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CLINICAL PSYCHOLOGY | REVIEW ARTICLE

Psychosis in adolescents in Africa: A scoping review for current understanding and future directions

Samuel Adjorlolo^{1,2*} and Mawuko Setordzi²

Abstract: Research into psychosis in adolescents is important in Africa in view of the high burden of mental disorders and prevalence of risk factors such as child maltreatment implicated in the etiology of mental health problems. In this paper, we synthesized the existing literature on psychosis in adolescents in Africa to understand current developments and chart a pathway for robust research agenda on psychosis. A search was conducted on electronic databases, including Africa Index Medicus and Scopus and selected journals for papers. Google, Google Scholar, reference list of papers selected for inclusion in the review and study authors were contacted for additional papers and grey literature. A total of 11 articles were included in this review and discussed under the following thematic areas: (1) assessment of psychosis; (2) prevalence of psychosis; (3) demographic/psychosocial correlates of psychosis; (4) clinical correlates of psychosis; (5) substance misuse and psychosis; and (6) psychosis literacy and help-seeking behavior. A pathway for research into psychosis centering on the representation of psychosis, risk and protective factors, management/treatment of psychosis and aforementioned thematic areas was proffered.

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PUBLIC INTEREST STATEMENT

Psychosis is a major mental disorder that is associated with disorganized behaviors and thought processes. Adverse environmental factors such as child abuse, conflict and hunger that are highly prevalent in African countries increase the risk of psychosis. Studies have shown that the period of adolescence confers a special vulnerability for psychosis and psychotic like experiences (PLEs). Despite the growing interest in psychosis research in adolescents in Africa, no study has synthesized the literature to provide a comprehensive and one-stop understanding of developments in the field. This review was also undertaking to chart a pathway for a research agenda. This review identified and integrated 11 studies on psychosis among adolescents. The review revealed that research is needed to investigate psychosis in adolescents more broadly. Of interest are the representation or manifestation of psychosis, risk and protective factors and management/treatment of psychosis.

Subjects: Mental Health;; Child & Adolescent Psychiatry & Clinical Psychology; Mental Health Research; Psychological Disorders

Keywords: Psychosis; Schizophrenia; adolescents; review; Africa

0.1. Introduction

Psychosis is a mental disorder characterized by a range of cognitive, motor and behavioral dysfunctions, such as delusions, hallucinations, disorganized thought and speech and negative symptoms, such as anhedonia. The symptoms of psychosis can occur in a range of disorders such as schizophrenia, mood disorders and substance misuse (Gaebel & Zielasek, 2015). Globally, psychosis has received significant research and professional attention mainly due to its debilitating nature, poor prognosis and reduced remission (Saha et al., 2007; Walker et al., 2015), as well as association with behavioral maladies, such as suicide and depressive symptoms (Kelleher et al., 2012; Palmer et al., 2005; Subramaniam et al., 2014). Psychosis is often diagnosed in young adulthood; however, it can manifest first in adolescence and sometimes in childhood as psychotic-like experiences (PLEs; Zavos et al., 2014). PLEs are subclinical psychotic symptoms that occur outside the context of sleep disturbance or are unrelated to drug use (Van Os et al., 2009). Among some individuals, PLEs can be a marker for future diagnosis with psychotic disorders (Fusar-Poli et al., 2013; Van Os et al., 2009). Therefore, studies focusing on PLEs are as important as those on patients diagnosed with psychotic illness. Understanding the nature and characteristics of PLEs would help in identifying at-risk individuals who would benefit from early interventions to improve their mental well-being. The current review is focused on integrating the literature on psychosis in adolescents in Africa. Psychosis is defined broadly to include clinically diagnosed psychotic disorders and PLEs.

Epidemiological studies have suggested that the period of adolescence confers a special vulnerability for psychosis and PLEs, relative to adulthood (Linscott & Van Os, 2013). The prevalence and burden of psychosis in adolescence have been attributed to the ontogenetic or progressive structural brain changes (Benes, 2003; Ziermans et al., 2012). For example, structural and functional studies of brain characteristics in psychosis suggest strongly that the normal adolescent neuromaturational processes may go awry, thereby increasing the risk for the emergence of psychotic syndromes (Holtzman et al., 2013). The diathesis stress model (Kendler, 2020) expanded on the above, noting that, biological predispositions are only meaningful when they interact with harmful environmental stressors. That is, very potent environmental factors or stressors have significant impact on the maturing brain and can exacerbate the risk of psychosis among persons with genetic or biological predispositions. Compared with in adult, adolescents diagnosed with psychosis tend to suffer from several adverse outcomes, including lower premorbid functioning, more hospitalizations, poorer cognitive and executive functioning, and poor prognosis (Patel et al., 2020). Studies targeting children, adolescents and young adults are extremely important as they offer a unique opportunity to optimize interventions to promote better functional outcomes (Larsen et al., 2007; Ronald et al., 2013; Welsh & Tiffin, 2014).

