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The psychometric properties of the Washington Early Recognition Center Affectivity and Psychosis (WERCAP) screen in adults in the Kenyan context: Towards combined large scale community screening for affectivity and psychosis

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ABSTRACT

There is a need for screening for early symptoms of psychosis and affectivity at community level to promote early diagnosis and management. Any screening instrument should have good psychometric properties. One such instrument is the Washington Early Recognition Center Affectivity and Psychosis (WERCAP) Screen that has been used in the USA, Kenya and Rwanda. However, its properties have not been studied outside the USA, and not in adults. The study aims to document the psychometric properties of the WERCAP Screen in Kenyan adults with positive screens on the WHO mental health treatment GAP- Intervention Guidelines (mhGAP-IG). We administered the WERCAP Screen and a gold standard – the Mini-International Neuropsychiatric Interview (MINI-Plus) section on psychosis to 674 Kenyan adults who had screened positive on the WHO mhGAP-IG. Out of these, 464 (68.84%) scored positive for both affectivity and psychosis sections on the MINI-Plus. The WERCAP affectivity and psychosis scales had good psychometric properties as screening measures, with a cut-off point of 22 for affectivity and 20 for psychosis. The WERCAP Screen has the potential for combined scale up screening for affectivity and psychosis in Kenyan population.

1. Introduction

The WHO mental health treatment GAP - Intervention Guidelines (mhGAP-IG) has pointed out that treatment gap in Low and Middle Income Countries (LMIC) is much higher (about 85%) in LMIC compared with High Income Countries (HIC) (35–45%) (World Health Organization, 2010). Part of the explanation is the dearth of psychiatrists and other mental health specialists in LMIC compared with the HIC (Ndetei et al., 2007). The mhGAP-IG identified 8 priority mental disorders in adults needing most urgent attention because of the disability they cause, thus the need for early diagnosis and management, even in contexts where there are no mental health specialists. Screening for early signs of psychiatric conditions such as mania and psychosis is normally carried out by experienced clinicians, who are in short supply and not available outside clinical settings that are usually in urban areas. Alternatively, assisted screening and diagnosis using instruments can be applied but most of these are long, time consuming and normally carried out by mental health specialists in clinical rather than non-clinical community based settings, which are manned by non-mental health specialists for maximum reach (Fischler et al., 2016).

Several instruments with known psychometric properties are available for psychotic symptom screening (Fonseca-Pedrero et al., 2017; Mamah et al., 2014). The Washington Early Recognition Center Affectivity and Psychosis (WERCAP) Screen was originally developed to identify early symptoms of psychotic and bipolar disorders, and is divided into two sections to estimate affectivity and psychosis severity based on symptom frequency and functionality (Mamah et al., 2014). Developed in the United States, the WERCAP Screen has found applicability in LMIC (specifically in Kenya and Rwanda) in both clinical and non-clinical subjects (Mamah et al., 2016; Owoso et al., 2018). Nearly all the reported studies have been in youth with the aim of capturing the prodromal state of these conditions at the earliest possible

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Table 1
Demographic characteristics and factors associated with affectivity and psychosis and mhGAP-IG disorders.

