode psychosis. *Behaviour Research and Therapy*, *45*(5), 1025–1037. https://doi.org/10.1016/j.brat.2006.07.011

Burns, J. K., & Tomita, A. (2015). Traditional and religious healers in the pathway to care for people with mental disorders in Africa: A systematic review and meta-analysis. *Social Psychiatry and Psychiatric Epidemiology*, *50*(6), 867–877. https://doi.org/10.1007/s00127-014-0989-7

Crockford, D., & Addington, D. (2017). Canadian schizophrenia guidelines: Schizophrenia and other psychotic disorders with coexisting substance use disorders. *The Canadian Journal of Psychiatry*, *62*(9), 624–634. https://doi.org/10.1177/0706743717720196

Dolphin, L., Dooley, B., & Fitzgerald, A. (2015). Prevalence and correlates of psychotic like experiences in a nationally representative community sample of adolescents in Ireland. *Schizophrenia Research*, *169*(1–3), 241–247. https://doi.org/10.1016/j.schres.2015.09.005

Fekih-Romdhane, F., Sassi, H., Ennaifer, S., Tira, S., & Cheour, M. (2020). Prevalence and correlates of psychotic like experiences in a large community sample of young adults in Tunisia. *Community Mental Health Journal 56*, 991-1003. https://doi.org/10.1007/s10597-019-00542-1

Fosu, G. B. (1995). Women's orientation toward help-seeking for mental disorders. *Social Science & Medicine*, *40*(8), 1029–1040. https://doi.org/10.1016/0277-9536(94)00170-X

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*(3), 220–229. https://doi.org/10.1001/archgenpsychiatry.2011.1472

Fusar-Poli, P., Borgwardt, S., Bechdolf, A., Addington, J., Riecher-Rössler, A., Schultze-Lutter, F., Seidman, L. J., Ruhrmann, S., Seidman, L. J., Valmaggia, L., Cannon, T., Velthorst, E., De Haan, L., Cornblatt, B., Bonoldi, I., Birchwood, M., McGlashan, T., Carpenter, W., McGorry, P., Yung, A., & Keshavan, M. (2013). The psychosis high-risk state: A comprehensive state-of-the-art review. *JAMA Psychiatry*, *70*(1), 107–120. https://doi.org/10.1001/jamapsychiatry.2013.269

Garety, P. A., Kuipers, E., Fowler, D., Freeman, D., & Bebbington, P. (2001). A cognitive model of the positive symptoms of psychosis. *Psychological Medicine*, *31*(2), 189–195. https://doi.org/10.1017/S0033291701003312

Hartley, S., Barrowclough, C., & Haddock, G. (2013). Anxiety and depression in psychosis: A systematic review of associations with positive psychotic symptoms. *Acta Psychiatrica Scandinavica*, *128*(5), 327–346. https://doi.org/10.1111/acps.12080

Hielscher, E., Connell, M., Lawrence, D., Zubrick, S. R., Hafekost, J., & Scott, J. G. (2018). Prevalence and correlates of psychotic experiences in a nationally representative sample of Australian adolescents. *Australian & New Zealand Journal of Psychiatry*, *52*(8), 768–781. https://doi.org/10.1177/0004867418785036

Hodgekins, J., Lower, R., Wilson, J., Cole, H., Ugochukwu, U., Maxwell, S., & Fowler, D. (2018). Clinician-rated and self-reported psychotic-like experiences in individuals accessing a specialist youth mental health service. *British Journal of Clinical Psychology*, *57*(3), 367–381. https://doi.org/10.1111/bjc.12178

Ibrahim, A., Hor, S., Bahar, O. S., Dwomoh, D., McKay, M. M., Esena, R. K., & Agyepong, I. A. (2016). Pathways to psychiatric care for mental disorders: A retrospective study of patients seeking mental health services at a public psychiatric facility in Ghana. *International Journal of Mental Health Systems*, *10*(1), 63. https://doi.org/10.1186/s13033-016-0095-1

Iqbal, Z., Birchwood, M., Chadwick, P., & Trower, P. (2000). Cognitive approach to depression and suicidal thinking in psychosis: 2. Testing the validity of a social ranking model. *The British Journal of Psychiatry*, *177*(6), 522–528. https://doi.org/10.1192/bjp.177.6.522

Johns, L. C., Cannon, M., Singleton, N., Murray, R. M., Farrell, M., Brugha, T., Bebbington, P., Jenkins, R., & Meltzer, H. (2004). Prevalence and correlates of self-reported psychotic symptoms in the British population. *The British Journal of Psychiatry*, *185*(4), 298–305. https://doi.org/10.1192/bjp.185.4.298