The Global Burden of Disease Study identified mental and substance use disorders as among the leading causes of disability-associated burden in Africa. For example, compared with the global rate of 23%, mental and substance use disorders accounted for 19% of years lived with a disability in sub-Saharan Africa (Charlson et al., 2014). Major mental health disorders such as depression, bipolar disorder and psychosis are projected to increase the burden of mental health problems by 2050 (Charlson et al., 2014). However, scholarly efforts over the years have focused overwhelming on depression (Sankoh et al., 2018). Meanwhile, in most African settings, mental illness appeared to be conceptualized within psychotic symptoms framework (Ventevogel et al., 2013) whereby a “truly” mentally ill person is expected to exhibit psychotic symptoms such as hallucinatory and delusional tendencies, disorganized and bizarre behaviors, and/or wander aimlessly on the street or public space (Adjorlolo, 2016; Ventevogel et al., 2013). Research into psychosis is, therefore, extremely important in Africa settings to underscore illness representation, treatment modalities and treatment outcomes. The evidence on the nexus between adversities and psychosis from high income countries (Davies et al., 2020; Oliver et al., 2020; Rodrigues & Anderson, 2017) provides

suitable justification for research on psychosis in a continent riddled with adverse environmental factors. Notable among them are malnutrition, child labor, child maltreatment and abuse, physical conditions such as HIV, violence/war/conflict (Owoso et al., 2018), traumatic brain injury, poor antenatal/obstetric history (Okewole et al., 2016), childhood developmental abnormalities and early infections (Messias et al., 2007). Current developments, indeed, suggest that there is a growing interest to establish a research agenda in psychosis in Africa to support evidence-based, culturally sensitive decision-making and discussions bothering the detection/assessment and prevention of psychosis through public health intervention problems. For instance, research on assessment (Mamah et al., 2014; Owoso et al., 2014) and prevalence of psychosis (Mamah et al., 2013; Okewole et al., 2015) have been pursued vigorously, recently.

However, a major gap relates to the lack of studies synthesizing the literature on psychosis in adolescents in Africa. The growing literature is scattered across different journal and publication outlets, making it extremely difficult to have a comprehensive and one-stop understanding of developments in the field. This development has largely hampered discussions on psychosis and adolescents in Africa, including prescribing areas where research may be needed most. Efforts to chart a pathway for a robust research agenda on psychosis in adolescents in Africa and as well as provide insight into the directions and values of undertaking systematic reviews and meta-analysis have suffered from a lack of integrated review of research on psychosis. In fulfilling this gap, the current review is aimed at synthesizing the existing literature on psychosis in adolescents in Africa.

1. Methodology

A scoping review was conducted to take stock of the literature on psychosis in adolescents in Africa. In scoping review, empirical studies focusing on thematically similar research areas, such as psychosis are integrated, regardless of the research designs used (Cosgrave et al., 2019). A scoping review is a generic synthesis of studies of varied designs to proffer broader descriptions and analysis of developments in a particular area of enquiry. It is deemed appropriate for the current project because no study has reviewed and integrated the literature on psychosis in adolescents in Africa to provide directions for systematic reviews and/or meta-analysis. The current review is situated in the methodological framework proposed by Arksey and O'Malley (2005) for undertaking scoping reviews; identifying relevant studies, selecting and collating studies, summarizing and reporting the results. To proceed, we followed the PRISMA guidelines for conducting reviews.