Variable	Category	Overall (N = 674) n(%)	aWERCAP Mean ± SD	$P^{\dagger}$	pWERCAP Mean ± SD	$P^{\dagger}$
Age	20 and below	34(5.0%)	26.5 ± 13.5	**0.001**	35.9 ± 18.8	**<0.001**
	21–30 years	182(27.0%)	25.0 ± 12.7		35.8 ± 16.5	
	31–40 years	174(25.8%)	24.0 ± 13.3		33.9 ± 17.0	
	41–50 years	116(17.2%)	24.3 ± 13.5		34.1 ± 17.7	
	51–60 years	97(14.4%)	19.4 ± 12.9		27.0 ± 16.7	
	60 and above	71(10.5%)	19.5 ± 13.4		26.6 ± 19.4	
Gender	Male	327(48.5%)	24.0 ± 12.8	0.231	34.6 ± 16.5	**0.009**
	Female	347(51.5%)	22.7 ± 13.8		31.1 ± 18.4	
Marital status	Married	294(43.6%)	21.6 ± 13.3	**0.008**	30.8 ± 17.2	**0.003**
	Single/never married	280(41.5%)	24.9 ± 12.6		35.5 ± 16.3	
	Ever married	100(14.8%)	24.0 ± 14.6		31.2 ± 21.1	
Education Level	No formal education	72(10.7%)	21.0 ± 14.5	0.144	26.7 ± 20.2	**0.005**
	Primary	428(63.5%)	23.5 ± 13.2		33.6 ± 17.0	
	Secondary	149(22.1%)	24.5 ± 13.0		34.3 ± 18.1	
	Tertiary	25(3.7%)	19.6 ± 12.4		28.0 ± 11.9	
Employment Status	Self-Employed	164(24.6%)	20.7 ± 12.5	**0.012**	31.2 ± 16.4	0.226
	Employed	169(25.3%)	24.6 ± 13.5		34.6 ± 16.1	
	Unemployed	335(50.1%)	24.0 ± 13.5		32.7 ± 18.7	
Wealth Index	Quintile 1	157(23.3%)	24.7 ± 13.5	0.100	32.8 ± 19.3	0.576
	Quintile 2	112(16.6%)	21.0 ± 13.8		31.0 ± 17.5	
	Quintile 3	192(28.5%)	23.8 ± 12.2		34.4 ± 16.3	
	Quintile 4	79(11.7%)	24.8 ± 13.7		31.9 ± 18.0	
	Quintile 5	134(19.9%)	22.1 ± 13.8		32.6 ± 17.2	
Psychotic disorder		464(68.8%)	25.4 ± 13.1	**<0.001**	36.0 ± 15.9	**<0.001**
Major Depression		98(14.5%)	25.1 ± 13.6	0.152	28.6 ± 19.0	**0.011**
Suicidality		27(4.0%)	21.3 ± 14.4	0.428	30.8 ± 18.3	0.549
Mania/Hypomania		351(52.1%)	26.1 ± 12.5	**<0.001**	37.8 ± 15.9	**<0.001**
Alcohol Abuse/Dependence		29(4.3%)	24.5 ± 15.5	0.631	33.3 ± 21.1	0.883
Substance Abuse/Dependence		47(7.0%)	26.2 ± 14.7	0.128	36.7 ± 20.6	0.116
Dementia		59(8.8%)	16.4 ± 13.7	**<0.001**	21.5 ± 18.1	**<0.001**
Epilepsy		18(2.7%)	27.3 ± 13.4	0.195	36.9 ± 16.0	0.312

time. We have used the WERCAP screen in Kenya with a focus on community adolescents and young adults (Mamah et al., 2014). It has been found to have good psychometric properties in U.S youth with established mental disorders (Hsieh et al., 2016). Little is known about the value of this screening tool for identifying psychopathology in older populations in Kenya with established mental disorders. We report the first study to attempt to determine the psychometric properties of the WERCAP in an adult population in a rural setting in Kenya.

2. Methods

2.1. Study site

This study was conducted in Makueni County in southeast Kenya amongst 674 rural adults who screened positive on the mhGAP-IG, indicating the presence of a mental disorder (World Health Organization, 2010). The mhGAP-IG disorders in the population are summarized in Table 1. The mhGAP-IG was administered by trained community-based health providers, and participants were subsequently referred to health facilities where a trained research assistant administered the WERCAP and the MINI-Plus concurrently. The description of the study site has been detailed in an earlier publication (Mutiso et al., 2018).

2.2. Measures

For purposes of this study, two instruments were administered concurrently: the WERCAP Screen (https://werc.wustl.edu/Content/pdfs/WERCAP_Screen.pdf) and the MINI-Plus (Van Vliet and de Beurs, 2007)(reference standard) section on schizophrenia and mania disorders. MINI-Plus is a short, structured questionnaire for DSM-IV and ICD-10 psychiatric disorders. The MINI-Plus includes questions for 23 disorders and is useful in confirming the presence of a disorder and to eliminate possible confounders. It can be administered by a trained lay interviewer (Sheehan et al., 1998), has good psychometric properties (Sheehan et al., 1997) and has been used extensively in LMICs (Nakimuli-Mpungu et al., 2012; van Heyningen et al., 2016).In the current study, we used the MINI-Plus to confirm the presence of current psychosis. Among the 674 participants, 464 (68.84%) were found to have psychosis on the MINI-PLUS.

Before administering the instruments, we undertook a procedure for translating it. To eliminate bias, the WERCAP screen scale was translated by two independent translators fluent in both written and spoken English and Kamba. Both translated versions were then given to another independent translator fluent in both written and spoken English and Kamba, who did not have knowledge of the original WERCAP screen to reconcile both translations and back translate into English. The back translated version was then given to an English-speaking health professional for comments. The agreed upon English version was then culturally adapted in a group process to identify any language discrepancies while also taking into consideration the degree of understanding of each item. During the pilot study, in-depth interviews were carried out with a sample of eligible participants to ensure clarity on each item, comfort in answering the questions and cultural context as well as the comprehensiveness of the instructions of the WERCAP screen. The adapted version of the WERCAP screen was then piloted outside the study area. The final agreed version was administered to all referred participants.

