THE EPIDEMIOLOGY OF PSYCHIATRIC DISORDERS IN AFRICA: A SCOPING REVIEW

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ABSTRACT

This review of population-based epidemiologic studies was conducted to provide background information on the rates and distribution of psychiatric disorders in Africa in the context of calls to broaden diversity in psychiatric genetic studies. The lifetime prevalence of mood, anxiety, substance use, and psychotic disorders ranged from 3.3-9.8%, 5.7-15.8%, 3.7-13.3%, and 1.0-4.4%, respectively, in 36 studies from 12 African countries. While the prevalence of mood and anxiety disorders appears lower than that observed in research outside the continent, we identified similar distributions by gender though not by age or urbanicity. This review reveals gaps in epidemiologic research on psychiatric disorders and opportunities to leverage existing epidemiologic and genetic research within Africa to advance our understanding of psychiatric disorders. Studies that are methodologically comparable, but diverse in geographic context are needed to advance psychiatric epidemiology and provide a foundation for understanding environmental risk in genetic studies of diverse populations globally.

INTRODUCTION

Studying the epidemiology of psychiatric disorders in Africa should lead to a deeper understanding of the frequency, patterns, distributions, and risk factors in populations residing in Africa and facilitate global cross-population comparisons. While it is widely presumed that the prevalence of psychiatric disorders with high heritability is roughly constant across the globe, psychiatric disorders with low heritability likely interact more strongly with modifying social and environmental risk factors that may influence their incidence and prevalence across populations. The last few years have seen several calls to broaden the scope of ancestral and geographic diversity in large scale genetic studies.[1,2] The Psychiatric Genomics Consortium (PGC), the largest international consortium to study the genetic architecture of eleven psychiatric disorders, was formed in 2007 to launch a global effort to obtain the necessary large sample sizes for genome-wide association studies (GWAS). Although by 2020, the PGC had published several landmark studies on the genetic architecture of major psychiatric disorders, they were predominantly conducted in populations of Asian or European ancestry and outside of Africa.[3] Research on the genetics of schizophrenia and bipolar disorder led by African and international researchers in Africa has been recently emerging, but remains underrepresented relative to studies in western countries. [4,5] Examining populations of similar ancestry that are underrepresented in existing genetics studies may enable the exploration of the role of environment and culture to be separated from genetic factors that contribute to psychiatric disorders.

The originators and participants who provided data for genetic studies noted that it was essential that diverse populations and geography become better represented.[1] Seventy-one percent of the individuals had been recruited from the United States, the United Kingdom, and Iceland.[1] The call for a broadening of diversity they noted would "improve the effectiveness of genomic medicine by expanding the scope of known human genomic variations and bolstering our understanding of disease etiology,"pg 589.[1] These statements were beginning to reflect efforts to carry out gene discovery in Africa.

Data on the epidemiology of psychiatric disorder has flourished since Freedman's introduction of the Epidemiologic Catchment Areas study in 1984 with the editorial "Psychiatric Epidemiology Counts".[6] Similar to genetic studies, these landmark epidemiologic studies focused primarily, but not exclusively, on populations of European descent in European or North American countries. The extent to which the prevalence and distribution of psychiatric disorder is comparable to populations in other settings is largely unknown. These gaps do not exist for some non-psychiatric disorders in Africa. For example, there have been large population-based epidemiological studies that have been critical to understanding HIV, neurological disorders such as epilepsy, among others.[7,8] Epidemiologic studies on disorders that differ in prevalence among African relative to non-African populations have advanced our understanding of the etiology of these high-burden disorders, which may serve as a model for furthering knowledge on the epidemiology of psychiatric disorder in Africa.[7] It was within this context that this review of the epidemiology of psychiatric disorders in Africa was undertaken. We are ultimately interested in exploring whether syndrome constructs are similar globally, potential environmental factors that modify prevalence, and the delineation of genetic and environmental factors that contribute to risk across populations.

This paper is a scoping review of population-based studies to identify sources of evidence and gaps in existing research on the epidemiology of psychiatric disorders in Africa.[9] The objective is to obtain information on prevalence and distributions of psychiatric disorders using clinical criteria and methods similar to those used in ongoing genetic studies. To guide the current scoping review, we focused on the following research questions: ‘How

has the prevalence of psychiatric disorders in African countries been estimated across population-based studies?' and 'What is the nature, range, and extent of the literature on the epidemiology of psychiatric disorders in Africa?' This review aimed to explore the prevalence of psychiatric disorder based on geography (i.e., studies conducted in African countries) as opposed to populations of African ancestry.

METHODS

Rationale for a scoping review

We conducted a scoping review to identify key concepts, sources of evidence, and gaps in existing research on the epidemiology of psychiatric disorders in Africa. Scoping reviews are appropriate for assessments in areas where the range of existing literature on a particular topic is initially uncertain, as was the case with the topic of this review. Accordingly, we have followed Arksey and O'Malley's (2005) methodological framework of conducting a scoping review that entails identifying the research question, developing search strategies, selecting studies, charting data, and collating, summarizing and reporting the results.[10]

Search strategy and selection criteria

We searched three electronic databases: PubMed, EMBASE, and Web of Science to retrieve relevant literature from 1984 onwards. We chose 1984 as this was the year that the first epidemiologic studies using clinical criteria were published[11] and, we were interested in diagnoses that had been used in current genetic studies globally. The search strategy included three sets of search terms: those that are (i) relevant to psychiatric disorders; (ii) terms for each country in Africa; and (iii) related to prevalence and population-based surveys. Search terms were grouped using Boolean "or" operators, and the queries were combined using "and" operators as described below.

1. Prevalence and ('general population' or community or population or epidemiolog*)

2. Africa or Sub-Saharan Africa or Algeria or Egypt or Libya or Morocco or Tunisia or Cameroon or Central African Republic or Chad or Congo or Democratic Republic of the Congo or Equatorial Guinea or Gabon or Burundi or Djibouti or Eritrea or Ethiopia or Kenya or Rwanda or Somalia or Sudan or South Sudan or Tanzania or Uganda or Angola or Botswana or Lesotho or Mozambique or Ivory Coast or Namibia or South Africa or Swaziland or Zambia or Zimbabwe or Benin or Burkina Faso or Cote D'ivoire or Gambia or Ghana or Guinea or Guinea-Bissau or Liberia or Mali or Malawi or Mauritania or Mauritius or Burundi or Eswatini or Madagascar or Niger or Nigeria or Senegal or Sierra Leone or Togo

3. (psychiatric and disorder*) or (mental and disorder*) or depress* or anxiety or 'post-traumatic stress' or PTSD or panic or (eating and disorder*) or schizo* or psychosis or bipolar or (mood and disorder*) or ((substance or alcohol or drug) and (disorder* or abuse or dependence)) or (personality and disorder*) or ADHD or (emotional and problem*) or (behavioral and problem*)

4. Search range: 1984/01/01– 2020/08/18

5. Language: English, French, Portuguese

6. #1 and #2 and #3 and #4 and #5

We aimed to identify studies that reported on the prevalence of psychiatric disorder in a sample that was expected to be representative of the characteristics of the general population within the setting where the study was conducted. We were interested in exploring the study designs used to estimate prevalence and therefore did not restrict the results by sampling method (e.g., probability samples). Publications were eligible if they were quantitative community- and population-based studies published from 1984 onward and reported prevalence estimates of one or more psychiatric disorders in the general population in an African country. Prevalence estimates were described as point (i.e., current) prevalence, period (i.e., past year) prevalence, or lifetime (i.e., ever) prevalence. Studies that assessed psychiatric disorders but did not report one of these three prevalence rates were excluded. We restricted the search to English, French, or Portuguese articles. We did not exclude any studies based on sample size. Given the

focus of this article to study the prevalence of psychiatric disorders in Africa (i.e., geographic context), we excluded studies reporting on the prevalence of psychiatric disorders in population of African ancestry outside of Africa.