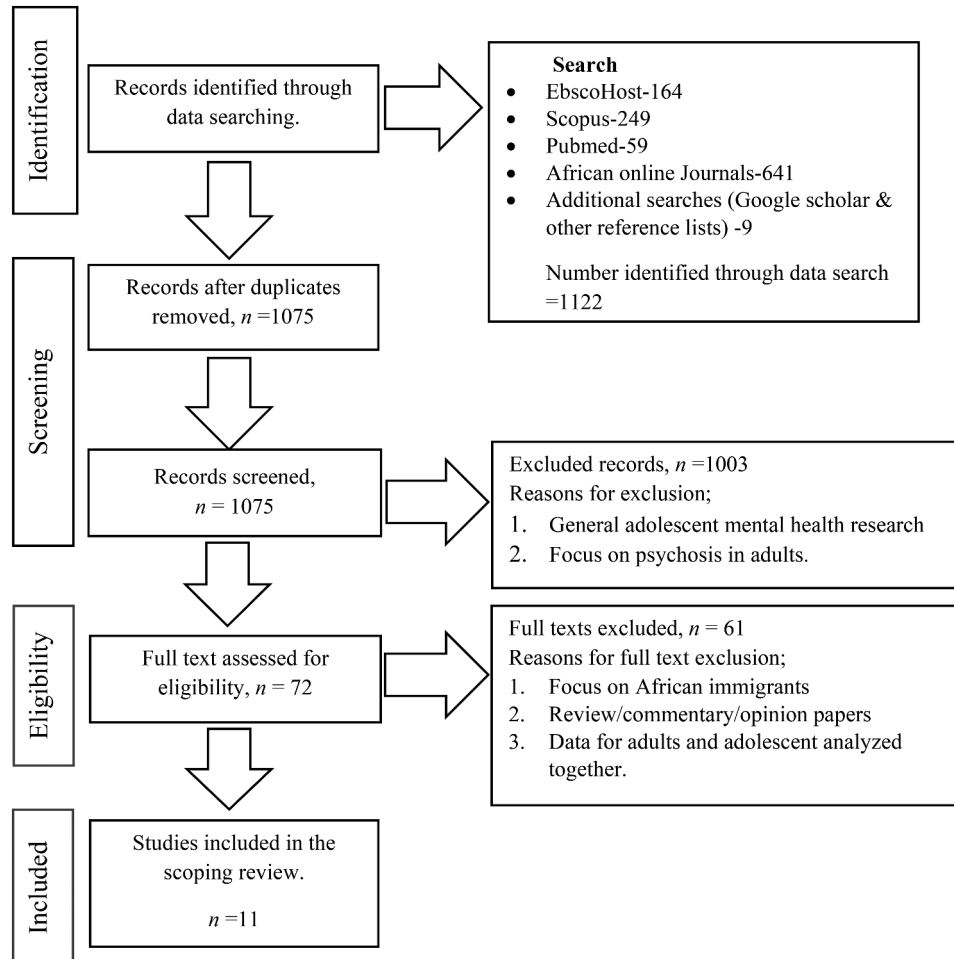
1.1. Identifying relevant studies

Different strategies were used to identify relevant papers. First, a search was conducted on relevant electronic databases, namely Africa Index Medicus, Scopus, EBSCOHost, CINAHL and PubMed. The search terms used were “psychosis”, schizop*, “schizoaffective”, psycho*, hallucinat*, delusion*, paranoi* AND “adolescents” OR “adolescence” OR “teens” OR “teenagers” OR “youth” AND “Africa”. Second, journals dedicated to publishing African scholarship on mental health were searched. These include the *Southern African Journal of Child and Adolescent Mental Health*, *South African Journal of Psychology* and *African Journal of Psychiatry*. Additionally, we searched Google and Google Scholar engines for both grey and published literature. The reference lists of papers selected for inclusion were also searched for additional papers. Lastly, we contacted individual authors who have published in psychosis among adolescence in Africa for additional literature. Due to technical and financial constraints, the search was restricted to papers published in English up to September 2019 and available online.

1.2. Study selection

The papers were subjected to a predetermined inclusion criterion, i.e., papers reporting on psychosis in adolescents/youth in Africa: The following exclusion criteria were applied; (1) language other than English, (2) publication not based on findings from participants recruited from Africa (e.g., African immigrants) and (3) publications in which data on adolescents and adults were aggregated and analyzed together. The titles and abstracts of the identified papers were screened by the authors during the initial search. Papers selected for inclusion were further reviewed, with

Figure 1. Prisma flow diagram of database search.



a focus on the age of the participants and settings where the studies were conducted. Disagreements relating to the inclusion of papers were resolved via soliciting the opinion of a third party who was a professor of mental health and/or consensus.

