



## Reliability and Validity of the Persian Version of the World Health Organization-Five Well-Being Index

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### Abstract

**Introduction:** A multidimensional approach to health which addresses the psychological features of health justifies the necessity of designing or validation of brief instruments for screening in general population. This study aims to evaluate the reliability and validity of the Persian version of the WHO-5-P as a brief scale of well-being.

**Methods:** In this study 451 individuals, i.e., over-15-year old subjects completed the WHO-5-P and GHQ-28 questionnaires. Cronbach's alpha and factor analysis were used for internal consistency evaluation. For predictive validity we compared WHO-5-P with GHQ-28 scores using receiver operating characteristic (ROC) analysis.

**Results:** The mean age, score of WHO-5-P and GHQ-28 were  $32.3 \pm 11.5$ ,  $13.4 \pm 6.5$ , and  $25.4 \pm 13.4$  respectively. The WHO-5-P had an acceptable internal consistency ( $\alpha = 0.94$ ), and it showed adequate convergent validity with the GHQ-28 ( $r = -0.66$ ;  $P < 0.001$ ). The optimal cut-off score of the WHO-5-P was  $< 13$  (12.13) with a sensitivity of 0.68 and a specificity of 0.85. The area under curve in this study was 0.82. Confirmatory factor analysis revealed one factor structure.

**Conclusion:** WHO-5-P is a valid and reliable instrument for screening psychological state.

**Keywords:** GHQ-28; Mental health; Reliability; Well-being; WHO-5; Validity.

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## Introduction

A review of studies on the prevalence of mental disorders in Iran indicates differences in prevalence rates throughout the country. According to National Health Survey (NHS) in Iran the prevalence of mental disorders was 21.3% in rural areas and 20.9% in urban areas (1). A meta-analysis of the studies showed that the prevalence of children and adolescent depression was 43.55% using the BDI and 15.87% using SCL-90 (2). The overall estimation of current prevalence of major depressive disorder (MDD) in Iran was 4.1% (95% CI: 3.1-5.1) (3).

Many instruments have been developed for screening psychological problems, but most of them are somewhat extensive and time-consuming to fill out. An appropriate instrument is the one which is brief, simple and fast and hence acceptable to the test taker, test giver and the data analyst.

Therefore, a brief and rapid instrument for detecting mental disorders in a population may play an important role in the enhancement of health care.

A candidate is the World Health Organization-Five Well-Being Index (WHO-5), which was initially developed to evaluate the quality of care for diabetic patients (4,5). WHO - Five well-being indexes (WHO-5) is a positively worded instrument designed to assess the level of emotional well-being over a 14-day period (6). This instrument is available in a variety of languages including Persian. The structural validity of this questionnaire was not assessed previously in normal population in Iran. Mortezaei et al. were assessed its validity in a population of women in the third trimester of pregnancy (7).

The Well-Being Scale appears to be a useful instrument for identifying subjects with reduced subjective quality of life and low scores on the scale indicate that decreased well-being is related to the presence of a psychiatric disorder (8). Bonsignore et al. reported a good internal and external validity of the WHO-5 in detecting depression in the elderly population (9). The aim of this study was to evaluate the reliability and validity of the Persian version of the WHO-5 (WHO-5-P) as a brief well-being scale.; Therefore, the researchers set out this study to establish the psychometric properties and validity of the Persian version of WHO-5 questionnaire in adolescents over 15 years old in Shahroud.

## Materials and Methods

The Persian translation of WHO-5 (WHO-5-P) was available on <http://www.who-5.org> site free of charge. Persian version of WHO-5 was compared with the original English version of the WHO-5 by the linguistic panel. It was theorized as a one-dimensional measure that contains five positively worded items the degree to which the aforementioned positive feelings were present in the last 2 weeks is scored on a 6-point Likert Scale ranging from 0 (not present) to 5 (constantly present), with high scores thereby indicating an increased sense of well-being. A score below 13 indicates poor wellbeing. Almost all participants stated that the questionnaire was easy to read and understand.

In this study 451 over-15-year olds in Shahroud, northeast of Iran, completed the WHO-5-P and GHQ-28 questionnaires. They were selected through multistage random sampling.

Whole data collection process occurred in July 2012. The study was designed to collect a total of 470 cases, but 19 subjects were excluded due to incomplete data. Mean age of subjects was  $32.3 \pm 11.5$ . There were 209 females (43.3%) and 242 males (53.7%). Most of them (64.7%) were married and one-third had graduated from college (31.3%) and 1.3% were illiterate.