Reference lists of eligible studies were reviewed to identify additional studies. Titles and abstracts were screened using the inclusion criteria, after which full articles were retrieved. Studies with irrelevant titles (such as those that included non-African populations or African populations residing outside Africa) were excluded, as were commentaries, conference abstracts, editorials, intervention studies, and theoretical papers. We also excluded studies on specific subpopulations (e.g., participants with medical conditions, treated samples, pregnant women). Potentially relevant full-text studies were then evaluated against review eligibility criteria by two authors (TY and MCG), and any discrepancies were resolved by consensus, including review by the senior author (MMW).

Figure 1 presents a Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Review Guideline (PRISMA-ScR) flow diagram displaying the process of searching and selecting the studies.[12]

Data extraction

We extracted data on the last name of the first author, year of publication, study location, year of data collection, study sample, age range, sample size, the diagnostic instrument, and prevalence of psychiatric disorders. Where the same parent study data were used in more than one publication, we put the reports together and deemed the papers as one study even if the final analytic sample size differed between studies.

RESULTS

The search yielded 20,075 records, 9798 of which were duplicate articles. We screened 9512 titles followed by 1103 abstracts, which resulted in 105 articles assessed for eligibility. Fifty-three full text articles were excluded due to recruiting samples that weren't representative of the general population (n=33records), not describing which type of prevalence estimate the study was reporting (n=18 records), not a community population-based study (n=5 records). One was conference abstract. One study of geriatric depression in Tanzania was classified as awaiting classification because the full text was not available and thus could not be fully evaluated against our eligibility criteria [13]. Forty-seven articles representing 36 unique studies were included in this review (Figure 1 shows the flow diagram). Included studies were published between 1996-2020, with half published after 2008 (n=28 articles).

Setting and population characteristics

Thirty-six studies estimated the prevalence of one or more psychiatric disorders in the general population in twelve countries in north, east, west, and southern Africa (Table 1; Supplemental File 1). Twenty-four studies were conducted in five of these countries: South Africa (n=8; 22.2%),[14-28] Ethiopia (n=5; 13.9%),[29-37] Kenya (n=5; 13.9%),[38-42] Nigeria (n=3; 8.3%),[18-20,43-46] and Uganda (n=3; 8.3%).[47-49] Remaining studies were conducted in Benin (n=1; 2.8%),[50] Burkina Faso (n=2 studies; 5.6%),[51,52] Egypt (n=2; 5.6%),[53,54] Ghana (n=1; 2.8%),[26] Morocco (n=2; 5.6%),[55,56] Mozambique (n=2; 5.6%),[57-59] and Rwanda (n=2; 5.6%).[60,61] Studies were designed to be nationally representative (n=10 studies),[15-17,21-23,25-27,52-55] representative of populations in rural regions (n=14 studies),[28,29,33-35,37-41,47-50,58-60] a peri-urban community (n=1 study),[24] or a region that included a mix of rural, urban, and/or peri-urban communities (n=11 studies).[14,18-20,30-32,36,42-46,51,56,57,61] Twelve studies aimed to estimate the prevalence of psychiatric disorders among adults at least 18 years of age.[14,17-20,25,27,36,37,43,44,46-48,50,52,53,60,61] Eighteen studies aimed to estimate the prevalence of psychiatric disorders among adolescents and adults usually defined as 15 years or older.[15,16,21,23,24,29-35,38-40,51,54-57] Three studies focused on either young children[41] or children and adolescents.[42,49] Two studies were restricted to older adults.[22,26,45] One study was restricted to female heads of household.[58,59] Recruitment and study interviews were completed at participant's homes in all studies with one exception. One study that focused on estimating the prevalence of substance use disorder avoided conducting study interviews within the household to prevent underreporting of substance use by participants when in close proximity to their family.[54]

Sampling procedures

Participants were sampled using multi-stage cluster probability sampling procedures (n=25 studies),[14-23,25-28,30-32,36-39,42,43,45,46,49,51,52,55-59,61] simple or systematic random samples of households or individuals (n=6 studies),[24,40,41,47,48,60] enrolling all eligible persons in the sampling frame (n=2 studies),[29,33-35] selecting a random direction from the center

of the village and approaching all households in that direction to identify eligible participants (n=1 study),[50] or using a non-probability sampling method (n=2 studies).[53,54] Sample sizes ranged from 351 to 68,491 individuals,[33,35,48] with a median sample size of 1769 individuals. In total, included studies enrolled 232,015 persons.

Assessment of psychiatric disorders

Case definitions for psychiatric disorder were most commonly informed by DSM-IV criteria (n=16 studies)[14,17-20,24,25,27,35,41,43,45-47,49-51,55,56,60,61] followed by ICD-10 (n=6 studies),[22,26,30-34,38,39,54] DSM-5,[40,44,58,59] or a combination of ICD-10 and DSM-IV (n=1 study).[29] Psychiatric disorders were measured using diagnostic interviews in 21 studies using the World Health Organization World Mental Health Composite International Diagnostic Interview (CIDI),[17-20,22,25-27,29-35,45,46,50,62] the Mini International Neuropsychiatric Interview (MINI),[14,40,44,49,51-53,55,56,61,63] and the Clinical Interview Schedule-Revised (CIS-R).[38,39,64] Five of these studies combined the use of a diagnostic interview with screening tools,[30-32,38,43,44,49] which included the Patient Health Questionnaire (PHQ-9),[65] the Generalized Anxiety Disorder-7 (GAD-7),[66] the Alcohol Use Disorders Identification Test-Consumption (AUDIT-C),[67] the Self Reporting Questionnaire (SRQ-20),[68] and the Strengths and Difficulties Questionnaire (SDQ).[69] Thirteen studies used screening tools to estimate the point, period, or lifetime prevalence of probable cases of psychiatric disorder using the Hopkins Symptom Checklist in combination with a locally developed functional impairment measure;[47,60,70,71] the Center for Epidemiologic Studies Depression Scale (CES-D);[24,72] the Patient Health Questionnaire (PHQ-8);[58] the SRQ (point prevalence);[36] the Child Behavior Checklist (CBCL; point prevalence);[41,42,73] the Youth Self Report (YSR; point prevalence);[42,74] the AUDIT-C (point prevalence);[43,44] the AUDIT (point and period prevalence);[23,24,48,59,75] the CAGE questionnaire (lifetime prevalence);[15,16,21,76] the Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST; point prevalence);[37,77] adapted Addiction Severity Index (lifetime prevalence);[54,78] and the Life Events Checklist (LEC)[79] in combination with the Harvard Trauma Questionnaire (HTQ).[24,80] Other methods included having participants maintain a diary recording their past-week alcohol consumption and applying NIAAA cutoffs to determine past-year harmful alcohol use,[26] and locally developed questions and vignettes as part of structured and semi-structured interviews to increase community-based case identification of lifetime psychosis and intellectual disability.[57] Nine studies reported using measures that had been adequately validated in the study population or country.[18-20,24,40,43,44,47,55-57,60,62]

