Psychometric properties of the Multidimensional Anxiety Scale for Children (MASC) amongst Nairobi public secondary school children, Kenya

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Abstract

Background: There are few psychometric instruments whose properties have been studied in a developing country's context. Aim: To determine the psychometric properties of the Multidimensional Anxiety Scale for Children (MASC) in Nairobi public secondary school children, Kenya. Method: Concurrent self-administration of the MASC and Children's Depression Inventory (CDI) to students in Nairobi public secondary schools. Results: The MASC had a high overall internal consistency alpha coefficient (0.85) in the Kenyan sample, which is similar to Western findings, and is hence a reliable tool for measuring anxiety in the study population. It was also similar to the findings from two Western studies in the anxiety domains of physical symptoms, social anxiety, separation anxiety and harm avoidance. The correlation coefficient with CDI was similar to Scandinavian findings. Conclusion: The MASC can be used in Kenyan children and, by extension, other Africa children

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INTRODUCTION
The Multidimentional Anxiety Scale for Children (MASC) is a 39 item likert-type scale which is self administered. It taps the following four dimensions of childhood anxiety in both normal and clinical samples: Physical symptoms, social anxiety, separation anxiety and harm avoidance and was found to have high internal reliability (March 1997, March, et al, 1999). A special advantage of the MASC and other newer instruments is that they are closely connected to current diagnostic systems such as DSM IV (American Psychiatric Association, 1994), and thus facilitate
interpretation of anxiety problems in children and adolescents (Chorpita et al 2000). This study aimed to study the properties of MASC in a Kenyan Secondary School children population. The properties studied included reliability (internal consistency) and divergent validity using the Children’s Depression Index (CDI) (Kovacs 1992). The co-efficient alpha for the CDI has been reported to be 0.84 (Smari et al, 2001).

METHOD
A stratified sample of 17 out of 49 public secondary schools in Nairobi were included in the study. The public secondary schools in Kenya have a four year course, known as Form 1 to Form 4. The average age for Form one is 13-14 years. For each of the classes in each of four forms for each of the 17 schools, every 8th student was asked to complete the MASC. This was done after obtaining consent from the school authorities and assent from the children (there were 8 sets of questionnaire each measuring different types of psychopathology). The questionnaires were completed anonymously during class time, folded and deposited in a ballot box. The questionnaires also enquired gender, age, class (form) and whether the student was a boarder or day scholar.

In order to compare with the MASC findings in other countries only children up to 15 years of age were included. A total of 232 respondents aged 13 (the minimum age at Form 1) and 15 years were included for this analysis.

To establish the divergent validity of the MASC and its subscales, the Child Depression Inventory (CDI) (Kovacs, 1992) was administered alongside MASC. The CDI is a 27-items inventory on a three-point likert scale. For each item, respondents choose one alternative given with regard to depressive symptoms.

SPSS version 11 was used to analyze the data. Cronbach’s alpha scale was used to estimate reliability (internal consistency) between MASC items. Laverne’s covariance was utilized to determine differences between the MASC subscales and gender, while Pearson’s correlation coefficient was used to examine the association of MASC and CDI scores.

RESULTS
The means and standard deviations for the four MASC subscales and MASC overall score were computed, for the sample as a whole and separately by gender. The results are shown in table 1a. Table 1b shows the results of a similar study done in Icelandic school children. (Thor et al, 2004).

**TABLE 1A AND 1B APPEAR HERE**

The internal consistency alpha coefficient of MASC was 0.778, indicating that the tool was reliable in measuring anxiety in this population. (Thor et al, 2004). The covariance matrix showed that harm avoidance and separation anxiety were varied between sexes. Girls were more likely to have harm avoidance \( p=0.002 \) and separation anxiety \( (0.0001) \). The overall MASC anxiety score varied with age \( (P=0.02) \), with younger students being more susceptible to anxiety symptoms.

Alpha coefficients were then obtained for MASC and its subscales, of which results are presented in table 2 (which also shows equivalent findings for western countries for purpose of comparison).

**TABLE 2 APPEAR HERE**

**MASC AND CDI Compared**

All participants scored above the cut-off (19) on the CDI, indicating high rates of depression in the study population. The mean score for girls was 26.7; for boys, 26.5; and for both, 26.3. The corresponding scores in a study done in Scandinavian sample were, girls, 9.3; boys, 8.7; both, 8.3. (Smari, et al 2001).

Pearson’s correlations coefficients for the MASC in different sexes were computed and the results tabulated in table 3 below.
DISCUSSION

The mean and standard deviation scores compared well with those of the Icelandic sample (Tables 1a & 1b). (Thor et al, 2004), most importantly on the subscale of harm avoidance. Thor et al, (2004) also reported that the mean and standard deviation in his sample concurred with the standardisation sample (March 1997). The higher anxiety scores for girls, especially on separation and harm avoidance, confirm epidemiological findings of diagnosed anxiety disorders in children (Verhust, 2001; March et al 1997).