2. RESULTS

A summary of the search and screening processes is illustrated in Figure 1. In all, a total of 11 papers were deemed appropriate for the study. The characteristics and major findings of the studies are summarized in Table 1. The included papers were further examined to determine if they could be grouped into meaningful themes based on the principal areas of investigations. This was done by critically reviewing mostly the heading, background, research objectives/goals and methodology sections of the papers included in the review. The themes shared by at least two papers were retained for inclusion in this review. The following themes were identified: (1) assessment of psychosis; (2) prevalence of psychosis; (3) demographic correlates of psychosis; (4) clinical correlates of psychosis; (5) substance misuse and psychosis; and (6) psychosis literacy and help-seeking behavior.

2.1. Assessment of psychotic experience/diagnosis of psychosis

In assessing psychosis, clinicians or researchers often use interview guides and self-report measures formulated along the major diagnostic manuals (i.e., DSM and ICD). Because majority of the existing assessment measures were developed in Western countries, there are concerns about their appropriateness and usefulness when administered on non-Western samples (Moleiro, 2018). The inconsistencies regarding the cross-cultural application of screening and/or diagnostic measures highlight

Table 1. Summary of studies included in the review

Author/Year	Country	Sample Characteristics & size	Category of sample	Psychosis Measure	Main Findings
Paruk et al. (2009)	South Africa	70 adolescents aged 12–18 years old; 80% males	Clinical	Clinically diagnosed with psychosis	* More than half used substance. *Common diagnoses were schizophrenia and schizophreniform disorders. *85.7% treated with first-generation antipsychotic
Mamdh et al. (2012)	Kenya	2,758 youth aged 14–29 years old; 1,628 males.	Community/household	Modified version of PRIME-Screen	*Overall prevalence of psychosis was 45.5% *Persecutory ideation and auditory hallucinations were severe in females. *Participants clustered into 4 groups: Normative (55%); high symptom (11%), intermediate symptom (19%) and grandiose symptom (15%).
Ndetei et al. (2012).	Kenya	2,963 adolescents 1,513 males	School	Composite International Diagnostic Interview, version	* Prevalence of psychotic experience was 23% *Three categories of participants: non-psychotic class (83.8%), a predominantly hallucinatory class (“type I PLE”; 12.7%), and 3) a multiple symptom class (“type II PLE”; 3.5%).
Paruk et al. (2013)	South Africa	45 adolescents aged 12–18 years; 39 (86.6%) males	Clinical	Clinically diagnosed with psychosis	*Cannabis use was common. * No gender difference in cannabis use

(Continued)

Table1. (Continued)

Mamdh et al. (2013)	Kenya	1,971 adolescents aged 19 years or less; 938 males	School	Composite International Diagnostic Interview, version 3.0	<p>*Prevalence of psychosis was 22.1%.</p> <p>*Psychotic experiences more common in males than females.</p> <p>*Participants classified into 3 groups: Normative class (83.3%), predominately. Hallucinatory class (Type 1 psychosis: 9.6%), and a panpsychotic class (Type 2 psychosis: 7.2%).</p>
Owoso et al. (2014).	Kenya	182 participants aged 14–29 years; 108 males.	Community/household	Modified version of PRIME-Screen & STPS.	<p>* mPRIME had a sensitivity of 40% and a specificity of 64.8%</p>
Paruk et al. (2015)	South Africa	45 adolescents with first episode EOP aged 10–18 years; 31 males	Clinical	Clinically diagnosed with psychosis	<p>* More than half reported cannabis misuse</p> <p>*Poor recognition of prodromal in about half of participants</p> <p>*Males significantly abused cannabis than females.</p> <p>* Mean duration of untreated psychosis (DUP) was 27.2 weeks</p>
Okewole et al. (2015).	Nigeria	508 adolescents 37% males	School	Prodromal Questionnaire-Brief Version	<p>* Prevalence of prodromal symptoms was 20.9%</p> <p>*Females reported more prodromal symptoms.</p> <p>* Major life event, being bullied or abused were associated with prodromal symptoms.</p>

(Continued)

Table1. (Continued)

Mamah et al. (2016)	Kenya	330 adolescents aged 14–20 years; 116 males	School	SIPS & WERCAP	* Psychiatric comorbidities and increased psychosocial stress were common in participants identified as high risk for psychosis. * Conversion rate from high risk to psychotic disorders was 3.8%
Paruk et al. (2017)	South Africa	45 adolescents with first episode EOP aged 10–18 years; 31 males	Clinical	Clinically diagnosed with psychosis	*84% were diagnosed with schizophrenia spectrum psychotic disorder.
Paruk et al., 2018	South Africa	45 adolescents with first episode EOP	Clinical	Clinically diagnosed with psychosis	*EOP adolescents came from disadvantaged demographic background. * EOP adolescents used cannabis frequently than non-EOP adolescents