The prevalence of psychiatric disorders in Africa

Mood and anxiety disorders

Twenty-two studies estimated the prevalence of one or more mood disorders. The point, period, and lifetime prevalence of any mood disorder ranged from 3·8-6·4%, 1·1-4·9%, and 3·3-9·8%, respectively.[17-19,25,46,53] The point, period, and lifetime prevalence of major depressive disorder ranged from 2·0-33·2%, 1·1-7·1%, and 0·3-26·2%, respectively (Table 2; Figure 2).[17,20,22,24,25,27,28,33,40,43,45-47,52,53,58,60] Studies restricted to older adults and those that used screening tools to ascertain cases tended to report higher prevalence estimates relative to studies with younger populations and those that used diagnostic interviews. The prevalence of depression was consistently higher among females than males (prevalence ratio: 1·1-2·2) and lowest in studies conducted in Nigeria. The point and lifetime prevalence of bipolar disorder ranged from 0·1-3·2% and 0·0-5·2%, respectively. Studies reporting the prevalence of bipolar disorder by gender produced inconsistent findings. The point and lifetime prevalence of bipolar disorder were 2- and 6-fold higher among females in Ethiopia's capital city, respectively;[31] whereas, in a study conducted in a rural setting in Ethiopia, the lifetime prevalence of bipolar disorder was twice as high among males relative to females.[35] Other studies examined the prevalence of major depressive episodes,[31,49-52,55,61] affective problems,[41] recurrent depressive episode,[31,52] persistent mood disorder,[31] and dysthymia.[46,49,50,52,53]

Eighteen studies estimated the prevalence of anxiety and stress-related disorders. The period and lifetime prevalence of anxiety disorders ranged from 4.1-8.1% and 5.7-15.8%, respectively (Table 3). Twelve of these studies reported the point prevalence of generalized anxiety disorder,[17,25,38,39,43,46,50,52,53,55,56,61] which ranged from 0·9-36·5% (Table 3). The point prevalence of generalized anxiety disorder, often referred to as the presence of symptoms during the past six months, which is consistent with the DSM-IV definition of current generalized anxiety disorder. Only one study reported a point prevalence of generalized anxiety disorder greater than 10%, which the authors attribute to the high prevalence of violence and history of trauma in post-genocide Rwanda. Three studies reported the past-year and/or lifetime prevalence of generalized anxiety disorder and estimated that 0·0-1·4% of the target population met criteria for generalized anxiety disorder in the past year and 0·1-4.0% met criteria for generalized anxiety disorder in their lifetime. The prevalence of generalized anxiety disorder was consistently higher among females relative to

males. Among children, the estimated point prevalence of anxiety problems was 12.6%[41]. Other anxiety disorders included panic disorder,[17,25,38,39,46,50,52,53,55,56] agoraphobia,[17,25,38,39,46,52,53,55,56] social phobia,[17,25,38,39,46,50,52,53,55,56] specific phobia,[30,38,39,46,53] obsessive-compulsive disorder,[38,39,46,50,53,55,56] neurosis,[28,30,53] and post-traumatic stress disorder.[17,24,25,38-40,46,50,52,53,55,56,61]

Psychotic disorders

Nine studies estimated the prevalence of psychotic disorders. Four studies examined psychosis or psychotic disorders/syndromes generally,[40,52,53,57] three assessed schizophrenia,[28,29,34] and one study assessed both schizophrenia and schizoaffective disorder(Table 4; Figure 2).[32] The point prevalence of psychosis in a nationally representative study in Egypt was 0·19%. The lifetime prevalence of psychosis was assessed in three different settings and ranged from 1% in a rural setting in Kenya, 1·6% in an urban setting in Mozambique, to 4·4% in a rural region of Mozambique. Two studies assessed psychotic syndrome. One of these studies conducted in Burkina Faso reported that 1.7% of the sample experienced isolated psychotic syndrome while the prevalence of recurrent psychotic syndrome was 4.1%.[52] In a separate study conducted in Benin, the point prevalence of psychotic syndrome was 9.3% and the lifetime prevalence of psychotic syndrome was 30.2%.[50] Another study examined the presence of psychotic symptoms without applying a diagnostic algorithm and found that 8% of persons 16-65 years of age in a rural region of Kenya displayed at least one symptom of psychosis in the past year. Three of the four studies evaluating the prevalence of schizophrenia and/or schizoaffective disorder were conducted in Ethiopia. These studies found that 0·06-0·3% of the population currently met criteria for schizophrenia, whereas the lifetime prevalence ranged from 0·40% in the capital city to 0·47% in a rural region of Ethiopia. One study assessed the point prevalence of paranoid schizophrenia in a rural setting in South Africa, which was estimated to be 5%.[28] The only study evaluating schizoaffective disorder found that the point and lifetime prevalence of schizoaffective disorder in Addis Ababa, Ethiopia was 0·4% and 0·5%, respectively. The prevalence of schizophrenia was comparable between males and females; however, males were 2·5-3·5 times as likely to meet current or lifetime criteria for schizoaffective disorder.

Substance use disorders

Nineteen studies estimated the prevalence of alcohol or other drug use problems and/or disorder. In samples that enrolled adolescents and adults, the past-year and lifetime prevalence of any substance use disorder (alcohol or other drugs) ranged from 0·8-5·8% and 3·7-13·4%, respectively (Table 5; Figure 2). The case definitions for alcohol-related problems varied and included hazardous/harmful alcohol use,[23,26,37,43,44,48,52,59] alcohol problems,[15,16,21] or alcohol use disorder (abuse/dependence).[14,17,24,25,44,46,48,50,52,53,55] The point, period, and lifetime prevalence of alcohol use disorder (abuse or dependence) ranged from 0·03-16·7%, 0·5-35·5%, and 1.2-14·0%, respectively. The point, period and lifetime prevalence of non-alcohol substance use disorder ranged from 0·13-5·8%, 0·2-1·5%, 1·0-4·5%, respectively.[17-19,25,40,43,44,46,50,52-55] Among studies that assessed both alcohol use disorder and other drug use disorder, studies conducted in Benin, Burkina Faso, Nigeria, and South Africa found the prevalence of alcohol use disorder to be approximately 2-3 times as prevalent as drug use disorders. In contrast, studies conducted in Egypt and Morocco found that other drug use disorders were up to twice as prevalent as alcohol use disorders. The prevalence of alcohol use disorders was 1·8-5·9 times more common among males relative to females, with the exception of Morocco, where the prevalence of alcohol use disorders was 14·5 times as prevalent among males relative to females. The prevalence of drug use disorder was consistently higher among males relative to females. Notably, in Morocco, the point prevalence of drug use disorder was 25 times greater among men (10%) relative to women (0·4%).[55]

Other psychiatric disorders

Other psychiatric disorders assessed in included somatoform disorders/problems (point prevalence: 0.7-11.8%; lifetime prevalence: 3.1%),[30,42,53] dissociative disorders (point prevalence: 0.4%; lifetime prevalence: 0.8%),[30] insomnia,[52] internalizing problems (point prevalence; 19.3%),[42] impulse control and externalizing disorders (point prevalence of oppositional problems: 2.3% or externalizing problems 10.2%; period prevalence of externalizing disorders: 0.1%; lifetime prevalence of impulse control disorder: 0.3%),[18,19,41,42] attention or attention-deficit hyperactivity problems (point prevalence: 2.3-5.0%),[41,42] antisocial personality disorder (lifetime prevalence: 3.1%),[40,50] eating disorders (lifetime prevalence: 1.7%),[40,50] mental retardation (lifetime prevalence: 1.3-1.9%),[57] pervasive developmental problems (point prevalence: 5.3%),[41] seizure disorders (lifetime prevalence: 1.6%),[57] and suicide risk and behaviors (lifetime prevalence: 6.7-16%; point prevalence: 4.2% low risk – 0.6% high risk).[40,52,61] Furthermore, several studies identified high rates of comorbidity between variable combinations of psychiatric disorders.[24,25,43,44,53]

DISCUSSION

In this scoping review, we identified 36 studies estimating the prevalence of one or more psychiatric disorders in the general population in twelve African countries, half of which were published after 2008. Studies reported lifetime prevalence estimates for mood, anxiety, substance use, and psychotic disorders ranging from 3.3-9.8%, 5.7-15.8%, 3.7-13.3%, and 1.0-4.4%, respectively. Epidemiologic studies of psychiatric disorder in Africa use comparable diagnostic interviews and screening tools as studies conducted outside of the continent. However, this scoping review revealed significant sources of methodological and clinical heterogeneity as well as gaps in research on certain populations, settings, and disorders.