All instruments were administered by trained Research Assistants (RAs) after obtaining participants' informed consents. The RAs were community based high school graduates who underwent two days training on how to ask the questions up to three times without elaborating. The training involved how to read the questions to the participants, role plays and mock interviews. This training of the RAs was deliberate: to increase intra and inter-rate reliability. The RAs asked the same questions the same way and recorded the participants' responses

in the language they were comfortable with. Though some of the participants could have read the questions themselves, others were not literate enough and so for uniformity, all the instruments were interviewer-administered.

2.3. Data analysis

2.3.1. Reliability

In order to investigate the reproducibility and consistency of the WERCAP screen, reliability coefficients as measured by Cronbach's alpha were calculated.

2.3.2. Cluster analysis

K-means iterative cluster analysis (Everitt et al., 1993; Lee et al., 2011; MacQueen, 1967) was used on the frequencies of occurrence of all 16 WERCAP screen items to identify latent subgroups of subjects with related symptom patterns. We used elbow method (Kodinariya and Makwana, 2013) to estimate the optimal number of clusters. Age and gender were compared across the clusters using one-way ANOVA employing Least Significant Difference (LSD) for multiple comparison and chi-square test.

2.3.3. Concurrent validity

Using spearman's correlation analysis, the relationship between scores of WERCAP affectivity (aWERCAP), WERCAP psychosis (pWERCAP) and MINI-Plus diagnoses was investigated to determine the magnitude of the relationship between the two measures i.e. concurrent validity. Concurrent validity requires that aWERCAP and pWERCAP should correlate positively with MINI-Plus diagnosis.

*Sensitivity; specificity; Positive/Negative predictive value (+PPV/-NPV) and Positive/*Negative *likelihood ratio (+LR/-LR).*

For each aWERCAP and pWERCAP cutoff point, sensitivity/true positive rate i.e. proportion of individuals with current psychosis according to MINI-Plus criteria that were correctly identified by aWERCAP and pWERCAP; specificity/true negative rate i.e. proportion of individuals without current psychosis according to the reference standard correctly identified as such by aWERCAP and pWERCAP; Positive predictive value (+PPV) i.e. Proportion of true positives among all positives identified by the aWERCAP and pWERCAP and Negative predictive value (–NPV) i.e. Proportion of true negatives among all those who scored negative by aWERCAP and pWERCAP; Positive likelihood ratio +LR i.e. probability of an individual without the condition having a positive test and Negative likelihood ratio –LR i.e. probability of an individual without the condition having a negative test were calculated.

2.3.4. ROC curve

Youden's index was used as a criterion for choosing optimal cut-off point for the aWERCAP and pWERCAP, optimal cut-off point is the value (sensitivity + specificity −1) for which sensitivity and specificity is maximized. Criterion validity was assessed by receiver operating characteristic (ROC) curves. The ROC curve is a plot of the sensitivity versus [1-specificity] over all possible threshold values of the test being validated. The aWERCAP and pWERCAP point showing simultaneously the highest sensitivity and specificity was also evaluated using the ROC curve. aWERCAP and pWERCAP's accuracy (proportion of results, both positive and negative, correctly identified by the MINI-Plus) was estimated by the area under the ROC curve (AUROC). All analyses were performed using SPSS version 23 software.

3. Results

Average scores for affectivity and psychosis by socio-demographics are shown in Table 1.

Mean aWERCAP items showed significant differences in age groups, LSD correcting for multiple comparisons, showed that those aged 20 years and below had significantly higher aWERCAP scores compared to those aged 51–60 and 60 years and above respectively. Those who were married had significantly lower aWERCAP scores compared to those who were single and divorced respectively. Those who were employed or unemployed had significantly higher aWERCAP scores compared to those who were self-employed. Scores on the aWERCAP did not significantly differ between gender, education level and wealth index.

Mean pWERCAP items showed that males experienced significantly higher total psychotic symptoms than females ($P = 0.0094$). Those aged 20 years and below had significantly more psychotic symptoms compared to those aged 51–60 and 60 years and above respectively. Those who were married had significantly less psychotic symptoms compared to those who were single and divorced respectively. Those with primary (1–8 years of formal education), secondary (1–4 years post primary education) and tertiary level (post-secondary training or education) of education had significantly more psychotic symptoms compared to those with no formal education. Level of wealth and employment status were not significantly associated with either aWERCAP or pWERCAP scores.

3.1. Reliability

WERCAP scale reliability calculated using Cronbach's alpha was 0.887 for aWERCAP and pWERCAP 0.893. The mean and Cronbach's alpha for the scale if the individuals items are deleted is shown in Table 2.

