## Research Article

# The utility of WHO-five-well-being index as a screening tool for depression among elderly

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**ABSTRACT**

**Background:** WHO-Five-Well-being Index (WHO-5) is an uncomplicated questionnaire used to appraise subjective well-being. This study was conducted to determine the validity and internal consistency of WHO-5 in the appraisal of depression among elderly and establish the agreement between GDS-15 and WHO-5.
**Methods:** After obtaining clearance from the institutional ethics committee, a cross-sectional study was conducted for 6 months in an urban slum on elderly persons aged ≥60 years, with consent. A pre-designed and semi-structured interview schedule was used to collect the information. WHO-5 was used to assess depression. It was translated to local language and then back translated. To confirm the diagnosis of major depression, Mini International Neuropsychiatric Interview (MINI) was adopted. The relationship between WHO-5 mean scores and the grading of depression as per Geriatric Depression Scale Short Form (GDS-15) was determined.
**Results:** A total of 218 study participants were included, of which 44 (20.18%) were depressed. Mean raw WHO-5 score was $14.80 \pm 5.14$. WHO-5 demonstrated a good internal consistency (Cronbach's Alpha=0.85). The concurrent validity while considering MINI was gold standard was good. Those found to be normal when subjected to MINI had a significantly lower score ($15.28 \pm 5.2$) when compared to those diagnosed as depressed ($7.46 \pm 4.31$) [t=8.728, df=218, p<0.0001]. When convergent validity was assessed, a good correlation was found between GDS-15 and WHO-5 (r=0.68, p<0.0001).
**Conclusions:** WHO-5 is a valid and reliable tool to assess depression among elderly. The elderly who present to health centres may be subjected to screening of depression and well-being, using WHO-5.

**Keywords:** Depression, Elderly, Assessment, Validity

## INTRODUCTION

Depression has emerged as a major health concern among elderly, with various epidemiological studies reporting a prevalence ranging from 12.70% to 70.0% among community-dwelling elderly.[1-5] This issue is compounded by the certitude that depression among elderly remains frequently unidentified.[6] Thus, to address this issue of under-reporting of depression among elderly, an accurate diagnosis is absolutely essential.[7] Moreover, screening of elderly individuals for depression using validated tools

facilitates early detection of depression.[8] Geriatric Depression Scale (GDS), developed by Yesevage et al. is one such validated tool which aids in the recognition of depression.[9] GDS was originally a 30 item scale which was subsequently reduced to a 15 item scale (GDS-15), comprising of two sub-scales which assess symptoms specifically found in depression and psychological well-being.[10] In an attempt to assess subjective well-being of individuals, the World Health Organization (WHO), developed the WHO-Five-Well-being Index (WHO-5), a brief, self-administered questionnaire, consisting of 5

questions evaluating mood, vitality and general interests.[11] Additionally, the WHO-5 has also been successfully used to assess depression in the elderly, as demonstrated by a few researchers.[12-14] However, the amount of published literature intending to ascertain the utility of the WHO-5 as a screening tool for geriatric depression are fewer in number.[15,16] The WHO-5, being shorter than GDS-15, is easier to administer.[17] However, there is a need to ascertain the utility of this screening tool in varied settings. In this context, I carried out this study to find out the validity and internal consistency of the WHO-5 as a screening tool for depression in the elderly and to establish the agreement between GDS-15 and WHO-5 in assessment of depression among elderly.

## METHODS

A cross-sectional study design was adopted for the achievement of the study objective. I conducted this study for a duration of six months (June 2012 to January 2013) in an urban slum situated in Dharwad District, Karnataka State. The study area has a population of 20000 with 5000 households. I sought to interview permanent residents of the study area, aged 60 years and above. Those who reported a past history of psychiatric disorders, any organic disease associated with depression and serious cognitive, visual, hearing impairment were excluded from this study. Individuals who couldn't be contacted despite two visits to the house and those unwilling to participate voluntarily in the study were termed as non-respondents.

The formula $n=4pq/l^2$, which considers 95% confidence limits was used for sample size estimation.[18] The prevalence of depression in elderly, "p", was set at 31.40%.[19] The value "q", which is equivalent to 100-p was calculated to be 69.30%. The required relative precision in the estimate of "p", "l" was fixed at 20%. Therefore, the sample size was calculated to be 218.

The WHO-5 was translated into the local language, Kannada, by two language experts separately. An independent translator back translated the Kannada version into English. The most suitable Kannada version was selected. The translated version was finalized after a pilot study on 10% of the estimated sample size.