First, there are gaps in coverage of epidemiologic estimates across countries, populations, and disorders. Only twelve African countries were represented in this review, none of which were conducted in central Africa. More than half of the population-based psychiatric epidemiology surveys in Africa were conducted in only five countries - Ethiopia, Kenya, Nigeria, South Africa, and Uganda. The included studies most frequently assessed mood and/or alcohol use disorders. Few studies examined psychotic disorders.

Second, studies estimating the point prevalence of psychiatric disorder, particularly mood, anxiety, and substance use disorders, displayed substantial methodological variation in measurement approaches. Most studies used a diagnostic interview or screening tool, similar to those commonly used in other world regions, to measure psychiatric disorder. Studies that used screening tools often reported higher rates of psychiatric disorder than studies that utilized diagnostic interviews. For example, studies that estimated the prevalence of alcohol-related problems reported higher estimates when using the AUDIT or CAGE relative to the CIDI and MINI. Compared to diagnostic interviews in other countries, previous meta-analyses of screening tools have similarly found that the estimated prevalence of psychiatric disorder is greater for studies using screening tools relative to diagnostic interviews[81]. Other sources of measurement error may be due to differential misclassification by cultural context. Previous analyses of CIDI diagnoses from countries in Africa (Nigeria, South Africa), New Zealand, and the United States suggest that these diagnostic interviews underestimate the prevalence of depression in African countries relative to western contexts due to differential item performance and relevance across countries.[82] It is also possible that screening and diagnostic tools do not capture the symptoms or features of psychiatric disorder that present in specific cultural contexts. For example, observed variation in substance use disorder may be partially attributable to the application of tools that do not cover all types of substances or use local terms for different types of substances. Khat, a stimulant plant with amphetamine-like properties, is widely used and culturally accepted in many parts of East Africa, and has been associated with psychosis and psychotic symptoms.[83] Most epidemiologic screening and diagnostic tools do not capture khat use and related problems, which may underestimate substance use disorder in regions where khat use is prevalent. Scales that have been adapted to assess khat use were not included in the studies we identified in this review.[84] This suggests the need to broaden the scope of substances to include those relevant to local use. In general, accurate measurement and the training of experts in the development and adaptation of screening and diagnostic tools is one of the greatest challenges for conducting psychiatric epidemiologic studies in all parts of the world. Strengthening capacity in psychometrics and measurement adaptation is needed and can leverage the training and capacity that has been developed for other disorders, such as epilepsy and other neurological disorders.[7] There is also a need to improve reporting of these estimates. For example, several studies and data points were excluded because the authors did not specify which type of prevalence they were reporting.

Third, while this review identified consistencies in the epidemiology of DSM and ICD psychiatric diagnoses with previous studies from countries outside of Africa, it is likely that applying these diagnostic tools may have excluded culturally specific presentations of mental health problems, idioms of distress, or culture-bound syndromes.[85] There is significant debate regarding the relevance of universal application of western psychiatric diagnoses without cultural formulation and considerations.[86] The absence of culture-bound syndromes and limited representation of local measurement approaches may also reflect limitations in our review process. Notably, we restricted studies to those published in English, French, and Portuguese and did not search grey literature databases. The official languages in most African countries include Afroasiatic languages and Niger-Congo languages; thus, this review may have missed eligible studies published in these common languages. Potential measurement error resulting from lack of cross-cultural validity, different assessment approaches (diagnostic interviews vs. screening tools), and unique presentations of psychiatric disorders and culture-bound syndromes suggest observed differences in the

prevalence of psychiatric disorder may be due, in part, to methodological and measurement differences between studies.

Results from this review revealed notable heterogeneity in prevalence estimates across studies, which may be due to the methodology, but also differences in population characteristics and risk factors related to cultural norms and behaviors, social determinants of health, genetic differences, and geographic or contextual differences. Most psychiatric disorders, including those with high heritability, displayed comparable or lower estimated prevalence in studies conducted in Africa relative to large epidemiologic studies conducted outside of Africa (see Figure 2).[18,19,87-95] For example, the range in lifetime prevalence of mood (3.3-9.8%) and anxiety (5.7-15.8%) disorders was lower than that reported in countries from other world regions including Colombia (mood: 14.6%; anxiety: 25.3%), France (mood: 21.0%; anxiety: 22.3%), Lebanon (mood: 12.6%; anxiety: 16.7%), and the United States (mood: 21.4%; anxiety: 31.0%), but similar to that observed in Japan (mood: 7.6%; anxiety: 6.9%).[19,87-95] The lifetime prevalence estimates for bipolar disorder were consistent with estimates from countries outside of Africa. The lifetime prevalence of alcohol use disorder was comparable to other countries (Colombia: 9.4%; France: 7.1%; Japan: 7.3%; Lebanon: 1.6%; United States: 13.8%). The lifetime prevalence of substance use disorder (1-4.5%) was higher than that reported for Japan (0.2%) and Lebanon (0.4%), but lower than the lifetime prevalence of substance use disorder in the United States (8.5%). Comparison with these other studies must be interpreted with caution given substantial clinical and methodological heterogeneity and also the lack of meta-analytic summary estimates that preclude statistical comparison of these estimates across world regions.

It is possible that observed differences in the prevalence of psychiatric disorder are due to genetic and environmental risk or protective factors but may also be explained by confounders, stigma, and different cultural perceptions of mental disorders that may prevent people from reporting psychiatric symptoms. For example, Africa has the youngest population globally, which may partially explain the lower observed general population prevalence estimates. Within studies conducted in Africa, we also observed substantial heterogeneity by region. The prevalence of alcohol use disorder was consistently lowest in North African countries and highest in South Africa. With the exception of the South African studies, the prevalence of alcohol use disorder was similar to previous studies from low- and middle-income countries and lower than those reported from high-income countries.[89,96] The prevalence of drug use disorder in Morocco and South Africa was higher than most other low- and middle-income countries, yet comparable to estimates from high-income countries.[97] Regional differences in the prevalence of substance use disorders may reflect the differences in the types of substances consumed and cultural norms related to substance use.

The relative prevalence of psychiatric disorders by demographic subgroups displayed some consistencies and deviations from patterns observed outside of Africa. Gender differences in the prevalence of psychiatric disorders in Africa were consistent with studies outside of Africa, whereby major depression and generalized anxiety disorders were more common among females, while substance use disorders were more prevalent among males.[88,89,91,96,97] With regard to age, we found that the prevalence of emotional and behavioral problems among children was comparable to what has been observed outside of Africa,[42,98,99] yet studies restricted to older adults produced higher period and lifetime prevalence estimates for major depressive disorder. This differs from epidemiologic studies of depression in high-income settings where the force of morbidity and period prevalence is often highest in early and middle-adulthood.[19,93,100] A study of psychosis in Mozambique found a higher prevalence in rural relative to urban settings, which is in contrast to research from the United States and Western European countries that have consistently found a higher prevalence of schizophrenia in urban as compared to rural settings.[101-103]

To better understand the global epidemiology of psychiatric disorders and set the foundation for future genetic research, we need studies that are methodologically comparable, but diverse in population characteristics, culture, and context. Epidemiologic and population-based research is needed to investigate factors that explain the observed heterogeneity of psychiatric disorder in Africa may further our understanding of the epidemiology of psychiatric disorders by disentangling methodological explanations for these differences from meaningful risk and protective factors. Furthermore, strengthening the infrastructure and capacity for conducting psychiatric epidemiologic research in Africa will facilitate further understanding of the role of genetic and environmental factors while also building equitable partnerships and ownership of psychiatric genetic epidemiology research among scientists in Africa. There is a rich history of genetics and epidemiologic research on HIV/AIDS,[104,105] malaria,[106] chronic and infectious diseases[107] in Africa, including one of the first large-scale genomic studies of HIV and tuberculosis co-infection,[108] which have significantly advanced the global knowledge of the etiology of these diseases. Future

research should now include efforts to understand and measure culture-bound syndromes, unique presentations of and measurement considerations for DSM and ICD psychiatric disorders, and relevant disorders that were not covered in this review (e.g., autism spectrum disorder, epilepsy). Similar to the advances made in other chronic and infectious disease epidemiology, further investment in research on psychiatric disorders in Africa has the potential to develop a better understanding of the epidemiology and genetics of psychiatric disorder and to ultimately inform contextually relevant policies and practices aimed at reducing the burden of mental disorder and improving public mental health equity globally.