The study was approved by Medical Ethics Committee at Shahrood University of Medical Sciences. Oral informed consent was obtained after the objectives of the study had been explained and the people agreed to participate.

The evaluation of reliability and validity of GHQ-28 in Iran showed a cut-off point of 24 for mental disorders (10), and validation of this tool indicate that it can be used successfully in epidemiological studies of mental disorders as a screening instrument. The Persian version of GHQ-28 was employed as gold-standard measures for the current diagnosis of mental disorder.

Confirmatory factor analysis (CFA) and exploratory factor analysis were conducted. Chi square, root mean square error of approximation (RMSEA), Goodness of Fit Index (GFI) and comparative fit index (CFI) were also calculated. RMSEA values between 0.08 and 0.10, GFI and CFI values greater than 0.90 are indicative of adequate fit (11). Internal consistency by Cronbach's Alpha and item-total and inter-item correlations were calculated to assess the reliability of the scale. For internal consistency, an  $\alpha$  of 0.70–0.80 is desirable, and the item-total correlation should be larger than 0.20 (12). Concurrent validity was examined by calculating correlation coefficients among GHQ-28 and WHO-5-P scores. Sensitivity and specificity of the WHO-5-P were tested against those for the GHQ-28 using receiver operating characteristic (ROC) curves. The positive predictive value (PPV) and negative predictive value (NPV) were calculated using a  $2 \times 2$  contingency table. In addition, differences in sex and history of mental disorders in family were tested using t-test. Statistical analyses were performed using STATA version 12. Significance level was set at  $P < 0.05$ .

## Results

The mean total WHO-5-P score of our sample was  $13.4 \pm 6.5$  and the mean total GHQ-28 score was  $25.4 \pm 13.4$ .

Cronbach's alpha was found to be 0.94, and all items, if deleted, would consistently decrease the total scale alpha (Table 1). The overall Kaiser-Meyer-Olkin measure of sampling adequacy was 0.897. The Bartlett's test of sphericity was significant ( $P < 0.001$ ), indicating that the variables correlated with one another. Hence, our preliminary analyses confirmed the appropriateness of factor analysis for the data. A factor analysis identified only one factor when considering eigenvalues greater than 1.0. The factor with eigenvalues of 3.98 explained 79.6% of the variance and the factor loading for the items ranged from 0.87 to 0.91 (Table 1). These findings indicate that the WHO-5-P has an adequate internal consistency. The CFA confirmed the one-factor structure of the WHO-5 [ $\chi^2 = 27.9(5)$ ,  $P < 0.001$ ], an RMSEA of 0.104, a GFI of 0.97 and a CFI of 0.99 (Figure 1).

Pearson product-moment correlation coefficient was used to determine the convergent validity; the total score of the

WHO-5-P and the GHQ-28, which are scored in opposite directions, were negatively correlated ( $r = -0.66$ ,  $P < 0.001$ ). The WHO-5-P score correlated moderately with subscales of GHQ-28; depression ( $r = -0.58$ ) psychosocial activity ( $r = -0.46$ ), anxiety ( $r = -0.48$ ), and somatic ( $r = -0.48$ ). According to the GHQ-28, 198 patients (44%) were diagnosed with mental disorders. The mean WHO-5-P score for these patients (mean  $\pm$  SD:  $9.4 \pm 6.0$ ) was significantly lower than that of normal people (mean  $\pm$  SD:  $16.6 \pm 4.8$ ). No significant differences in the WHO-5-P total scores were observed between the male (mean  $\pm$  SD:  $13.4 \pm 6.4$ ) and female (mean  $\pm$  SD:  $13.4 \pm 6.5$ ) subjects. In subjects with positive family history of mental disorders, the mean score of WHO-5-P is significantly less than others' mean score ( $12.8 \pm 6.8$  vs.  $13.8 \pm 6.3$ ).

