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Short Report

Psychometric evaluation of the psychosis screening questionnaire in South Africa with attention to overlap between symptoms and normative cultural beliefs

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Abstract: *We evaluated the 5-item Psychosis Screening Questionnaire (PSQ) against a diagnostic gold standard in South Africa. 1885 adults at primary and tertiary health facilities were screened with the PSQ and diagnosed using the Mini International Neuropsychiatric Interview-V. Minor adaptations were required of both instruments to distinguish between psychiatric symptoms and normative cultural beliefs. We assessed internal consistency, criterion validity and sensitivities and specificities for identifying current or lifetime hypomanic or manic episode and/or psychotic disorders. The PSQ only yielded acceptable criterion validity for lifetime hypomanic or manic episode. A positive PSQ screen yielded sensitivities of 74.36%, 55.00%, and 64.68% for lifetime hypomanic or manic episode, psychotic disorder, and any SMD, respectively. Given the overlap between symptoms and normative cultural beliefs, preemptive framing was required to improve the cultural understanding and relevance. With these adaptations, the translated PSQ functioned adequately for hypomanic or manic episode, but not for psychotic disorder.*

Keywords: Cultural Validation, Severe Mental Disorders, Screening; Psychotic Disorder, Manic or Hypomanic Episode, Primary Care.

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INTRODUCTION

Severe mental disorders (SMDs), such as psychotic disorders, schizophrenia and bipolar disorders, have high morbidity and mortality.(Murray et al., 2020) In South Africa, the 2019 estimated age-adjusted prevalence of schizophrenia and bipolar disorder was 131.5 per 100,000 individuals and 320.8 per 100,000 individuals.(GBD Mental Disorders Collaborators, 2022) Few individuals with these conditions receive appropriate and sustained treatment. This is due in part to a dearth of psychiatric specialists, underdeveloped community- and primary-care referral services, and low mental health literacy.(Lund et al., 2010; Petersen & Lund, 2011) However, screening for SMDs is critical as it can facilitate early detection, treatment initiation, and improved health and well-being.

Screening tools play a crucial role in identifying individuals with SMDs. Such tools aid in early detection, enabling timely intervention, and improved outcomes. Several SMD screening tools have been developed with varying diagnostic accuracy, feasibility, and applicability in diverse clinical settings.(Addington et al., 2015; Carta & Angst, 2016) Given the cultural and contextual nuances in the presentation, experience, and reporting of psychotic and manic symptoms,(Heuvelman et al., 2018; Lewis-Fernandez et al., 2009) it is imperative that screening tools be locally translated and validated to address the burden of the SMDs on individuals and healthcare systems alike.
We met with international mental health practitioners, policymakers, and researchers specializing in psychosis and mania measurement to review existing

screening tools for SMDs; we considered acceptability and feasibility of administration (e.g., number of items), and access and sustainability (e.g. cost per use).(Lovero et al., 2021) The Psychosis Screening Questionnaire (PSQ) is a five-item screener that captures psychotic symptoms in the last year with questions asking about hypomania, thought insertion, paranoia, strange experience, and hallucinations.(Bebbington & Nayani, 1995) The PSQ was developed and has been used widely in high-income settings. While the PSQ has been used in sub-Saharan African settings,(Bitta et al., 2022; Hailemariam et al., 2019; Jenkins et al., 2010; Jenkins et al., 2012; Kwagala et al., 2023) it has only been validated against a diagnostic gold-standard in Mozambique.(Lovero, Unpublished) This study aimed to validate a battery of mental health screeners.(Stockton et al., Pending Publication) This paper describes the validation of the PSQ against a diagnostic gold standard, the Mini International Neuropsychiatric Interview (MINI-V), in South Africa.

METHODS

Study Setting

Data were collected from four primary and one tertiary care facility (Feb-May 2022) located in Buffalo City Metro (BCM) Health District in Eastern Cape Province, South Africa.