Author contributions

MW conceived of the ideas of this review and TL, PS, and MLW further developed the rationale. MCG, TY, and MW designed the methodology for the scoping review. TY led the searches and initial screening of the study articles. MCG screened all full-text articles, verified eligibility of included articles and drafted the scoping review methodology. Any discrepancies in assessing the eligibility of potential articles were reviewed by MW. MCG, TY, and MW drafted the manuscript. All study authors provided revisions, critical feedback on the manuscript, and approved the final version.

Declaration of interest

- Authors MCG, TY, TL, LCG, CNP, CLM, WF, TLS, MAS, and MLW declare no competing interests
- PFS- Reports personal fees and other from RBNC Therapeutics, from null, outside the submitted work.
- AM- Reports personal fees from Janssen, personal fees from Illumina, grants from The Sackler Trust, outside the submitted work
- JW- Reports grants from Takeda Pharmaceuticals Ltd, outside the submitted work.
- MMW- Reports research grants in the last three years from NIMH, Brain and Behavior Foundation, Templeton Foundation and the Sackler Foundation at Columbia, and book royalties from the Perseus Press, Oxford Press, and APA Publishing. MMW has also received royalties on the social adjustment scale from Multihealth Systems. None of these represent a conflict of interest.

Figure Titles and Captions

Figure 1. Flow diagram

Figure 2. Range of prevalence estimates by disorder as compared to World Mental Health Survey Estimates

Caption: Range of point, period, and lifetime prevalence estimates for studies conducted in Africa. The shapes display lifetime prevalence estimates from select countries included in the World Mental Health Survey initiative.