3.2. Cluster analysis of WERCAP screen items

The 674 participants who completed the WERCAP screen items and were analyzed using k-means clustering and the elbow method to estimate the optimal number of clusters showed a three-cluster solution as the optimal cluster. Table 3provides the mean WERCAP screen standardized items scores of the participants in each of the three clusters. These three clusters consisted of (Fig. 1); (1) *Affective only group* (16.9%), consisting of subjects with relatively high scores across only the affectivity items. (2) *Psychosis-affectivity group (38.7%),* consisting of subjects with relatively high scores across all WERCAP items and (3) the *normative group* (44.4%) consisting of subjects with low scores across the WERCAP items.

3.3. ROC curves for WERCAP

To evaluate the discriminative power of the WERCAP screen to detect current psychosis, ROC curves were calculated for aWERCAP and pWERCAP as shown in Fig. 2 and Table 4

For detecting current psychosis aWERCAP performed significantly better than chance, with an area under the curve AUC of 0.646 (S.E. = 0.0228), 95% C.I 0.609–0.682, $P < 0.0001$; Youden index $J = 0.2355$). The optimal cutoff on the aWERCAP to identify current psychosis was 22 (Table 5).

Sensitivity at this point was 59.3%and specificity of 64.3%. The PPV and NPV were 78.6% and 41.7% respectively. The positive and negative likelihood ratio at this point was 1.66 and 0.63 respectively. Similarly, pWERCAP performed significantly better than chance, with an area under the curve AUC of 0.659 (S.E. = 0.0238), 95% C.I 0.622–0.695, $P < 0.0001$; Youden index $J = 0.2566$). The optimal cutoff on the pWERCAP to identify current psychosis was 20. Sensitivity at this point was 82.3%and specificity of 43.3%. The PPV and NPV were 76.2% and 52.6% respectively. The positive and negative likelihood ratio at this point was 1.45 and 0.41 respectively.

4. Discussion

We present the first study on psychometric properties of the WERCAP outside the U.S. and the first one globally that focuses on a

Table 2
Reliability, Item-total correlations for the total sample and scores for WERCAP screen (Affectivity and Psychosis items for the total sample.

Affectivity Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1. Have you had sadness or depression lasting 1 month or longer?	16.53	96.686	0.621	0.877
2. Have you been sad or depressed AND slept 5 h or more than you normally do?	16.696	97.089	0.612	0.878
3. Have you become angry for most of the day over little things?	16.634	96.631	0.628	0.876
4. Have you had sudden shifts (changes) between sadness and happiness for no apparent (obvious) reason	16.491	92.708	0.742	0.865
5. Do you have extreme happiness or “highs” that others thought were excessive lasting 2 days or longer?	16.579	94.687	0.659	0.873
6. Have you had so much energy that you felt little or no need to sleep?	16.84	94.185	0.678	0.871
7. Do Ideas and thoughts come to you so fast that you could not express/communicate them all?	16.089	94.895	0.7	0.869
8. Have you felt that you have great abilities or supernatural powers which no other person in the world has?	16.976	95.595	0.629	0.876
Overall (8 items)				0.887
Psychosis				
9. Have you been confused whether something you have experienced is real or imaginary? (Existing only in mind).	17.479	101.112	0.625	0.884
10. Have you felt your mind was taken over by strange /unusual forces that were making you do things you did not choose to do	17.515	98.696	0.724	0.875
11. Have you felt that some force was inserting/putting in (or removing) thoughts into (or from) your head	17.586	97.545	0.737	0.873
12. Have you thought that people might be able to read your mind or that you can read other people's mind	17.426	101.74	0.63	0.884
13. Have you thought that some force communicates directly to you by sending special signs that only you could not understand	17.856	97.817	0.694	0.878
14. Have you thought that there was an unfair plot going on to harm you, or people following you that others did not believe it was true	17.933	99.367	0.639	0.883
15. Have you heard a voice or sound that others around you didn't seem to hear?	17.028	99.329	0.689	0.878
16. Have you seen objects (things), people or animals that others around you didn't seem to see?	17.27	99.163	0.635	0.883
Overall (8 items)				0.893

Table 3
Cluster Analysis of WERCAP.

