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Psychometric properties of the General Health Questionnaire (GHQ-12) to be applied for the Iranian elder population

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ABSTRACT

Introduction: The General Health Questionnaire (GHQ-12) is a self-administered questionnaire to screen and detect individuals with a diagnosable psychiatric disorder. This study was designed to validate the Persian translated version of the short 12-item General Health Questionnaire (GHQ-12) for use with the Iranian elder population.

Method: A forward−backward translation method was performed to ensure the quality of the English to Persian translation. A sample of 300 Iranian elder (60 years and over) people was selected from locations known to be frequented by older adults residing in three cities in Iran. Factor of the GHQ-12 was assessed using confirmatory factor analysis (CFA). Internal consistency and test−retest reliability were measured by estimating the Cronbach's alpha and Spearman correlation coefficients, respectively.

Results: The study participants included 157 (52.3%) men and 143(47.7%) women with an average age of 66.5 years (SD = 5.5). Cronbach's alpha for Social dysfunction, psychological distress and overall score were 0.80, 0.78 and 0.82, respectively. The test−retest correlation coefficients among two subscales of the GHQ-12 as well as the overall scores ranged from 0.84 to 0.93. CFA revealed a good fit for a modified 12-item two-factor structure.

Conclusion: The Persian version of the 12-item General Health Questionnaire was found to be valid and reliable for measuring general health of Persian speaking elderly populations.

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Confirmatory analysis; factor structure; GHQ-12; elderly; psychometrics

Introduction

The size of the elderly population is growing expeditiously in several countries due to increase in their life expectancy which is one of the consequences of socio-economic development in many parts of the world. It is predicted that the world's population of over 65 years old is to double within 47 years, of which, about 52% will be in the Asian countries. By the time, almost 47% of the global old population will be living in the developed countries (World Health Organization [WHO], 2014).

According to the WHO reports, within two decades, there will be a remarkable change in diseases epidemics and people's health needs so that infectious diseases will be quickly replaced by noninfectious disorders, such as mental health problems, and they will be the major cause of disability and even premature death in most of the countries (Mehri & Sedighi, 2009).

Mental health disorders are more prevalent among elder people due to various contextual factors that are related to the old ages, e.g. social isolation, deteriorated quality of life, cognitive and physical impairments or disabilities (Can, 2011). Income reduction following retirement, limited access to job opportunities and being a victim of abusive behaviors could also aggregate their mental problems (Najafi et al, 2013). Mental health disabilities are the second cause in the rank of mediators that are responsible for lost years of healthy life (disability adjusted life year [DALY]) (Mortazavi, Ardebili, Mohammad, & Dorali, 2011) and their *impact* for elder people may even be more excruciating.

In Iran, as a developing country, there is a progressive pattern of elderly population growth (Rashedi, Rabani, Hejazi, Alipour, & Nabavi, 2014; Matlabi, Shaghaghi, & Amiri, 2014).

Accurate mental health assessment of elder people and early detection of the disorders could assist curative and palliative interventions.

Various scales were introduced in the recent decades to be used in the psychiatric screenings and one of the commonly used measures that widely applied for general populations is the Goldenberg's General Health Questionnaire that was developed for recognition of psychological distresses (Yaghobi, Karimi, Omidi, Baroti, & Abedi, 2012).

The original questionnaire consists of 60 items but different shorter versions (30, 28 and 12 items) have also been adapted and validated in different studies (Goldberg, 1988). The 12-items version of the questionnaire (GHQ-12) takes a shorter time to be completed and was used broadly due to its brevity (Ebadi et al., 2012; Salama-Younes, Montazeri, Ismaïl, & Roncin, 2009).

The psychometric properties of the Persian version of the questionnaire were also studied in several studies to assess its applicability among the young and middle aged Persian speaking subgroups of Iranians (Ebadi et al., 2012; Montazeri et al., 2003).

The GHQ-12, however, was not studied for its validity and applicability among Iranian old people. This study was, therefore, performed to examine validity and reliability of the GHQ-12 to be used for assessment of mental health status among Iranian old people.

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Method

Participants and procedures

To assess applicability of the General Health Questionnaire (GHQ-12) for use amongst Iranian elder people, 300 participants were recruited in person at locations known to be frequented by older adults such as the Civil Servants Pension Organization, national park, coffee shop in the cities of Tabriz, Sanandaj and Yasooj. The selected sample size in this study was consistent with the recommended minimum sample size that is required for modeling covariance structure (MacCallum, Browne, & Sugawara, 1996). The study was approved by ethics committee of Tabriz University of Medical Sciences.