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SUPPLEMENTAL FILES

Supplemental File 1. Map of included studies

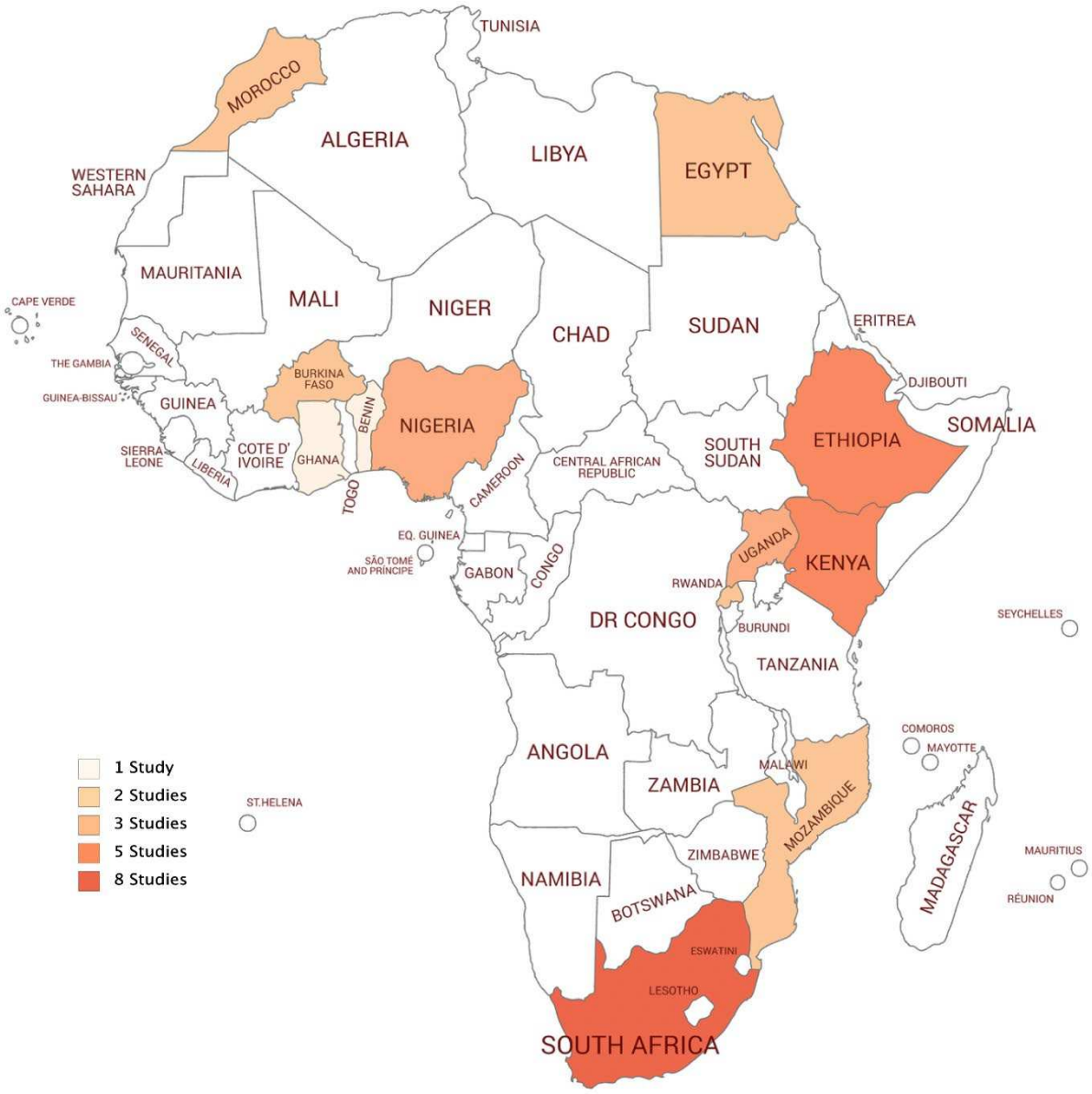

Table 1. Characteristics of included studies				
First author, year	**Country, DC year**	**Sample**	**Age**	**Diagnostic interview [Sample size]**
1a. Adewuya et al. (2018)	Nigeria 2015	Multistage sampling; Representative of Lagos state (urban/peri-urban); Lagos State Mental Health Survey (LSMHS)	18-40	DSM-IV PHQ-9 AUDIT-C MINI -5.0 [n =11246]
1b. Adewuya et al. (2020)				DSM-5 MINI-5.0 [n =11246]
2. Andersson et al. (2018)	South Africa 2012	Multistage sampling; Representative of the Eastern Cape Province (urban/peri-urban)	18-40	DSM-IV MINI [n = 977]
3a. Audet et al. (2018)	Mozambique 2014	Multistage sampling; Representative of female heads of household in 14 rural districts in central Mozambique (rural)	16-62	DSM-5 PHQ-8 AUDIT [n = 3892]
3b. Wainberg et al. (2018)				
4. Bolton et al. (2002)	Rwanda 1999	Random sample of households; Representative of Kanzenze Commune (rural)	18+	DSM-IV DHSCL [n = 368]
5. Bolton et al. (2004)	Uganda 2000	Systematic random sample of households; Representative of Masaka and Rakai districts (rural)	18+	DSM-IV DHSCL WHODAS-II [n = 587]
6. Department of Health, Medical Research Council (2007)	South Africa 2003	Multistage sampling; Representative of South Africa (national); South Africa Demographic and Health Survey 2003	15+	CAGE Questionnaire [n = 10214]
7. Duthe et al. (2016)	Burkina Faso 2010	Multistage sampling; Representative of Ouagadougou (peri-urban); Ouagadougou Health and Demographic Surveillance System	15+	DSM-IV MINI [n=2187]
8. Fedaku et al. (2004)	Ethiopia 1998	Complete coverage of Zeway Islands (rural)	16+	ICD-10 CIDI SCAN [n = 1691]
9. Gedif et al. (2019)	Ethiopia 2018	Multistage sampling; Representative of Mandura Woreda (rural)	18+	ASSIST [n=1588]
10. Ghanem et al. (2009)	Egypt 2003	Purposive sampling of sites selected to represent different socioeconomic, cultural, and geographic characteristics in Egypt (national)	8-64	MINI-Plus [n = 14640]
11. Gureje et al. (2007)	Nigeria 2003-2004	Multistage sampling; Representative or Yoruba-speaking areas of Nigeria (urban/peri-urban/rural); Ibadan Study of Aging	65+	DSM-IV CIDI [n = 2152]
12a. Gureje et al. (2006)	Nigeria 2001-2003	Multi-stage sampling; Representative or Yoruba-speaking areas of Nigeria (urban/peri-urban/rural); Nigerian Survey of Mental Health and Well-Being	18+	DSM-IV CIDI [n = 4985]
12b. Kessler et al. (2015, 2009, 2007)				[n = 2143]
				[n = 6752]
			18-39	[n = 1203]

13. Hamdi et al. (2013)	Egypt 2005-2006	Purposive stratified sampling of individuals in eight governates (national)	15+	ICD-10 ASI [n = 44000]
14a. Herman et al. (2009)	South Africa 2002-2004	Multistage sampling; Representative of South Africa (national); South African stress and health (SASH) study	18+	DSM-IV CIDI 3.0 [n = 4351]
14b. Kessler et al. (2015, 2009, 2007)				DSM-IV CIDI 3.0 [n = 4315]
14c. Stein et al. (2008)				DSM-IV CIDI 3.0 [n = 4433]
14d.Tomlinson et al. (2009)				DSM-IV CIDI 3.0 [n = 4351]
15. Hunduma et al. (2017)	Ethiopia 2016	Multistage sampling; Representative of Harari People Regional State (urban/rural)	18+	SRQ [n=901]
16. Jenkins et al. (2012)	Kenya 2000	Multistage sampling; Representative of Maseno, Kisumu District, Nyanza Province (rural)	16-65	ICD-10 CIS-R PSQ [n = 876]
17. Jenkins et al. (2015)	Kenya 2004-2013	Multistage sampling; Representative of Maseno, Kisumu District, Nyanza Province (rural)	16-65	ICD-10 CIS-R [n = 1158]
18. Kadri et al. (2007)	Morocco 1994	Multistage sampling; Representative of 8 prefectorats of Casablanca (urban)	15+	DSM-IV MINI [n = 800]
19. Kadri et al. (2010)	Morocco 2004-2005	Multistage sampling; Representative of Morocco (national)	15+	DSM-IV MINI [n = 5498]
20. Kariuki et al. (2017)	Kenya	Simple random sample of parent-children dyads; Representative of Kilifi county (rural); Kilifi Health and Demographic Surveillance System	1-6	DSM-IV CBCL [n=3273]
21a. Kebede et al. (1999a) 21b. Kebede et al. (1999b) 21c. Kebede et al. (1999c)	Ethiopia 1994	Multistage sampling; Representative of Addis Ababa (urban)	15+	ICD-10 CIDI SRQ [n = 1420]
22a. Kebede et al. (2003) 22b. Kebede et al. (2005)	Ethiopia 1998-2001	Complete coverage of Butajira, Ethiopia (rural)	15-49	ICD-10 CIDI SCAN [n = 68378] [n = 68491]
22c. Negash et al. (2005)				DSM-IV/ CIDI SCAN [n = 68378]
23. Kinyanda et al. (2013)	Uganda	Multistage sampling; Representative of Lira, Tororo, Kaberamaido, and Gulu districts (rural)	3-19	DSM-IV MINI SDQ [n=1587]

24. Kwobah et al. (2017)	Kenya 2015-2016	Random sample of individuals; Representative of Kosirai division, Nandi County (rural)	15+	DSM-5 MINI-7 [n = 420]
25. Magai et al. (2018)	Kenya	Multistage sampling; Representative of Kiambu and Nyeri County (urban/rural)	6-18	CBCL YSR [n=1022]
26. Nalwadda et al. (2018)	Uganda 2013	Random sample of households; Representative of Kamuli District (rural)	18+	AUDIT [n = 351]
27. Ouedraogo et al. (2019)	Burkina Faso	Multistage sampling; Representative of Burkina Faso (national)	18+	MINI [n=2587]
28. Parry et al. (1998)	South Africa 1998	Multisage sampling; Representative of South Africa (national); First South African Demographic and Health Survey (SADHS)	15+	CAGE Questionnaire [n = 13826]
29. Patel et al. (2007)	Mozambique 2003	Multistage sampling; Representative of Maputo City (urban)	17+	SI & SSI [n = 1796]
	Mozambique 2003	Multistage sampling; Representative of Cuamba city (rural)	17+	SI & SSI [n = 943]
30. Peltzer et al. (2011)	South Africa 2008	Multistage sampling; Representative of South Africa (national); South African National HIV Incidence, Behaviour & Communication (SABSSM) survey	15+	AUDIT [n = 15828]
31a. Peltzer et al. (2013)	South Africa 2007-2009	Multistage sampling; Representative of South Africa; National population-based study- Study of Global AGEing & Adult Health (SAGE)	50+	ICD-10 CIDI [n = 3840]
31b. Thapa et al. (2014)				NIAAA/ Diary recording alcohol use [n = 3668]
32. Rumble et al. (1996)	South Africa 1992	Multistage sampling; Representative of Mamre village (rural)	15+	SRQ PSE-CATEGO [n = 560]
33. Smit et al. (2006)	South Africa 2002	Random sample of households; Representative of a township outside of Cape Town (peri-urban)	15+	DSM-IV CES-D AUDIT LEC [n = 645]
34. Thapa et al. (2014)	Ghana 2007-2009	Multistage sampling; Representative of Ghana; National population-based study- Study of Global AGEing & Adult Health (SAGE)	50+	NIAAA Diary recording alcohol use [n = 4289]
35. Tognon-Techégnonsi et al. (2020)	Benin 2013	Sampling of households along a randomly selected direction in Tourou community (rural)	18+	DSM-IV CIDI [n=603]
36.Umubyeyi et al. (2014)	Rwanda 2011-2012	Multistage sampling; Representative of eight districts in the Southern Province (primarily rural)	20-35	DSM-IV MINI 5.0 [n = 917]

Abbreviations: Alcohol Use Disorder; AUDIT = Alcohol Use Disorder Identification Test; ASI = Addiction Severity Index; CES-D = Center for Epidemiologic Study for Depression Scale; CIDI = Composite International Diagnostic Interview; CIS-R = Clinical Interview Schedule- Revised; DHSCL = Depression Section of the Hopkins Symptom Checklist; DSM= Diagnostic and Statistical Manual of Mental Disorders; ICD-10 = International Classification of Disease, 10th revision; LEC = Life Event