Kelleher, I., Keeley, H., Corcoran, P., Lynch, F., Fitzpatrick, C., Devlin, N., Harley, M., Clarke, M. C., Harley, M., Arseneault, L., Wasserman, C., Carli, V., Sarchiapone, M., Hoven, C., Wasserman, D., Cannon, M., & Molloy, C. (2012). Clinicopathological significance of psychotic experiences in non-psychotic young people: Evidence from four population-based studies. *The British Journal of Psychiatry*, *201*(1), 26–32. https://doi.org/10.1192/bjp.bp.111.101543

Kirmayer, L. J., & Ryder, A. G. (2016). Culture and psychopathology. *Current Opinion in Psychology*, *8*, 143–148. https://doi.org/10.1016/j.copsyc.2015.10.020

Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine*, *16*(9), 606–613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x

Larøi, F., Luhrmann, T. M., Bell, V., Christian, W. A., Jr, Deshpande, S., Fernyhough, C., … Woods, A. (2014). Culture and hallucinations: Overview and future directions. *Schizophrenia*. *Bulletin*, *40*(Suppl_4), S213–S220. https://doi.org/10.1093/schbul/sbu012

Loewy, R. L., Johnson, J. K., & Cannon, T. D. (2007). Self-report of attenuated psychotic experiences in a college population. *Schizophrenia Research*, *93*(1–3), 144–151. https://doi.org/10.1016/j.schres.2007.02.010

Mamah, D., Mbwayo, A., Mutiso, V., Barch, D. M., Constantino, J. N., Nsofor, T., Khasakhala, L., & Ndetei, D. M. (2012). A survey of psychosis risk symptoms in Kenya. *Comprehensive Psychiatry*, *53*(5), 516–524. https://doi.org/10.1016/j.comppsych.2011.08.003

Mamah, D., Musau, A., Mutiso, V. N., Owoso, A., Abdallah, A. B., Cottler, L. B., Striley, C. W., Walker, E. F., & Ndetei, D. M. (2016). Characterizing psychosis risk traits in Africa: A longitudinal study of Kenyan adolescents. *Schizophrenia Research*, *176*(2–3), 340–348. https://doi.org/10.1016/j.schres.2016.08.004

Mamah, D., Owoso, A., Mbwayo, A. W., Mutiso, V. N., Muriungi, S. K., Khasakhala, L. I., Barch, D. M., & Ndetei, D. M. (2013). Classes of psychotic experiences in Kenyan children and adolescents. *Child Psychiatry and Human Development*, *44*(3), 452–459. https://doi.org/10.1007/s10578-012-0339-5

Mamah, D., Owoso, A., Sheffield, J. M., & Bayer, C. (2014). The WERCAP screen and the WERC stress screen: Psychometrics of self-rated instruments for assessing bipolar and psychotic disorder risk and perceived stress burden. *Comprehensive Psychiatry*, *55*(7), 1757–1771. https://doi.org/10.1016/j.comppsych.2014.07.004

Mark, W., & Toulopoulou, T. (2016). Psychometric properties of "community assessment of psychic experiences": Review and meta-analyses. *Schizophrenia Bulletin*, *42*(1), 34–44. https://doi.org/10.1093/schbul/sbv088

McGlashan, T., Walsh, B., & Woods, S. (2010). *The psychosis-risk syndrome: Handbook for diagnosis and follow-up*. Oxford University Press.

McGorry, P., McFarlane, C., Patton, G., Bell, R., Hibbert, M., Jackson, H., & Bowes, G. (1995). The prevalence of prodromal features of schizophrenia in adolescence: A preliminary survey. *Acta Psychiatrica Scandinavica*, *92*(4), 241–249. https://doi.org/10.1111/j.1600-0447.1995.tb09577.x

Morrison, A. P. (2001). The interpretation of intrusions in psychosis: An integrative cognitive approach to hallucinations and delusions. *Behavioural and Cognitive Psychotherapy*, *29*(3), 257–276. https://doi.org/10.1017/S1352465801003010

Murray, G. K., & Jones, P. B. (2012). Psychotic symptoms in young people without psychotic illness: Mechanisms and meaning. *The British Journal of Psychiatry*, *201*(1), 4–6. https://doi.org/10.1192/bjp.bp.111.107789

Ndetei, D. M., Muriungi, S. K., Owoso, A., Mutiso, V. N., Mbwayo, A. W., Khasakhala, L. I., Barch, D. M., & Mamah, D. (2012). Prevalence and characteristics of psychotic-like experiences in Kenyan youth. *Psychiatry Research*, *196*(2–3), 235–242. https://doi.org/10.1016/j.psychres.2011.12.053

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 and Adolescent Mental Health*, *27*(3), 215–225. https://doi.org/10.2989/17280583.2015.1125906