EOP = Early-onset psychosis; SIPS = Structured interview of psychosis-risk syndromes; WERCAP = Washington early recognition center affectivity and psychosis

the need to examine the cultural appropriateness of measures used to assess psychosis and/PLEs in Africa (Adjorlolo, 2018; Adjorlolo & Watt, 2019). We examined all the eleven (11) studies included in this review to understand how psychosis or psychotic experience was measured. It was observed that 45% ($n = 5$) of the studies gathered data on participants diagnosed with psychosis at a local health facility (Paruk et al., 2013, 2015, 2017, 2018, 2009). There was, however, no information regarding the assessment modalities and data sources that formed the basis of the clinical diagnosis. Studies ($n = 6$; 55%) that recruited participants in the community or school settings (Mamah et al., 2012, 2016, 2013; Ndeti et al., 2012; Okewole et al., 2015; Owoso et al., 2014) used the following measures to assess for psychotic experience; (1) Structured Interview of Psychosis-risk Syndrome (Miller et al., 2003); (2) Composite International Diagnostic Interview (CIDI); (3) Washington Early Recognition Center Affectivity and Psychosis (WERCAP) screen, (4) Prevention through Risk Identification, Management, and Education (PRIME) and Prodromal Questionnaire-Brief Version (Loewy et al., 2011). Of these, only the WERCAP and PRIME have been subjected to psychometric properties examination in Kenya. Owoso et al. (2014) found that the sensitivity (40%) and specificity (68%) of a modified version (mPRIME) of the 12-item PRIME performed poorly in screening for psychotic experience in Kenyan sample. The psychosis facet of the WERCAP, on the other hand, exhibited excellent psychometric properties, with Cronbach's Alpha of .92, sensitivity of 89% and specificity of 100% at the optimal cut-point of >30 (Mamah et al., 2014).

2.2. Prevalence of psychotic experience and psychosis

Insight into the prevalence of psychosis is extremely important in the decision to establish and invest in a robust research agenda for psychosis. Only three studies (27%) included in this review investigated the prevalence of psychosis. In a poor, slum community in Kenya, the prevalence of PLEs was 45%, with males (46.3% out of 1,628) and females (44.8% out of 1,064) reporting similar prevalence rates (Mamah et al., 2012). The authors further classified the participants into four groups based on their endorsement of psychotic symptoms: Normative (55%), high symptom (11%), intermediate symptom (19%), and grandiose symptom (15%). Another study involving 1, 971 students from Kenya found a lifetime prevalence of 22.1%, with 16.3% reporting that the psychotic experience was unrelated to sleep disturbance or drug use (Mamah et al., 2013). In this sample, the prevalence of specific psychotic experiences ranges from 15.3% (unrelated to sleep or drug = 9.7%) for visual hallucinations to 10.1% (unrelated to sleep or drug = 7.3%) for persecutory ideation. A gendered analysis of the specific psychotic experiences revealed that males reported significantly more visual hallucination, mind control, referential thinking and persecutory ideation than their female counterpart. Based on the pattern of endorsement of psychotic symptoms, the participants were classified into normative class (83.3%), a predominantly hallucinatory class (Type 1 psychosis: 9.6%), and a pan-psychotic class (Type 2 psychosis: 7.2%). The results further showed that significantly more males belonged to the psychotic classes. Lastly, among 508 students from Nigeria, the prevalence of prodromal symptoms was estimated at 20.9% (Okewole et al., 2015).

2.3. Demographic /psychosocial correlates of psychotic experience

A total of seven studies (63%) provided data on the demographic characteristics and psychosis/psychotic experience. Participants recruited from health centers in South Africa were more likely to be blacks, come from poor socioeconomic background, have a family history of mental illness and resident in a rural area (Paruk et al., 2013, 2018, 2009). Studies on gender have reported mixed or inconsistent findings, perhaps owing to differences in data sources. Data on clinical samples in south Africa revealed that significantly more males than females were diagnosed with psychosis in South Africa (Paruk et al., 2015, 2009). Among student samples from Nigeria, female students reported significantly more prodromal symptoms than their male counterpart (Okewole et al., 2015). Among males and females recruited from a slum in Kenya, there was no statistically significant overall difference; females significantly rated persecutory ideation and auditory hallucinations to be severe (Mamah et al., 2012). In contrast, a study conducted among clinical samples from South Africa reveals that gender did not significantly influence symptom severity and presentation (Paruk et al., 2015).