Check-list; MINI = Mini-International Neuropsychiatric Interview; NIAAA = National Institute on Alcohol Abuse and Alcoholism; PHQ = Patient Health Questionnaire; PSQ = Psychosis Screening Questionnaire; SCAN = Schedule for Clinical Assessment in Neuropsychiatry; SI = Structured Interview; SQ = Structured Questionnaire; SRQ = Self-Reporting Questionnaire; SSI = Semi-structured Interview; WHODAS-II = World Health Organization Disability Assessment Schedule 2.0

Table 2. Estimated prevalence of mood disorders in Africa

POINT PREVALENCE											
Country	**Study**	**Survey year**	**Sample size**	**Age**	**Diagnostic Criteria**	**Measure**	**MD**	**MDD**	**DE**	**DY**	**BD**
Benin	Tognon-Techégnonsi 2020	2013	603	18+	DSM-IV	CIDI	..	..	32.3	..	..
Burkina Faso	Duthe 2016	2010	2187	15+	DSM-IV	MINI	..	..	4.3	..	..
Burkina Faso	Ouedraogo 2019	..	2587	18+	..	MINI	..	5.1	11.6	10.1	..
Egypt	Ghanem 2009	2003	14640	18-64	..	MINI-Plus	6.4	2.7	..	1.0	..
Ethiopia	Fedaku 2004	1998	1691	16+	ICD-10	CIDI/ SCAN	..	..	..	¨	1.8
Ethiopia	Kebede 1999b	1994	1420	15+	ICD-10	CIDI/SRQ	3.8	..	2.1	..	0.1
Kenya	Jenkins 2012	2000	876	16-65	ICD-10	CIS-R	..	..	0.7	..	..
Kenya	Jenkins 2015	2004-2013	1158	16-65	ICD-10	CIS-R	..	..	0.9	¨	..
Morocco	Kadri 2010	2004-2005	5498	15+	DSM-IV	MINI	..	26.5	..	¨	3.2
Mozambique	Audet 2018	2014	3892	16-62	DSM-IV	PHQ-8	..	14.0	..	..	..
Nigeria	Adewuya 2018	2015	11246	18-40	DSM-IV	MINI-5, PHQ-9	..	5.5	..	¨	..
Rwanda	Bolton 2002	1999	368	18+	DSM-IV	DHSCL	..	15.5	..	..	..
Rwanda	Umubyeyi 2014	2011-2012	917	20-35	DSM-IV	MINI-5	..	..	19.6	¨	..
South Africa	Rumble 1996	1992	560	15+	..	SRQ PSE-CATEGO	..	2.0	..	¨	..
South Africa	Smit 2006	2002	645	15+	DSM-IV	CES-D	..	33.2	..	..	..
Uganda	Bolton 2004	2000	587	18+	DSM-IV	DHSCL, WHODAS	..	21.0	..	¨	..
Uganda	Kinyanda 2013	..	1587	3-19	DSM-IV	MINI-KID	..	..	7.6	..	..
PERIOD PREVALENCE											
Country	**Study**	**Survey year**	**Sample size**	**Age**	**Diagnostic Criteria**	**Measure**	**MD**	**MDD**	**DE**	**DY**	**BD**
Benin	Tognon-Techégnonsi 2020	2013	603	18+	DSM-IV	CIDI	..	..	11.6	..	..
Nigeria	Gureje 2007	2003-2004	2152	65+	DSM-IV	CIDI	..	7.1	..	¨	..
Nigeria	Gureje 2006; Kessler 2007, 2009, 2015	2001-2003	4985-6752	18+	DSM-IV	CIDI	1.1-1.3	1.1	..	0.1	0.0
South Africa	Herman 2009; Kessler 2007, 2009, 2015; Stein 2008; Tomlinson 2009	2002-2004	4351	18+	DSM-IV	CIDI	4.9	4.9	..	..	..
South Africa	Peltzer 2013	2007-2009	3840	50+	ICD-10	CIDI	..	4.0	..	¨	..
LIFETIME PREVALENCE											
Country	**Study**	**Survey year**	**Sample size**	**Age**	**Diagnostic Criteria**	**Measure**	**MD**	**MDD**	**DE**	**DY**	**BD**
Ethiopia	Kebede 1999b	1994	1420	15+	ICD-10	CIDI/SRQ	5.0	..	..	..	0.3
Ethiopia	Kebede 2005; Negash 2005	1998-2001	68478 - 68491	15-49	ICD-10 & DSM-IV	CIDI/SCA N	..	0.3	..	¨	0.5
Kenya	Kwobah 2017	2015-2016	420	15+	DSM-5	MINI	..	12.6	..	¨	5.2
Nigeria	Gureje 2007	2003-2004	2152	65+	DSM-IV	CIDI	..	26.2	..	¨	..
Nigeria	Gureje 2006; Kessler 2007, 2009, 2015	2001-2003	4985-6752	18+	DSM-IV	CIDI	3.3-4.1	3.1	..	0.2	0.0
South Africa	Herman 2009; Kessler 2007, 2009, 2015; Stein 2008; Tomlinson 2009	2002-2004	4351	18+	DSM-IV	CIDI	9.8	9.7-9.8	..	..	..

Disorder Abbreviations - BD: Bipolar Disorder, DE: Depressive Episode, DY: Dysthymia, MD: Mood Disorder, MDD: Major depressive disorder

Table 3. Estimated prevalence of anxiety disorders in Africa

POINT PREVALENCE														
Country	**Study**	**Survey year**	**Sample size**	**Age**	**Diagnostic Criteria**	**Measure**	**AN**	**GA**	**PN**	**AG**	**OC**	**SO**	**SP**	**PT**
Benin	Tognon-Techégnonsi 2020	2013	603	18+	DSM-IV	CIDI	..	9.6	3.5	..	20.7	14.3	..	11.1
Burkina Faso	Ouedraogo 2019	..	2587	18+	..	MINI	..	4.0	5.0	3.6	..	2.7	..	4.1
Egypt	Ghanem 2009	2003	14640	18-64	..	MINI-Plus	4.8	0.9	0.7	..	0.7	0.2	1.4	0.11
Kenya	Jenkins 2012	2000	876	16-65	ICD-10	CIS-R	..	1.6	2.6	..	0.2	..	0.3	..
Kenya	Jenkins 2015	2004-2013	1158	16-65	ICD-10	CIS-R	..	0.7	3.1	..	1.4	..	0.4	..
Morocco	Kadri 2007	1994	800	15-80	DSM-IV	MINI	..	4.3	2.0	7.6	6.1	3.4	14.3	3.4
	Kadri 2010	2004-2005	5498	15+	DSM-IV	MINI	..	9.3	6.6	9.4	6.6	6.3	..	2.1
Nigeria	Adewuya 2018	2015	11246	18-40	DSM-IV	MINI-5	..	3.5	..	..	..	..	..	..
Rwanda	Umubyeyi 2014	2011-2012	917	20-35	DSM-IV	MINI-5	..	36.5	..	..	..	..	..	13.6
South Africa	Smit 2006	2002	645	15+	DSM-IV	LEC, HTQ	..	..	..	..	..	..	..	14.9
PERIOD PREVALENCE														
Country	**Study**	**Survey year**	**Sample size**	**Age**	**Diagnostic Criteria**	**Measure**	**AN**	**GA**	**PN**	**AG**	**OC**	**SO**	**SP**	**PT**
Nigeria	Gureje 2006	2001-2003	4985-6752	18+	DSM-IV	CIDI	4.1	0.0	0.1	0.2	0.1	0.3	3.5	0.0
South Africa	Herman 2009	2002-2004	4351	18+	DSM-IV	CIDI	8.1	1.4	0.8	4.8	..	1.9	..	0.6
LIFETIME PREVALENCE														
Country	**Study**	**Survey year**	**Sample size**	**Age**	**Diagnostic Criteria**	**Measure**	**AN**	**GA**	**PN**	**AG**	**OC**	**SO**	**SP**	**PT**
Benin	Tognon-Techégnonsi 2020	2013	603	18+	DSM-IV	CIDI	..	..	9.0	..	..	..	..	..
Kenya	Kwobah 2017	2015-2016	420	15+	DSM-5	MINI	15.7	..	..	..	..	..	..	4.5
Morocco	Kadri 2007	1994	800	15-80	DSM-IV	MINI	..	..	2.3	8.4	..	..	..	..
Nigeria	Gureje 2006	2001-2003	4985-6752	18+	DSM-IV	CIDI	5.7	0.1	0.2	0.4	0.1	0.3	5.4	0.0
South Africa	Herman 2009	2002-2004	4351	18+	DSM-IV	CIDI	15.8	2.7	1.2	9.8	..	2.8	..	2.3