WERCAP items	Cluster 1	2	3
1. Have you had sadness or depression lasting 1 month or longer?	0.811	0.318	−0.586
2. Have you been sad or depressed AND slept 5 h or more than you normally do?	0.743	0.303	−0.548
3. Have you become angry for most of the day over little things?	0.677	0.350	−0.563
4. Have you had sudden shifts (changes) between sadness and happiness for no apparent (obvious) reason?	0.621	0.484	−0.659
5. Do you have extreme happiness or "highs" that others thought were excessive lasting 2 days or longer?	−0.173	0.649	−0.500
6. Have you had so much energy that you felt little or no need to sleep?	−0.058	0.682	−0.573
7. Do Ideas and thoughts come to you so fast that you could not express/communicate them all?	0.553	0.607	−0.741
8. Have you felt that you have great abilities or supernatural powers which no other person in the world has?	−0.273	0.854	−0.642
9. Have you been confused whether something you have experienced is real or imaginary? (existing only in the mind)	0.356	0.628	−0.684
10. Have you felt your mind was taken over by strange /unusual forces that were making you do things you did not choose to do	0.376	0.688	−0.744
11. Have you felt that some force was inserting/putting in (or removing) thoughts into (or from) your head	0.310	0.736	−0.761
12. Have you thought that people might be able to read your mind or that you can read other people's minds?	0.156	0.618	−0.599
13. Have you thought that some force communicates directly to you by sending special signs that only you could understand	0.000	0.729	−0.637
14. Have you thought that there was an unfair plot going on to harm you, or people following you that others did not believe it was true?	0.117	0.660	−0.621
15. Have you heard a voice or sound that others around you didn't seem to hear?	−0.088	0.680	−0.560
16. Have you seen objects (things), people or animals that others around you didn't seem to see?	−0.334	0.727	−0.507

wide adult age range (18–90 years). Results of a cluster analysis of the WERCAP screen were similar to that found in the U.S. study among adolescents from a community youth center (Mamah et al., 2014) . More specifically, we also found three clusters and did not find a psychosis-only cluster. Our study however had a larger percentage of individuals in the psychosis-affectivity cluster (39%) compared to the U.S. study (18%), presumably because the current study included an older, clinical population. Although these studies are not directly comparable as our current study involves a wider age range, consistent findings across the two studies provide further support that psychosis is very often associated with affectivity in the population.

Our findings on internal consistency of the WERCAP and pWERCAP of 0.998 and 0.893 are similar to the findings in U.S. young adults of 0.087 and 0.92 respectively (Hsieh et al., 2016). From our ROC analysis on the pWERCAP we estimated the minimum cut off point of 20 on the pWERCAP to determine current psychosis in the MINI-Plus. This differs from that found in a related research study in the U.S. of young adults, where the optimal pWERCAP cutoff for schizophrenia diagnosis was 13 (Hsieh et al., 2016). On the aWERCAP, the U.S. study found that the optimal cutoff score for bipolar disorder was 20 (Hsieh et al., 2016) which is comparable to the 22 cut-off point for aWERCAP for Kenya. This discrepancy on the cutoff point for pWERCAP between US (13) and Kenya (20) could partly be explained in several possibilities:(i) the gold standards used to determine the cutoff points in the two studies were different, (ii) the Kenyan sample was much bigger than the US sample (thus the larger sample for Kenya reflects a more accurate cutoff) and (iii) the Kenyan sample was composed of treatment naïve participants who may have had low grade symptoms of schizophrenia.

Further support for the findings on cutoff points comes from the ROC analysis which showed a modest area under the curve (i.e. 0.65 and 0.66), compared to the US findings of 0.87 and 0.89 (Hsieh et al., 2016) .This suggests that the WERCAP is not a strong predictor of psychotic or bipolar disorder from the MINI-plus. As already explained, one reason for this discrepancy may be differences in the gold standard instruments used. While the MINI-Plus has been reported to be a high useful assessment tool, clinical interviews by experienced psychiatrists would be preferable where such clinicians are available and have the time to interview the patients for ascertaining psychiatric diagnoses. Another factor that may influence ROC analysis results is that the WERCAP Screen was designed to identify "psychotic-risk" symptoms,

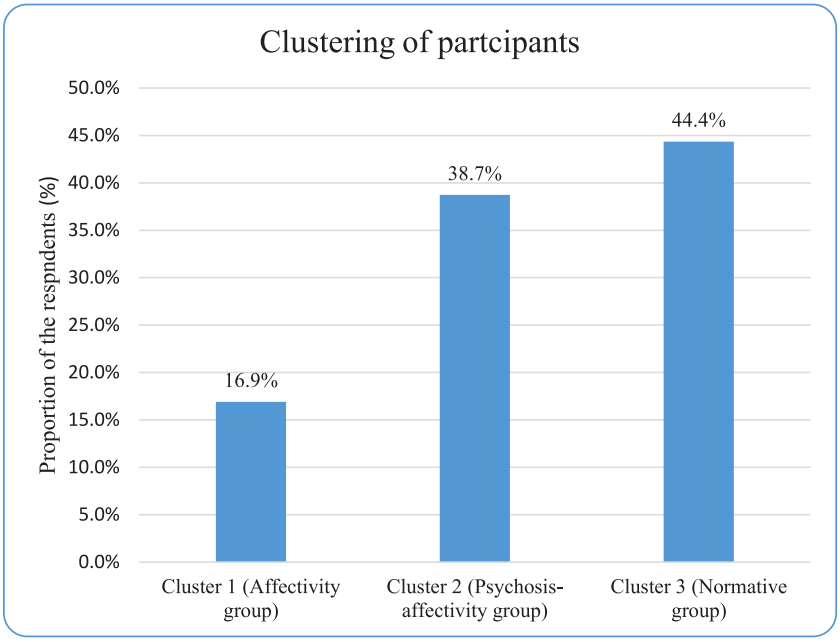

Fig. 1. Clustering of participants in the three clusters.