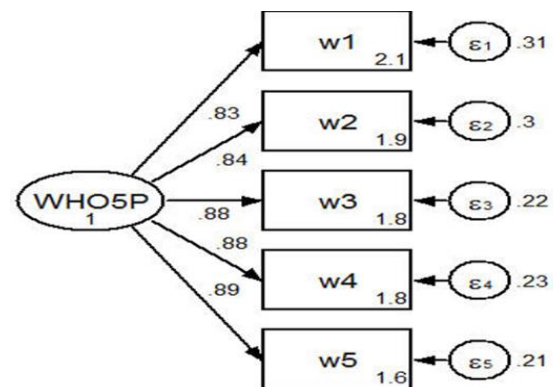


Figure 1. One-dimensional structure of the WHO-5 questionnaire with Standardized Estimates according to Confirmatory factor analysis (CFA),

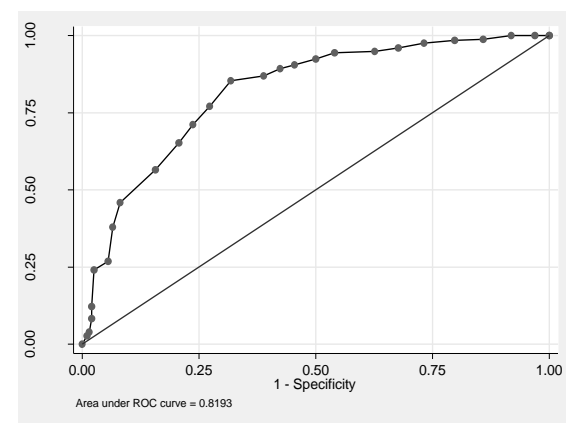


Figure 2. The receiver operating characteristic curve of the Persian version of the World Health Organization-Five Well-Being Index

The GHQ-28 was used as a gold standard in determining the predictive validity of the WHO-5-P. Figure 2 shows the ROC curve for the detection of mental disorders according to the WHO-5-P total score. The area under the curve in this study was 0.82 (95% CI: 0.78 to 0.86) which was significantly different from 0.5 ( $P < 0.001$ ). A cut-off of  $< 13$  (12/13) yielded the best sensitivity/specificity trade-off: Sensitivity, 68% (95% CI: 61.4–74.3); specificity, 85% (95% CI: 80.5–89.2); PPV, 78.5%; and NPV, 77.4%. The positive likelihood ratio was 4.7 at this cut-off point.

**Table 1. Persian version of the WHO-5-P item level values, item–total correlations and factor loading matrix**

WHO-5 item	WHO-5-P item	Mean if Item deleted	Corrected item–total correlation	Alpha if item deleted	Factor loadings
1. I have felt cheerful and in good spirits	در طول دو هفته گذشته شاد و خوش خلق بوده‌ام.	10.6	.804	.926	.875
2. I have felt calm and relaxed	در طول دو هفته گذشته احساس آرامش و راحتی داشتم.	10.7	.809	.925	.879
3. I have felt active and vigorous	در طول دو هفته گذشته احساس می‌کنم که فعال و پر انرژی بوده‌ام.	10.7	.845	.918	.904
4. I woke up feeling fresh and rested	در طول دو هفته گذشته شاداب و آسوده بیدار شده‌ام.	10.7	.841	.919	.901
5. My daily life has been filled with things that interested me	در طول دو هفته گذشته زندگی روزمره‌ام مملو از چیزهای مورد علاقه من بوده است.	10.9	.848	.918	.905

WHO-5-P, World Health Organization-Five Well-Being Index (Persian version)

## Discussion

This is the first study to examine the psychometric properties and validity of the WHO-5 questionnaire in adult population of Iran. The WHO-5-P was found to have adequate reliability and validity to be used with Iranian populations. Similar to the Study of de Wit et al, in diabetic patients (6), the one-dimensional structure of the questionnaire was also confirmed through exploratory and confirmatory factor analysis in our population.

WHO-5-P scale showed a significant moderate to strong correlation with GHQ-28. In other studies correlation of WHO-5 scale was assessed with different health-related questionnaires such as Self-Rating Depression Scale (SDS), State-Trait Anxiety Inventory (STAI), Short-Form 36 Health Survey questionnaire (SF-36) (7, 13). Internal consistency of our study was acceptable and it was in the same range as in preceding studies from Germany (14), Japan (15) and Thailand (16).

According to ROC analysis, it indicated that the WHO-5-P had a sufficient predictive validity as a screening tool for detecting mental disorders, at a standard cut-off point of lower than 13. This cut-off score is like the original version, which is less than 13. In conclusion this study has shown that the Persian version of WHO-5 is a valid and convenient instrument in screening for mental disorders. It has an acceptable sensitivity and specificity with a cut-off point of less than 13 for detecting mental health disorders in the adult Iranian population.

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## Conflict of Interest

The authors declare no conflicts of interest.

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