Study Population and Sampling

We used a targeting sampling strategy to recruit a gender-balanced sample of adults (patients and accompaniers 18 years or older) able to communicate in isiXhosa or English at the study facilities.(Stockton et al., Pending Publication) For this specific analysis, our target sample included 50 gender-balanced individuals per disorder (psychotic disorder or hypomanic or manic episode) and at least 100 individuals without any disorder in order to obtain precise confidence intervals. To reduce recruitment bias and ensure a representative sample of adults at the study facilities, research assistants approached every 7th person entering a study facility. Given the higher rate in which women attended the study facilities, research assistants were instructed to target all available men to ensure gender-balanced sampling.

Measures

The PSQ and MINI-V were translated into isiXhosa using a process of forward and backward translation and review by the study staff and psychiatrist. Each of the five PSQ questions has one to two probes that ascertains whether the experience is incongruent with social norms.(Bebbington & Nayani, 1995) A score representing the number of symptoms can be calculated, however a

positive screen for any of the five symptoms is considered indicative of a probable SMD. The (Hypo) Manic Episode and Psychotic Disorders modules of the MINI-V were used to diagnose SMDs, including current and lifetime hypomanic or manic episode and psychotic disorder (Sheehan et al., 1998).
The study psychiatrist trained research assistants to administer the PSQ, and nurses to administer the MINI-V. They then piloted both instruments among a sample of 53 individuals at a primary care facility in BCM. The pilot revealed a 23% and 30% prevalence of MINI-V cases of current and lifetime SMDs, particularly psychotic disorder, prompting further exploration. Both research assistants and nurses reported difficulties administering the PSQ and MINI-V since many of the psychosis symptom questions are adjacent to normative cultural beliefs. The research team discussed these difficulties in order to help identify ways to consistently differentiate between normative cultural beliefs and true manic or psychotic symptoms. The research assistants introduced the PSQ questions by prompting participants to distinguish between normal cultural practices and extraordinary phenomena. For the MINI-V, which allows for probing, nurses were empowered to use their clinical acumen in differentiating between true symptoms and cultural beliefs within normative range.

Data Collection

Research assistants approached potential participants, consented and enrolled interested individuals, and screened each participant with the PSQ in either English or isiXhosa. Following screening, nurses (blinded to the screening) separately used the MINI-V to diagnose mental disorders. Individuals with MINI-V diagnoses were either referred to onsite psychiatric staff or linked to necessary services in line with the South African integrated chronic services manual (ICSM) (National Department of Health South Africa, 2012).

Analysis

To assess internal consistency, the Cronbach's alpha and McDonald's omega were calculated with bootstrapped 95% confidence intervals.(Dunn et al., 2014; Hayes & Coutts, 2020) To assess criterion validity, we compared the total number of endorsed PSQ symptoms with the MINI-V diagnoses using a receiver operating characteristic curve and calculated the area under the receiver operating curve (AUC).(DeLong et al., 1988) Finally, we calculated the sensitivities and specificities of a positive screen (an endorsement of at least one symptom) for predicting current and lifetime psychotic disorder, hypomanic or manic episode, or any SMD.

Ethical Considerations

Participants provided written informed consent as approved by the New York State Psychiatric Institute Institutional Review Board, the Foundation for Professional Development Research Ethics Committee and the Eastern Cape Department of Health Research Committee.

RESULTS

Participant Characteristics

Sociodemographic and mental health characteristics of the 1885 participants are presented in **Table 1.** A small proportion of participants self-reported a previous SMD diagnosis (bipolar disorder, 1.6%; schizophrenia, 3.6%) and were currently on treatment. The lifetime SMD prevalence was 11.6% (n=218); the prevalence of current SMD was 8.1% (n=152). Among the 152 participants with a current SMD, 19.7% (n=30), 32.9% (n=50), and 43.4% (n=66) also had diagnosed comorbid alcohol or substance use disorder, low to high suicide risk, and a common mental disorder, respectively.