Olugbile, O., Zachariah, M., Kuyinu, A., Coker, A., Ojo, O., & Isichei, B. (2009). Yoruba world view and the nature of psychotic illness. *African Journal of Psychiatry*, *12*, 149-156. https://doi.org/10.4314/ajpsy.v12i2.43733

Osman, A., Bagge, C. L., Gutierrez, P. M., Konick, L. C., Kopper, B. A., & Barrios, F. X. (2001). The Suicidal Behaviors Questionnaire-Revised (SBQ-R): Validation with clinical and nonclinical samples. *Assessment*, *8*(4), 443–454. https://doi.org/10.1177/107319110100800409

Owoso, A., Jansen, S., Ndetei, D., Musau, A., Mutiso, V., Mudenge, C., Ngirababyeyi, A., Gasovya, A., & Mamah, D. (2018). A comparative study of psychotic and affective symptoms in Rwandan and Kenyan students. *Epidemiology and Psychiatric Sciences*, *27*(2), 157–168. https://doi.org/10.1017/S2045796016001074

Saha, S., Scott, J. G., Varghese, D., & McGrath, J. J. (2011). The association between general psychological distress and delusional-like experiences: A large population-based study. *Schizophrenia Research*, *127*(1–3), 246–251. https://doi.org/10.1016/j.schres.2010.12.012

Sankoh, O., Sevalie, S., & Weston, M. (2018). Mental health in Africa. *The Lancet Global Health*, *6*(9), e954. https://doi.org/10.1016/S2214-109X(18)30303-6

Scott, J., Martin, G., Bor, W., Sawyer, M., Clark, J., & McGrath, J. (2009). The prevalence and correlates of hallucinations in Australian adolescents: Results from a national survey. *Schizophrenia Research*, *107*(2–3), 179–185. https://doi.org/10.1016/j.schres.2008.11.002

Sharma, R. P., Dowd, S. M., & Janicak, P. G. (1999). Hallucinations in the acute schizophrenic-type psychosis: Effects of gender and age of illness onset. *Schizophrenia Research*, *37*(1), 91–95. https://doi.org/10.1016/S0920-9964(98)00144-3

Spitzer, R. L., Kroenke, K., Williams, J. B., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine*, *166*(10), 1092–1097. https://doi.org/10.1001/archinte.166.10.1092

Ssewamala, F. M., Bahar, O. S., McKay, M. M., Hoagwood, K., Huang, K.-Y., & Pringle, B. (2018). Strengthening mental health and research training in Sub-Saharan Africa (SMART Africa): Uganda study protocol. *Trials*, *19*(1), 423. https://doi.org/10.1186/s13063-018-2751-z

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*(10), 1333–1341. https://doi.org/10.1111/j.1360-0443.2004.00806.x

Stompe, T., Karakula, H., Rudalevičiene, P., Okribelashvili, N., Chaudhry, H. R., Idemudia, E., & Gscheider, S. (2006). The pathoplastic effect of culture on psychotic symptoms in schizophrenia. *World Cultural Psychiatry Research Review*, *1*(3/4), 157–163. https://www.worldculturalpsychiatry.org/wp-content/uploads/2019/08/10-Pathoplastic-V01N3.pdf

Subramaniam, M., Abdin, E., Vaingankar, J., Verma, S., & Chong, S. (2014). Latent structure of psychosis in the general population: Results from the Singapore Mental Health Study. *Psychological Medicine*, *44*(1), 51–60. https://doi.org/10.1017/S0033291713000688

Topp, C. W., Østergaard, S. D., Søndergaard, S., & Bech, P. (2015). The WHO-5 well-being index: A systematic review of the literature. *Psychotherapy and Psychosomatics*, *84*(3), 167–176. https://doi.org/10.1159/000376585

Westermeyer, J., & Janca, A. (1997). Language, culture and psychopathology: Conceptual and methodological issues. *Transcultural Psychiatry*, *34*(3), 291–311. https://doi.org/10.1177/136346159703400301

Zavos, H. M., Freeman, D., Haworth, C. M., McGuire, P., Plomin, R., Cardno, A. G., & Ronald, A. (2014). Consistent etiology of severe, frequent psychotic experiences and milder, less frequent manifestations: A twin study of specific psychotic experiences in adolescence. *JAMA Psychiatry*, *71*(9), 1049–1057. https://doi.org/10.1001/jamapsychiatry.2014.994

Ziermans, T. (2013). Working memory capacity and psychotic-like experiences in a general population sample of adolescents and young adults. *Frontiers in Psychiatry*, *4*, 161. https://doi.org/10.3389/fpsyt.2013.00161