A door to door survey was carried out. A technique of simple random sampling, without replacement, was used to select the study participants. A pre-tested, semi-structured interview schedule was used to elicit the information. The five items in the WHO-5, which were used to screen for depression in the study, were rated on a 6-point scale from 0 (not present) to 5 (constantly present). Scores were summated, with raw score ranging from 0 to 25. For interpretation, the raw scores were transformed to 0-100 by multiplying by 4, with higher scores indicating better well-being. A score of 50 or below was considered as low mood, while a score of 28 or below was regarded as likely depression. The study

participants were also subjected to a diagnostic interview for confirmation, through a Mini International Neuropsychiatric Interview (MINI), a standardized clinical diagnostic interview for mental disorders, which may be administered by trained lay interviewers.[20] The GDS-15, which is an accepted tool to assess severity of depression in elderly individuals was also incorporated in the study proforma.[10]

The study was analyzed using the software, Statistical Package for the Social Sciences (SPSS) for Windows, Version 16.0. Chicago, SPSS Inc. Categorical variables were expressed in terms of frequencies and proportions, while continuous variables were expressed through means and standard deviations. Student-t test was used in the comparison of two means. Analysis of variance (ANOVA) was applied to analyze the differences in more than two group means, namely the mean scores of WHO-5 and GDS-15. Cronbach's Alpha was used as a measure of internal consistency of the screening tool. The agreement between the two screening tools, WHO (Five) Well-being Index and GDS-15, was determined using the Kappa Statistics. The level of statistical significance was set at $p<0.05$ (two-sided).

## RESULTS

A total of 218 elderly individuals were included in my study. Most of the study participants were females, 137 (62.84%). Majority of the study participants, 159 (69.27%), were in the age group of 60-69 years, with the mean age being $66.1 \pm 2.5$ years (range: 60-81 years). Most of the study participants were living with their spouse (63.76%). The illiterates (56.88%) outnumbered the literates (43.12%). More than half of the study participants (54.59%) were not working.

On analysis of the WHO-5 scores, 44 (20.18%) were observed to have a score of ≤28 and termed as depressed (Figure 1). It is apparent from Table 1 that 22.48% were found to be mildly depressed, while 6.88% had severe depression. Thus, the prevalence of depression in the study population, according to GDS-15 was 29.35%. The WHO-5 and GDS-15 displayed a good agreement, as far as screening for depression among elderly was concerned (k=0.80, p<0.0001, Significant).

**Table 1: GDS scores of the study participants.**

| GDS score | Number (n=218) | Percentage (%) |
|---|---|---|
| Normal (0-9) | 154 | 70.64% |
| Mild (10-19) | 49 | 22.48% |
| Severe (20-30) | 15 | 6.88% |

Table 2 highlights the mean score of every individual item of the WHO-5. The mean raw score of the WHO-5 was calculated to be $14.80 \pm 5.14$, with a range of 3-25. The Cronbach's Alpha for the total scale was 0.85.

**Table 2: Mean scores of the WHO (Five) Well-being Index.**

| Item | Mean ± SD |
|---|---|
| I have felt cheerful and in good spirits | 2.98 ± 1.65 |
| I have felt calm and relaxed | 2.88 ± 1.35 |
| I have felt active and vigorous | 2.81 ± 1.57 |
| I woke up feeling fresh and rested | 2.95 ± 1.38 |
| My daily life has been filled with things that interest me | 2.94 ± 1.42 |

To ascertain the concurrent validity of the WHO-5, MINI was considered as the gold standard. As per the MINI, 36 (16.51%) were considered to be depressed. When the mean WHO-5 were compared, those not depressed according to MINI had a lower score (15.28 ± 5.2) when compared to those classified as having depression (7.46 ±

4.31). This difference was found to be statistically significant (t= 8.728, df=218, p<0.0001). This finding is shown in Table 3.

Convergent validity was determined using Pearson's correlation coefficient. WHO-5 and GDS-15 were scored in opposite directions. Thus, a negative correlation was established between the WHO-5 and GDS-15 (r=-0.68, p<0.0001). Those having severe depression (GDS-15 score of >10) had a lower mean WHO-5 score (7.77 ± 1.63). In comparison, those found to be mildly depressed (GDS-15 score of 6-10) had a mean WHO-5 score of 13.21 ± 0.87, while normal study participants (GDS-15 score of 0-5) possessed a relatively higher WHO-5 score (16.86 ± 0.85). On application of ANOVA, a statistically significant difference was established (F=838.930, df=217, p<0.0001), as presented in Table 4.