Table 1: Participant Characteristics

Mean (SD) or N (%)	Total (N=1885)	Men (n=651)	Women (n=1232)
Age (Range:18-88)	39.0 (13.1)	39.4 (12.4)	38.9 (13.5)
Language of PSQ Administration			
English	92 (4.9)	26 (4.0)	66 (5.4)
isiXhosa	1792 (95.1)	625 (96.0)	1165 (94.6)
Interchangeable	1 (0.1)	0 (0.0)	1 (0.1)
Race			
White	17 (0.9)	7 (1.1)	10 (0.8)
Black	1834 (97.3)	634 (97.4)	1198 (97.2)
Colored	31 (1.6)	10 (1.5)	21 (1.7)
Other	2 (0.2)	0 (0.0)	2 (0.2)
Health Seeking			
Seeking Care	1364 (72.4)	460 (70.7)	902 (73.2)
Accompanying	521 (27.6)	191 (29.3)	330 (26.8)
Previous Diagnosis (self-report)			
Bipolar Disorder	31 (1.6)	11 (1.7)	20 (1.6)
Schizophrenia**	68 (3.6)	59 (9.1)	9 (0.7)
Diagnoses			
Severe Mental Disorders	187 (9.9)	88 (13.5)	99 (8)
Psychotic Disorder, current	95 (5.0)	66 (10.1)	29 (2.4)
Psychotic Disorder, lifetime***	131 (7.0)	80 (12.3)	51(4.1)
Hypomanic Episode, current	47 (2.5)	13 (2.0)	34 (2.8)
Hypomanic Episode, lifetime	80 (4.2)	27 (4.1)	53 (4.3)
Manic Episode, current	20 (1.1)	7 (1.1)	13 (1.1)
Manic Episode, lifetime	37 (2)	13 (2)	24 (1.9)
Common Mental Disorders, current****	458 (24.4)	107 (16.4)	351 (28.5)
Alcohol or Substance Use Disorders, current	205 (10.9)	97 (14.9)	108 (8.8)
Low to High Suicide Risk, current	279 (14.8)	60 (9.2)	219 (17.8)

*Two participants identified as Transgender or Non-binary.
**Includes 1 participant who reported a diagnosis of "psychosis".
***lifetime includes current.
****Includes depression, anxiety, and PTSD.

Internal Consistency, Criterion Validity, Sensitivity and Specificity.

With respect to internal consistency, the PSQ yielded a of Cronbach's α of 0.755(95% CI 0.737-0.773) and McDonald's ωt of 0.757(95% CI 0.740-774) when scored from 0-5 for the number of symptoms endorsed.

The AUCs describing criterion validity relative to the number of PSQ symptoms endorsed are available in **Table 2**. The PSQ only had an AUC > 0.7 for lifetime hypomanic or manic episode.

A total of 648 individuals screened positive on the PSQ. The sensitivities and specificities of a positive PSQ screen are available in Table 2. A positive PSQ screen yielded higher sensitivity for identifying hypomanic or manic episode than for identifying psychotic disorder, and similar specificities for both disorders.

Table 2: AUC for the number of PSQ symptoms endorsed and the sensitivity and specificity of a positive PSQ screen for identifying current and lifetime SMD

Disorder	Cases (Prevalence)	AUC (95% CIs)	Sensitivity (95% CIs)	Specificity (95% CIs)
Current				
Severe Mental Disorder	152 (8.1%)	0.64 (0.60-0.68)	59.86 (51.62-67.72)	67.86 (65.60-70.06)
Psychotic Disorder	95 (5.0%)	0.60 (0.55-0.66)	53.68 (43.15-63.98)	66.65 (64.41-68.83)
Hypomanic or Manic Episode	67 (3.6%)	0.68 (0.62-0.73)	68.66 (56.16-79.44)	66.89 (64.67-69.05)
Lifetime				
Severe Mental Disorder	218 (11.6%)	0.67 (0.64-0.70)	64.68 (57.94-71.01)	69.69 (67.31-71.79)
Psychotic Disorder	131 (7.0%)	0.61 (0.57-0.65)	55.00 (46.03-63.66)	67.16 (64.91-69.36)
Hypomanic or Manic Episode	117 (6.2%)	0.71 (0.67-0.75)	74.36 (65.46-81.98)	68.27 (66.04-70.44)

SMD=Severe Mental Disorder; AUC=Area Under the Curve relative to the number of symptoms endorsed (range 0-5); CIs=Confidence Intervals.