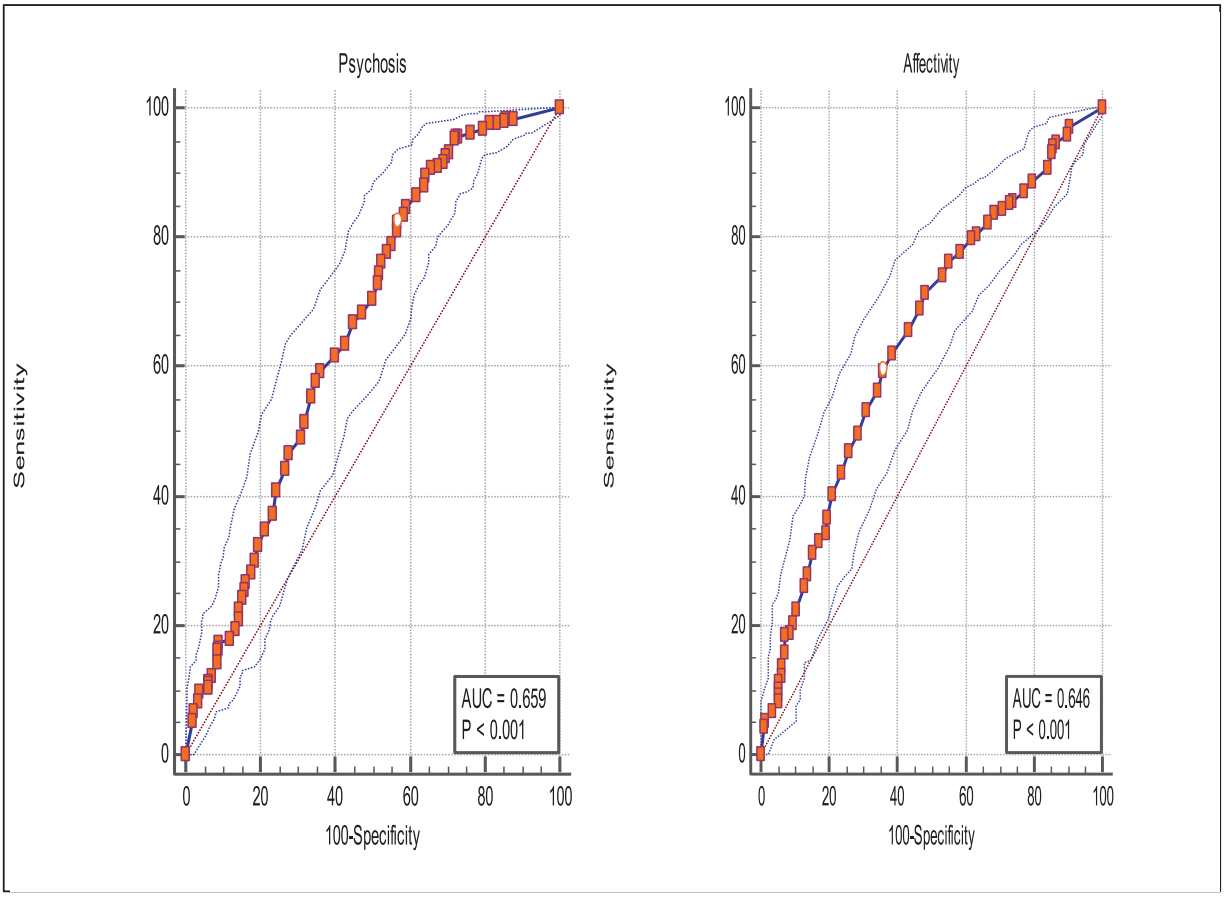

Fig. 2. Receiver operator characteristics curve for the performance of WERCAP screen scale (Affectivity and psychosis) compared to Mini International Neuropsychiatric Interview-MINI PLUS (gold standard) for the diagnosis of current psychosis (N = 674).
Note: AUC – Area under Curve; The ROC curve is a plot of the sensitivity versus [1-specificity] over all possible threshold values of the test being validated. The WERCAP point showing simultaneously the highest sensitivity and specificity was evaluated using the ROC curve.

Table 4
ROC curve summary.