Okewole et al. (2015) reported that experiencing a major life event and being bullied significantly predicted prodromal symptoms of psychosis (Okewole et al., 2015). In a related study from community samples in Kenya, relationship difficulties with family members, death of someone, poor health status of a family member and separation in the family correlated significantly with psychotic experience (Mamah et al., 2016)

2.4. Clinical characteristics and psychosis

A total of four studies (36.36%) provided information on clinical characteristics and psychosis. Among participants recruited from health facilities in South Africa who were given a psychosis-spectrum diagnosis, the majority (i.e., 80%) were diagnosed with schizophrenia and schizophreniform disorders (Paruk et al., 2013, 2015, 2009) and were treated with first-generation antipsychotic (Paruk et al., 2009). In terms of the symptoms of psychosis or schizophrenia, auditory hallucinations (47%) were the most occurring positive symptom, followed by delusions (33%), disorganized behavior (18%) and visual hallucinations (13%) (Paruk et al., 2015). Among school samples from Kenya, it was observed that individuals endorsing psychotic experience were significantly less likely to report symptoms of ADHD, major depression, bipolar disorder, generalized anxiety disorder and alcohol use disorder (Mamah et al., 2016). This suggests that the presence of these disorders may be markers of underlying pathology that may be independent of the likelihood of developing psychosis (Mamah et al., 2016).

2.5. Substance misuse and psychosis

The relationship between substance use disorders and psychosis has received attention from mental health researchers and practitioners. The conclusion reached by studies conducted in Western countries suggests that the prevalence of substance misuse is higher among persons diagnosed with schizophrenia and other psychotic-spectrum disorders than in the general population (Tandon & Shariff, 2019). A meta-analysis of 10 studies revealed that higher levels of cannabis use were associated with increased risk for psychosis (Marconi et al., 2016). This review identified four studies on substance misuse and psychosis conducted among individuals diagnosed with psychosis in South Africa. In an earlier study of 70 participants, 50% reportedly smoked nicotine, 61.4% used cannabis and 41.4% used alcohol (Paruk et al., 2009). Paruk et al. (2013) also found that 68.8% of 45 patients with first-episode psychosis reported a history of lifetime cannabis use, with no significant difference in pattern of use between those diagnosed with schizophrenia and other forms of psychosis. Consistent with the trend above, Paruk et al. (2018) found that adolescents diagnosed with early onset psychosis were motivated to use cannabis frequently, compared with healthy controls. Emerging evidence further suggests that most adolescents (96%) reported initiation of cannabis use before the onset of their first positive psychotic symptoms (Paruk et al., 2015). Lastly, males have been found to be significantly more likely than their female counterparts to report lifetime cannabis, alcohol and nicotine use/misuse (Paruk et al., 2015).

2.6. “Psychosis Literacy” and help-seeking behavior

“Psychosis literacy”, operationalized as knowledge and recognition of symptoms of psychosis is critical to early identification, help-seeking behavior and ultimately the course and prognosis of psychotic disorders. Two studies reported data on this theme. A study conducted in South Africa revealed that only 51% of caregivers or adolescents were able to recognize the prodromal symptoms of psychosis such as suspiciousness, restlessness, mood changes, trouble thinking and social withdrawal (Paruk et al., 2015).

With respect to help seeking, Mamah et al. (2013) reported that only 8.8 and 23.1% males and females in Kenya who were symptomatic for psychosis sought for help, respectively. According to a South African-based study, more than half of caregivers and patients who sought help first and foremost consulted traditional healers, followed by orthodox treatment or services (Paruk et al., 2015). This finding is largely consistent with the pathway to seeking mental healthcare in Africa (Burns & Tomita, 2015; Ibrahim et al., 2016).

2.7. Discussion

This review is the first attempt to synthesize the existing literature on psychosis among adolescents in Africa. As noted previously, the review was undertaken to understand current developments and more importantly propose a research agenda on psychosis in adolescents in Africa. First, there is paucity of empirical studies on psychosis among adolescents in Africa. Only 11 studies, mostly from South Africa and Kenya, were included in this review, with the findings partly supporting and contradicting existing studies from high Western countries. To illustrate, the prevalence rates of psychosis reported by the studies reviewed here appeared lower than those reported by studies conducted in high-income countries, including Australia, Spain, (Fonseca-Pedrero et al., 2011; Kelleher & Cannon, 2011; Laurens et al., 2012; Yung et al., 2009). On the other hand, the finding relating to high perceptual disturbances in Kenya sample support previous studies, while also contradicting others who found delusional experiences to be more among adolescents (Mamah et al., 2013).