**Table 3: Relationship between WHO (Five) Well-being Index mean scores and depression according to MINI.**

| MINI | WHO (Five) mean scores | Standard Deviation | Total number (n) | df* | t value | p value |
|---|---|---|---|---|---|---|
| Depressed | 7.46 | 4.31 | 36 | 216 | 8.728 | <0.0001 Significant |
| Not depressed | 15.28 | 5.02 | 182 | | | |

*df = Degree of freedom

**Table 4: Relationship between WHO (Five) Well-being Index scores and the severity of depression according to GDS-15.**

| GDS-15 | Number (n) | Mean WHO (Five) Well-being Index scores | SD* | 95% CI^ |
|---|---|---|---|---|
| Normal (0-5) | 154 | 16.86 | 0.85 | 15.02-17.89 |
| Mild (6-10) | 49 | 13.21 | 0.87 | 11.92-15.01 |
| Severe (>10) | 15 | 7.77 | 1.63 | 4.98-10.25 |

F=838.930, df=217, p<0.0001, significant; *SD = Standard Deviation; ^CI = Confidence Interval

## DISCUSSION

The findings of my study suggest that the WHO-5 may be applicable to the elderly for screening of depression. The prevalence of depression reported in my study was 20.18%. This was in agreement with studies conducted by Barua, et al.,[12] Sharma, et al.,[21] Manjubhashini, et al.[2] and Sandhya, et al.[3] who reported a prevalence of 21.7%, 35.7%, 31.7% and 25.4% respectively. However, a study conducted in Pune revealed that majority of the elderly (70%) were depressed.[5]

The primary objective of my study was to establish the validity of the WHO-5 for the assessment of geriatric depression. I observed that the WHO-5 had a good concurrent validity, as it correlated well with the MINI. A

statistically significant difference was established when the mean WHO-5 scores of those who were depressed according to MINI were compared with those not depressed (p<0.0001). This was in accordance with a study conducted in Thailand, with the primary purpose of finding out the reliability and validity of the Thai version of the WHO (Five) Well-being Index (WHO-5-T). According to this study, those who met the diagnosis of major depression according to MINI had significantly lower WHO-5-T scores when compared to those not depressed.[16]

Furthermore, WHO-5 also exhibited a good convergent validity, as evidenced by a good Pearson's correlation coefficient (r) of -0.68 (p<0.0001) with GDS-15. This guarantees the validity of the WHO-5 in screening for depression among elderly. A study by Saipanish, et al.

used the Hamilton Rating Scale for Depression (HDRS) to establish the convergent validity of the WHO-5. The two screening tools showed a moderate convergent validity (r=-0.54, p<0.0001).[16]

WHO-5 also displayed a Cronbach's Alpha of 0.85. Thus, the internal consistency was found to be good.[22] Another Indian study also attempted to find out the validity and reliability of the WHO-5. The study cited that WHO-5 has a sensitivity of 97.0%, specificity of 86.4%, a positive predictive value of 66.3% and an overall accuracy of 0.89. Besides, the Kappa Statistics displayed a markedly high reliability.[12]

Lastly, a good agreement was found between the WHO-5 and GDS-15 (k=0.80, p<0.0001, Significant). GDS-15 is known to be a sensitive and specific tool, as far as detection of geriatric depression is concerned.[22] Another study by Allgaier, et al. reported that besides GDS, WHO-5 can be considered as a valid screening tool to assess depression among elderly.[17] In the current study, the fact that the two screening tools are concordant affirm that the WHO-5 could be used alternatively to screen the elderly for depression.

Thus, the present study confirms the validity and internal consistency of the WHO-5. However, the results of this study should be understood with caution. Firstly, the cross sectional nature of this study is a lacuna. Secondly, there might have been an element of subjective and recall bias during the interview. Moreover, the sensitivity and specificity analysis couldn't be determined. Despite these limitations, this study furnishes information of paramount significance regarding a simple screening tool for geriatric depression, namely the WHO-5.

Thus, WHO-5 can be regarded as a valid and internally consistent screening tool to assess depression in the elderly. This screening tool being simple and easy to administer, comprises of a mere five questions and may be a potential alternative to the current gold standard for detection of depression among elderly, GDS-15, as evidenced by a good concordance between the two screening tools. Furthermore, this screening tool may be used routinely in the health centres and hospitals on all elderly patients, as a part of comprehensive assessment.

## ACKNOWLEDGEMENTS

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