	Affectivity	Psychosis
Number of observations	674	674
Positive Group(MINI-Plus)	464 (68.84%)	464 (68.84%)
Negative Group(MINI-Plus)	210 (31.16%)	210 (31.16%)
Area under the ROC curve (AUC)	0.646	0.659
Standard Error[a]	0.0228	0.0238
95% Confidence interval[b]	0.609 to 0.682	0.622 to 0.695
z statistic	6.408	6.683
Significance level P (Area = 0.5)	< 0.0001	< 0.0001
Youden index J	0.2355	0.2566
Associated criterion	> 22	> 20
Sensitivity	59.27	82.33
Specificity	64.29	43.33

[a] DeLong et al., 1988.
[b] Binomial exact.

and not a full-blown disorder. Screening items often probe subtle psychotic symptoms than diagnostic instruments, and would be expected to identify more individuals than those diagnosing schizophrenia. This is consistent with the pWERCAP being highly predictive of risk status based on the gold standard psychosis-risk assessment, the *Structured Interview for Psychosis-Risk Syndromes* (Mamah et al., 2016; Owoso et al., 2014).

In spite of the above limitations on MINI Plus as a diagnostic tool and the potential effects on our overall results, the WERCAP is an attractive choice for the LMIC for two main reasons: (i) The often observed co-existence of schizophrenia and affective disorders (Ndetei et al., 2008) and (ii) that the WHO mhGAP-IG, which classified these two conditions together as simply psychosis is finding extensive use in LMIC (Keynejad et al., 2017). However, the mhGAP-IG is a screener with no documented psychometric properties: thus the need for a simple user friendly instrument with good psychometric properties that can be self-administered by any literate person, or can be read to an illiterate person by a literate lay person in the community. This combination of a screener, followed by a gold standard instrument suitable for community based large scale administration by trained non-specialist mental health workers, followed if need be by a third tier of a gold standard by a mental health specialist, could lead to large scale early diagnosis and management of psychosis and affectivity in LMICs. This has the potential to reduce the current treatment gap. A further possible advantage of the proposed psychosis screener over the mhGAP-IG which is focused on LMIC is that it provides a basis for comparison with screening measures across LMIC and HIC's where it was first developed (U.S.).

5. Conclusions

aWERCAP and pWERCAP have good psychometric properties in the adult population in Kenya. It can be self-administered or read to the patients by a trained community based lay person. It has the potential for use in mass screening at the same time for affectivity and psychosis in adult patients. Further, it advances the possibility to bridge the gap of comparison between data from HIC and LMIC using comparable instruments.

Table 5
ROC curve analysis for WERCAP and diagnosis.