Several studies have, for instance (Thor et al, 2004, Spence 1998), predicted differences in terms of age, with an increase in social anxiety and a decrease in other kinds of anxiety occurring with age. However, in this study variances were only found in overall MASC scores but not in the other anxiety subcategories.

The alpha coefficients were close to the standardization study of March et al (1997). In most cases, the differences were no more than one standard deviation, whereas in some cases it was the same. However there was some variation in overall MASC score in all categories. It would imply differences in the level of anxiety with high levels in Kenya, or differences in manifestation secondary to cultural and contextual experiences. This requires further study in Kenya and by extension other African countries although the specific subscales compared well and were close to the Icelandic (Thor et al 1997) and standardization sample (March 1997, March et al 1999).

The correlation between depression and anxiety scales was high, especially in separate analyses by gender, but lower for the combined sample, moreso in respect of harm avoidance and overall MASC score. Correlations were not significant for harm avoidance and physical anxiety. The Icelandic sample found no correlation only for harm avoidance. However the correlations (p) compared well with the Icelandic sample, which in turn found comparable correlations with that found by March et al (1997).
We also found strong evidence for divergent validity. Even though measures of depression sometimes tap both characteristics, the correlation results show that MASC explicitly taps harm avoidance and physical anxiety, which makes it unique in focusing anxiety. The MASC has been reported to be less saturated in depression related content compared with the older tools. Dierker et al (2001) found that MASC discriminated better between anxiety and depression than the Revised Children’s Manifest Anxiety Scale (RCMAS) (Reynolds & Richmond, 1978).

In conclusion, the results showed MASC has strong psychometric properties in a Kenyan sample as demonstrated by the high internal consistency and the similarities of study group means and standard deviations to the original done of March et al (1997) and a more recent study in an Icelandic sample (Thor et al 2004). Divergent validity was also proven. The MASC can be said to be more specific in identifying anxiety in this Kenyan context, going by the fact that correlation failed in two subcategories of anxiety versus depression.

Limitations to the current study was that the study population targeted secondary school students whose age ranged from 13-20 years and the standardization sample by March et al (1997) targeted lower age groups aged 10 - 15 years. As such only those falling in this age bracket were considered for the analyses (age group 13-15) to facilitate comparison. Despite this, the findings compare in more instances than not with standardization sample as well as the Scandinavian study, mentioned earlier. This means that the MASC is an appropriate tool for measuring anxiety psychopathology in the context, which is important because accurate assessment and diagnoses is the first step in assisting affected populations. This allows comparison of results in Africa and the West obtained using the MASC. It would be interesting to perform similar studies in clinical samples.

The findings of this study suggest similarities in anxiety in similar aged children from divergent cultures. The findings should stimulate clinical and epidemiological research on anxiety in Africa children with a view to improving clinical practice and formulating policy on adolescent mental health.

Clinical Implications

1. The MASC is a reliable and valid instrument in Kenya for epidemiological surveys.
2. The results of MASC in Kenya can be used for direct comparison with similar results in Western countries.
3. Anxiety disorders in children are common and similar to those in the west and this calls for increased awareness and relevant policy for their recognition and management.

Limitations
1. This was a community survey whose clinical relevance needs further study
2. Though there was MASC data for children over 15 years of age, only data pertaining to 13-15 age group was used for the purposes of comparison with studies in Western settings.
3. Though for most secondary school students in Nairobi English is a first second language and students are de-culturalized, the MASC was not adopted and translated to Swahili, the lingua-franca.

Roles of the various contributors
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5. D.A. Kokonya – Conceptualization of the study
MBCHB, M.Med. Psy (Nairobi), Provincial Psychiatrists Kakamega Provincial hospital and Associate Researcher, Africa Mental Health Foundation
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MBCHB., MSc Clinical Psychology, (Nairobi), Kenya & Research Associate, Africa Mental Health Foundation
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REFERENCES


### Table 1a: Study Group results

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### Table 1b: Scandinavian – Icelandic study results

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Table 2: Alpha coefficients for MASC total scale and the main subscales for boy, girls and both.

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<td>0.77</td>
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*Key

K- Kenya sample
I- Icelandic sample (Thor et al, 2004)
S - Standardization sample (March 1997, March et al 1999)
Table 3: Correlation coefficients between MASC and CDI girls, boys and both

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*Key
I- Icelandic sample . (Thor et al, 2004)
K- Kenya sample

** p< 0.001
*  p< 0.05