The classification of participants from Kenya into clusters, based on their endorsement of psychotic symptoms, is largely consistent with the findings obtained from New Zealand (Gale et al., 2011) and United States (Shevlin et al., 2007). This suggests some commonality in the representation of psychotic symptoms across cultures. Although there is a trend suggesting that males are more likely to endorse psychotic symptoms than females (Barajas et al., 2015), the studies from Kenya have yielded inconsistent results partly due to differences between the samples (students versus slum dwellers) which might affect the conceptualization, measurement and threshold of endorsement of psychotic symptoms. The finding suggesting that demographic factors such as poor socioeconomic background, family history of psychosis strongly correlate with psychosis in South Africa is largely consistent with the trend in the literature (Cantor-Graae & Selten, 2005; Kirkbride et al., 2017; Sweeney et al., 2015). Moreover, consistent with the findings of the extant cross-cultural literature (Barnett et al., 2007; Carney et al., 2017), the review found evidence of substance abuse among adolescents diagnosed with psychosis or endorse psychotic symptoms in Africa. Finally, the review corroborates the general trend in the literature suggesting poor mental health literacy among the populace and service users (Lam, 2014; Zorrilla et al., 2019).

More importantly, notwithstanding the somewhat similarity in the findings of this review and studies conducted elsewhere on different topical areas, such as demographic and clinical correlates of psychosis, as noted previously, the small number of studies from the African region has hampered cross-cultural discussions on psychosis among adolescents. Similarly, although the sociocultural differences among the 54 countries in Africa provide a unique opportunity for inter-country comparison on psychotic characteristics, this was not possible in the current review because of the lack studies from several other African countries. Meanwhile, the existing studies from South Africa and Kenya have also examined different facets of psychosis, therefore making the results difficult to compare. For example, studies from Kenya focused predominantly on the cultural appropriateness and usefulness of psychosis screening measures, as well as prevalence of psychosis in non-clinical samples (Mamah et al., 2012, 2016, 2013, 2014; Owoso et al., 2018, 2014), as opposed to the demographic and clinical profiling of individuals diagnosed with psychosis in South Africa (Paruk et al., 2013, 2015, 2017, 2018, 2009).

This review has largely corroborated early suggestion that mental health in general (Charlson et al., 2014; Cortina et al., 2012; Sipsma et al., 2013) and mental health research in particular (Sankoh et al., 2018; Ssewamala et al., 2018) has been granted scant attention in Africa for reasons such budgetary constraints (Chisholm et al., 2019) and limited human resource (Cortina et al., 2012; Roberts et al., 2014; Sankoh et al., 2018). In their review of publications from Africa in *Lancet Global Health*, Sankoh et al. (2018) found that a search for “mental health disorders” in Africa produces just 16 items, whereas Cortina et al. (2012) investigations into the prevalence of mental health problems in individuals aged up to 16 years in Sub-Saharan Africa yielded only 10 eligible studies. Given the contribution of mental disorders to disability adjusted life years recorded in Africa (Ferrari et al., 2013; Sankoh et al., 2018; Vos et al., 2015), there is a pressing need for a strong research agenda to inform

and drive research into mental health problems, including psychosis, to provide empirical evidence pertinent to ensuring enhanced treatment outcomes and better quality of life (Paruk et al., 2009).

2.8. Agenda for research into psychosis in Africa

In addition to increased research into the thematic areas covered in the review, the following research areas have been proposed to advance knowledge and understanding of psychosis and its management in Africa. The first area relates to the expression or representation of psychosis. Because sociocultural factors significantly influence the expression of pathological and non-pathological behavioral repertoire, it would be insightful to investigate how the behaviors indexing psychosis are expressed in Africa. For examples, others have opined that delusions/hallucinations with religious content are highly prevalent in Africa mainly because of the dominance and subscription to various religious faith, including the demonology (Campbell et al., 2017). Therefore, to enhance cross-cultural discourse while providing increased understanding of psychopathologies in Africa, it is pertinent not only to examine the similarities in the expression of psychosis by superimposing existing nomenclature (Mamah et al., 2012, 2013), but more importantly to uncover developments that are unique to Africa setting. A mixed-method research approach, involving both qualitative and quantitative data gathering and analysis techniques, would help to illuminate culture-specific nuances in relation to the representation of psychosis.