Discussion

In this validation study, we assessed the performance of the PSQ in a sample of individuals at primary and tertiary care facilities. While several studies reported on the feasibility of using the PSQ in African settings, few examined the psychometric properties.(Bitta et al., 2022) A recent review of the performance of the PSQ in four sub-Saharan African countries, including South Africa, used confirmatory factor analysis and found good fit with a unidimensional model across all four countries.(Bitta et al., 2022) The one Mozambican study that used a diagnostic gold standard (also the MINI-V) found similar internal consistency, and lower sensitivity for psychotic disorder than for hypomanic or manic episode.(Lovero et al., 2021) A broad-spectrum mental health screener demonstrated similar sensitivity and specificity for SMD identification in South Africa.(Stockton et al., Pending Publication) Valid screening tools for SMD are urgently needed to identify cases at the community and primary care levels and facilitate linkage to critical psychiatric services.

The relative dearth of validation research on the PSQ in sub-Saharan Africa, despite widespread use, is problematic given how normative cultural beliefs in the region can resemble psychotic symptoms. For example, endorsing "*Have you ever believed that people were spying on you, or that someone was plotting against you or trying to hurt you?*" is commonplace in neighborhoods with a high prevalence of poverty and violence. In addition, endorsing "*Have you ever believed that someone or some force outside of yourself put thoughts in your mind that were not your own, or made you act in a way that was not your usual self?*" is also common as traditional beliefs around witchcraft, hexing, ancestral guidance and religious intervention are widespread and not necessarily unusual.(Campbell et al., 2017; Pantelic et al., 2018) Ultimately, nurses needed additional training on probing into these questions in order to distinguish between symptoms and normative beliefs. Further, this experience led to the development of the following standardized introductory script for the PSQ, "*Many South African cultures have a way of doing things, and customs, traditions, and religious beliefs. Besides these things that I have mentioned, the questions I am going to ask you are not related or*

are different to such cultural traditions, customs and religious beliefs," for an ongoing study (R01AI148461). As mental health programming for SMDs continues to engage non-specialists in the African context, efforts are needed to ensure screening tools are only translated, but valid and appropriate for the cultural context.

Limitations

Due to the targeted sample, the prevalence data reported in this manuscript should not be interpreted as generalizable to the South African adult population. The PSQ captures past-year symptoms whereas the MINI-V diagnoses current and lifetime disorders, which may account for the lower sensitivity.

CONCLUSION

The PSQ showed acceptable internal consistency, but only yielded acceptable criterion validity for lifetime hypomanic or manic episode and only adequate sensitivity for identifying hypomanic or manic episode or lifetime SMD. Given the overlap between some symptoms and South African normative cultural beliefs, preemptive framing was required to improve the cultural understanding and relevance of both tools. With these adaptations, the translated PSQ functioned as an adequate screener for hypomanic or manic episode, but not for psychotic disorder. More culturally and linguistically validated tools to screen for SMDs are needed in South Africa.

AUTHOR CONTRIBUTIONS

MAS designed the study, analyzed the results, and drafted the manuscript.

EW led the study staff training and helped develop data collection protocols, with support from KN, NN, ACW, PN, CB and CG.

CG led the clinical training and provided clinical oversight. CB and MMW provided statistical expertise and consultation. CB developed the data collection system.

EW, AK, and GS drafted portions of the manuscript.

MLW, AM, and PN provided senior leadership and oversight.

All authors contributed to drafting this manuscript.

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CONFLICT OF INTERESTS

All authors declare no conflicts interests.

DATA AVAILABILITY

The data from the current manuscript are not publicly available, but are available from the corresponding author on reasonable request.

HUMAN RIGHTS

This work complies with the Declaration of Helsinki.

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