Disorder Abbreviations – AG: Agoraphobia; AN: Anxiety disorders; GA: Generalized anxiety disorder; OC: Obsessive-compulsive disorder; PN: Panic disorder; PT: Post-traumatic stress disorder; SO: Social phobia; SP: Specific phobia

Table 4. Estimated prevalence of psychotic disorders in Africa

POINT PREVALENCE											
Country	**Study**	**Survey year**	**Sample size**	**Age**	**Diagnostic Criteria**	**Measure**	**PSY**	**SCZ**	**SCA**	**PAR**	**REC**
Benin	Tognon-Techégnonsi 2020	2013	603	18+	DSM-IV	CIDI	..	..	..	..	9.3
Burkina Faso	Ouedraogo 2019	..	2587	18+	..	MINI	..	..	..	..	..
Egypt	Ghanem 2009	2003	14640	18-64	..	MINI-Plus	0.19	..	..	..	..
Ethiopia	Fedaku 2004	1998	1691	16+	ICD-10	CIDI/SCAN	..	0.06	..	..	..
Ethiopia	Kebede 1999a	1994	1420	15+	ICD-10	CIDI/SRQ	..	0.30	0.40	..	..
Ethiopia	Kebede 2003	1998-2001	68378	15-49	ICD-10 & DSM-IV	CIDI//SCAN	..	..	..	..	..
Kenya	Kwobah 2017	2015-2016	420	15+	DSM-5	MINI	..	..	..	..	..
Mozambique	Patel 2007	2014	3892	16-62	DSM-IV	PHQ-8	..	..	..	..	..
South Africa	Rumble 1996	1992	560	15+	..	SRQ PSE-CATEGO	..	..	..	5.0	..
LIFETIME PREVALENCE							..	..	..	..	..
Country	**Study**	**Survey year**	**Sample size**	**Age**	**Diagnostic Criteria**	**Measure**	**PSY**	**SCZ**	**SCA**	**PAR**	**REC**
Benin	Tognon-Techégnonsi 2020	2013	603	18+	DSM-IV	CIDI	..	..	..	..	30.2
Burkina Faso	Ouedraogo 2019	..	2587	18+	..	MINI	..	..	..	..	4.1
Ethiopia	Kebede 1999a	1994	1420	15+	ICD-10	CIDI/SRQ	..	0.40	0.50	..	..
Ethiopia	Kebede 2003	1998-2001	68378	15-49	ICD-10 & DSM-IV	CIDI//SCAN	..	0.47	..	..	..
Kenya	Kwobah 2017	2015-2016	420	15+	DSM-5	MINI	1.0	..	..	..	..
Mozambique	Patel 2007	2014	3892	16-62	DSM-IV	PHQ-8	1.6 / 4.4	..	..	..	..

Disorder Abbreviations – PAR: Paranoid Schizophrenia; PSY: Psychosis/Psychotic disorder; REC: Recurrent psychotic syndrome; SCZ: Schizophrenia; SCA: Schizoaffective disorder

Table 5. Estimated prevalence of substance use disorders in Africa

POINT PREVALENCE											
Country	**Study**	**Survey year**	**Sample size**	**Age**	**Diagnostic Criteria**	**Measure**	**HazA**	**HarmA**	**AUD**	**SUD**	**AOD**
Benin	Tognon-Techégnonsi 2020	2013	603	18+	DSM-IV	CIDI	..	..	4.0	1.3	..
Burkina Faso	Ouedraogo 2019	..	2587	18+	..	MINI	..	0.1	1.0	0.5	..
Egypt	Ghanem 2009	2003	14640	18-64	..	MINI-Plus	..	..	0.03	0.13	..
Ethiopia	Gedif 2019	2018	1588	18+	..	ASSIST	25.8				..
Ghana	Thapa 2014	2007-2009	4289	50+	..	NIAAA	..	7.0	..	..	..
Morocco	Kadri 2010	2004-2005	5498	15+	DSM-IV	MINI	..	..	3.4	5.8	..
Mozambique	Wainberg 2018	2014	3892	16-62	DSM-IV	AUDIT	8.0	..	..	..	..
Nigeria	Adewuya 2018, 2020	2015	11246	18-40	DSM-IV	MINI-5, PHQ-9	..	8.7	7.1	2.1	..
South Africa	Thapa 2014	2007-2009	3668	50+	..	NIAAA	..	4.4	..	..	..
	Smit 2006	2002	645	15+	DSM-IV	AUDIT	..	..	16.7	..	..
PERIOD PREVALENCE											
Country	**Study**	**Survey year**	**Sample size**	**Age**	**Diagnostic Criteria**	**Measure**	**HazA**	**HarmA**	**AUD**	**SUD**	**AOD**
Nigeria	Gureje 2006; Kessler 2007, 2009, 2015	2001-2003	2143-4985	18+	DSM-IV	CIDI	..	..	0.6	0.2	0.8
South Africa	Andersson 2018	2012	977	18-40	DSM-IV	MINI, SSI	..	..	35.5	..	..
South Africa	Herman 2009; Kessler 2007, 2009, 2015; Stein 2008	2002-2004	4351	18+	DSM-IV	CIDI	..	..	5.7	1.5	5.8
Uganda	Nalwadda 2018	2018	351	18+	..	AUDIT	2.9	0.7	0.5	..	..
LIFETIME PREVALENCE											
Country	**Study**	**Survey year**	**Sample size**	**Age**	**Diagnostic Criteria**	**Measure**					
Egypt	Hamdi 2013	2006	44000	15+	ICD-10	ASI	..	..	..	..	1.6
Kenya	Kwobah 2017	2015-2016	420	15+	DSM-5	MINI	..	..	..	..	11.7
Kenya	Gureje 2006; Kessler 2007, 2009, 2015	2001-2003	2143-4985	18+	DSM-IV	CIDI	..	..	3.0	1.0	3.7
South Africa	Dept. of Health, Medical Research Council 2007	2003	10214	15+	..	CAGE	..	..	21M / 7F[a]	..	..
South Africa	Herman 2009; Kessler 2007, 2009, 2015; Stein 2008	2002-2004	4351	18+	DSM-IV	CIDI	..	..	14.0	4.5	13.3
South Africa	Parry 1998	1998	13826	15+	..	CAGE	..	..	28M / 10F[a]	..	..

Disorder Abbreviations – AOD: Alcohol or other drug use disorder; AUD: Alcohol use disorder; SUD: Substance use disorder; HazA: Hazardous alcohol use; Harm: Harmful/problematic alcohol use

[a]Study only reported gender-stratified estimates (M: Male, F: Female)