The second is concerned with risk and protective factors of psychosis. Meta-analytic studies focusing on Western-based studies have established strong association between adverse events and psychosis (Davies et al., 2020; Oliver et al., 2020; Rodrigues & Anderson, 2017). It was mentioned earlier that Africa is notably riddled with life adversities, such as conflict, child maltreatment and abuse, malnutrition, and harmful sociocultural practices such as female genital mutilation that are detrimental to the health and wellbeing of an individual. Therefore, it would be interesting to expand the existing scholarship in Africa by elucidating the influence of adversities across different phases of life in the development and expression of psychotic experiences using complementary research designs, including those involving biological assessment measures such as brain anatomy and physiology, genomics, electrophysiology, and blood-based markers. Doing this would help to facilitate multimodal biomarker approaches for psychosis risk stratification, isolate stable trait marker for psychosis, as well as predict clinical trajectories or outcomes. It should be noted, however, that not all individuals exposed to risk factors develop psychosis or more broadly psychopathologies. Protective factors, therefore, have the tendency to moderate or mediate the relationship between risk factors and psychosis, or act independent of risk factors to minimize the development of maladaptive and psychopathological behaviors (De Vries Robbé et al., 2015). Consistent with the biosocial approach to understanding psychopathological behaviors (Connolly & Beaver, 2014), research should explore protective factors of psychosis culled from biological (e.g., neurocognitive functioning, genetics) and psychosocial domains (resilience trait, social support). It will also be insightful to investigate how the usefulness of these factors can be maximized to mitigate the debilitating effects of the various risk factors of psychosis, as well as their mechanisms of action.

Lastly, research is needed on the prevention and management of psychosis. In several African countries, treatment for mental health problems is sought from different and sometimes competing sources, notably mental health institutions and traditional settings (herbalist, spiritualist) in a process termed as “treatment pluralism”. The treatment-seeking trajectory can be sequential, parallel or both. In the sequential treatment pluralism, treatment seeking begins mostly at traditional settings that are operated by herbalists and other spiritualist, namely religious leaders and leaders of traditional faith (e.g., priest of shrine). Cases mostly come to the attention of mental health institutions when the herbalists and spiritualists are unable to provide cure. For example, Mamah et al. (2016) reported that half of their participants and their caregivers reportedly consulted a traditional/spiritual healer first before accessing formal mental health services. Because of the delay in the treatment seeking process, most people utilizing this pathway tend to present significant impaired mental states that pose significant challenge to their recovery and wellbeing. The parallel pathway, on the other hand, involves the utilization of the services provided at the traditional settings and mental health

institutions concurrently. As suggested by others (Audet et al., 2017; Paruk et al., 2015), research into the factors influencing the choice of treatment modality and the impact of the various treatment modalities on recovery from mental health problems and psychosis would be helpful in decision making regarding the choice between parallel or sequential treatment model of mental health. Other areas of interest include the acceptance, satisfaction, and challenges with the parallel or sequential treatment modalities. Clinical trials are particularly attractive to investigate the short-, medium- and long-term outcome of the various treatment options on the continent. Research is also needed to uncover the nature and characteristics of the treatment rendered to patients diagnosed with psychotic illnesses or those endorsing high rates of psychotic symptoms. In addition to focusing on the existing treatment modalities on the Africa continent, studies are invited to adapt existing interventions that have proven effective in Western countries. Notably among them are cognitive-behavior therapy and family intervention (Mehl et al., 2015; Rathod et al., 2010), Mindfulness interventions (Khoury et al., 2013) and social skills training (Turner et al., 2014). To improve public mental health and prevent the development of psychosis, studies have suggested that psychological (e.g., cognitive behavior therapy), nutritional (e.g., omega-3 fatty acids), or combination or two or more treatment modalities are promising (Stafford et al., 2013). Research exploring the effectiveness of a range of interventions, including those listed above, at the population level is extremely important to contribute to reducing the burden of mental health problems in Africa.

2.9. Conclusions

Research into psychosis in adolescents in Africa is among the surest ways to develop the needed evidence-base to address the prevalence of psychosis and its associated burden in this population. There is the need to systematically increase the number of studies exploring different but salient aspects of psychosis in Africa. Capacity building through collaborative research partnership with researchers from well-resourced research centers and institutions will position African-based researchers to investigate salient issues pertaining to psychosis in adolescents. An African-led collaborative partnership would facilitate bilateral flow of technical expertise pertinent to launching a successful and robust research agenda on psychosis (Breuer et al., 2019).

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