Cutoff	Sensitivity		Specificity		± LR		-LR		PPV		NPV	
	aWERCAP	pWERCAP	aWERCAP	pWERCAP	aWERCAP	pWERCAP	aWERCAP	pWERCAP	aWERCAP	pWERCAP	aWERCAP	pWERCAP
≥0	100	100	0	0	1	1			68.8	68.8		
>0	96.98	98.28	9.52	12.38	1.07	1.12	0.32	0.14	70.3	71.2	58.8	76.5
>1	95.91	98.28	10	14.29	1.07	1.15	0.41	0.12	70.2	71.7	52.5	78.9
>2	94.83	98.06	13.33	14.76	1.09	1.15	0.39	0.13	70.7	71.8	53.8	77.5
>3	94.18	97.84	14.29	16.67	1.1	1.17	0.41	0.13	70.8	72.2	52.6	77.8
>4	93.1	97.63	14.76	18.57	1.09	1.2	0.47	0.13	70.7	72.6	49.2	78
>5	90.73	96.77	15.71	20.48	1.08	1.22	0.59	0.16	70.4	72.9	43.4	74.1
>6	88.79	96.12	20.48	23.81	1.12	1.26	0.55	0.16	71.2	73.6	45.3	73.5
>7	87.28	95.69	22.86	27.14	1.13	1.31	0.56	0.16	71.4	74.4	44.9	74
>8	85.56	95.47	26.19	27.62	1.16	1.32	0.55	0.16	71.9	74.5	45.1	73.4
>9	85.34	95.26	27.14	28.1	1.17	1.32	0.54	0.17	72.1	74.5	45.6	72.8
>10	84.48	93.32	29.05	29.52	1.19	1.32	0.53	0.23	72.5	74.5	45.9	66.7
>11	83.84	92.46	31.43	30.48	1.22	1.33	0.51	0.25	73	74.6	46.8	64.6
>12	82.33	91.59	33.33	30.95	1.23	1.33	0.53	0.27	73.2	74.6	46.1	62.5
>13	80.6	90.95	36.67	32.38	1.27	1.35	0.53	0.28	73.8	74.8	46.1	61.8
>14	79.96	90.73	38.1	34.29	1.29	1.38	0.53	0.27	74.1	75.3	46.2	62.6
>15	77.8	89.66	41.43	35.71	1.33	1.39	0.54	0.29	74.6	75.5	45.8	61
>16	76.29	88.15	44.76	36.19	1.38	1.38	0.53	0.33	75.3	75.3	46.1	58
>17	74.14	86.42	46.67	38.1	1.39	1.4	0.55	0.36	75.4	75.5	45	55.9
>18	71.34	84.7	51.9	40.95	1.48	1.43	0.55	0.37	76.6	76	45	54.8
>19	68.97	83.41	53.33	41.43	1.48	1.42	0.58	0.4	76.6	75.9	43.7	53
>20	65.73	**82.33**	56.67	**43.33**	1.52	**1.45**	0.6	**0.41**	77	**76.2**	42.8	**52.6**
>21	62.07	81.25	61.43	43.33	1.61	1.43	0.62	0.43	78	76	42.3	51.1
>**22**	**59.27**	79.09	**64.29**	44.76	**1.66**	1.43	**0.63**	0.47	**78.6**	76	**41.7**	49.2
>23	56.25	77.8	65.71	46.19	1.64	1.45	0.67	0.48	78.4	76.2	40.5	48.5
>24	53.23	76.29	69.05	47.62	1.72	1.46	0.68	0.5	79.2	76.3	40.1	47.6
>25	49.57	74.57	71.43	48.1	1.73	1.44	0.71	0.53	79.3	76	39.1	46.1
>26	46.98	73.06	74.29	48.57	1.83	1.42	0.71	0.55	80.1	75.8	38.8	44.9
>27	43.75	70.69	76.19	50	1.84	1.41	0.74	0.59	80.2	75.8	38	43.6
>28	40.3	68.53	79.05	52.86	1.92	1.45	0.76	0.6	81	76.3	37.5	43.2
>29	36.85	66.81	80.48	55.24	1.89	1.49	0.78	0.6	80.7	76.7	36.6	43
>30	34.27	63.58	80.95	57.14	1.8	1.48	0.81	0.64	79.9	76.6	35.8	41.5
>31	32.97	61.64	82.86	60	1.92	1.54	0.81	0.64	81	77.3	35.9	41.4
>32	31.25	59.27	84.76	63.81	2.05	1.64	0.81	0.64	81.9	78.3	35.8	41.5
>33	28.02	57.97	86.19	65.24	2.03	1.67	0.84	0.64	81.8	78.7	35.1	41.3
>34	26.08	55.39	87.14	66.19	2.03	1.64	0.85	0.67	81.8	78.4	34.8	40.2
>35	22.63	51.51	89.52	68.1	2.16	1.61	0.86	0.71	82.7	78.1	34.4	38.9
>36	20.26	49.14	90.48	69.05	2.13	1.59	0.88	0.74	82.5	77.8	33.9	38.1
>37	18.97	46.77	91.43	72.38	2.21	1.69	0.89	0.74	83	78.9	33.8	38.1
>38	18.53	44.18	92.86	73.33	2.59	1.66	0.88	0.76	85.1	78.5	34	37.3
>39	15.95	40.95	92.86	75.71	2.23	1.69	0.91	0.78	83.1	78.8	33.3	36.7
>40	13.79	37.28	93.81	76.67	2.23	1.6	0.92	0.82	83.1	77.9	33	35.6
>41	12.28	34.91	93.81	78.57	1.98	1.63	0.94	0.83	81.4	78.3	32.6	35.3
>42	11.21	32.54	94.76	80.48	2.14	1.67	0.94	0.84	82.5	78.6	32.6	35.1
>43	10.13	30.17	94.76	81.43	1.93	1.62	0.95	0.86	81	78.2	32.3	34.5
>44	9.27	28.23	94.76	82.38	1.77	1.6	0.96	0.87	79.6	78	32.1	34.2
>45	8.19	26.72	94.76	83.81	1.56	1.65	0.97	0.87	77.6	78.5	31.8	34.1
>46	6.68	25.43	96.67	84.29	2	1.62	0.97	0.88	81.6	78.1	31.9	33.8
>47	5.17	24.35	98.57	84.76	3.62	1.6	0.96	0.89	88.9	77.9	32	33.6
>48	4.53	22.63	99.05	85.71	4.75	1.58	0.96	0.9	91.3	77.8	32	33.4
>49	0	20.91	100	85.71		1.46	1	0.92		76.4	31.2	32.9

Note: Values shown reflect the aWERCAP and pWERCAP's predictive ability to predict Current Psychosis. Bolded figures indicate values recommended cutoff point.

Ethics approval

Maseno University Ethics Review Committee (MUERC) in Kenya granted the ethical approval for the study. Reference number #MSU/DRPC/MUERC/00130/15.

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Declaration of Competing Interest

To the best of our knowledge, no conflict of interest, financial or other, exists. We have no conflicts of interest to disclose.

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Supplementary materials

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