The original GHQ-12 was translated into Persian by two qualified translators (forward translation). Afterwards, the translators and project manager reconciled any discrepancies between the two translated versions. The translated versions were unified and then back translated by two of the authors who are bilingual English and Persian speaker and proficient in the field (backward translation). The authors were blinded to the original English version. The backward translations were compared to the original English version in a session. At the later step of translation procedure, two geriatricians were asked to check the final Persian translated version of the questionnaire and, based on their feedbacks, minor changes were made to enhance its lucidity.

Three trained and qualified interviewers were completed the study questionnaire through a face-to-face interview.

The inclusion criteria were: age above 60 years old, and over and able to understand and speak Farsi. Older adults were excluded from the study if they were unable to give informed consent and those who had cognitive impairment. The GHQ-12 was administrated for the study sample at two separate points in time. The instrument was administered once the eligible participants provided either consent. The same participants were asked to complete same questionnaire two weeks later.

GHQ-12

The General Health Questionnaire (GHQ) is a self-administered screening questionnaire, designed for use in consulting settings aimed at detecting individuals with a diagnosable psychiatric disorder (Goldberg & Hillier, 1979).

GHQ has been widely translated and used as a screening tool in many different languages, such as *French* (Salama-Younes et al., 2009), *Italian* (Piccinelli, Bisoffi, Bon, Cunico, & Tansella, 1993), *Chinese* (Ip & Martin, 2006), *Singaporean* (Gao et al., 2004), *English* (Hankins, 2008), *Spanish* (Lopez & Dresch, 2008) and *Persian* (Montazeri et al., 2003).

A number of studies have reported psychometric characteristics of the GHQ-12 with Cronbach's alpha coefficient values ranging from 0.75 to 0.9 in the unidimensional model. However, many studies have shown that GHQ-12 measures psychological morbidity in more than one dimension, most common being in two or three dimensions (Hankins, 2008).

This scale consists of two sub-scales to measure mental disturbances and social performance disturbances. In the current study, the Likert spectrum scale of four options (0−1−2−3) was used, and answers for each item were never, normal, extra normal and relatively more than normal. The scores were used to generate *overall score rating* from 0 to 36, with higher scores indicating worse conditions.

Statistical analysis

For all tests, a significance level of 0.05 was considered and statistics software SPSS version 21 and LISREL version 8.80 were used.

Construct validity

The factor structure of the GHQ-12 questionnaire was explored using first-order and second-order confirmatory factor analysis (CFA). The CFAs were performed using weighted least squares and models were fitted to polychoric correlations among items.

Goodness-of-fit of the model was tested by using chi-square χ^2, comparative fit index (CFI), Tucker−Lewis index (TLI), root mean square error of approximation (RMSEA), Akaike information criterion (AIC) and adjusted goodness-of-fit index (AGFI).

Indexes AGFI, CFI and TLI are estimated between 0 and 1, and figure closer to 1 means a model fitted better with data. The fit indices for satisfactory data−model fit were non-significant χ^2, CFI, AGFI and TLI > 0.9, RMSEA < 0.08. The AIC is a comparative measure of fit, and lower values indicate a better fit (McDonald & Ho, 2002).

Internal consistency and interclass correlation

In order to assess internal consistency, Cronbach's alpha coefficient was calculated for each domain and the overall score of the GHQ-12. To assess reliability of questionnaire over time, test−retest method in a period of two weeks was used on 30 elders. Test−retest reliability was measured using Spearman's rank correlation coefficient (rho). Values equal to or larger than 0.7 are considered acceptable range for Cronbach's alpha and rho, respectively (Fleiss, 1986).

Result

Study sample consists of 157 men (52.3%) and 143 women (47.7%). Mean age of participants in the study was 66.5 with a standard deviation of 5.5 years. Of the study respondents, 69% (207) were married and 31% were illiterate.

Content validity

The translated version of the questionnaire was sent to a panel of experts that consisted of academic staff members of the Tabriz University of Medical Sciences for content validity assessment. Content validity index (CVI) and content validity ratio (CVR) were calculated based on the respondents' answers to the questions about the relevancy of the questionnaire's items (CVI = 0.92 and CVR = 0.96).

Factor structure

Results from CFA on data showed a good fitness for first-order two-factor model (consistent with primary structure of questionnaire) ($Chi^2/df = 2.7 < 5$). The fit statistics for the first-order CFA model are presented in Table 1. It can be seen that the general factor model showed an adequate fit for all

Table 1. Goodness-of-fit indicators of models for GHQ-12 ($n = 300$).

Model	χ^2	*P* value	df	χ^2/df	AGFI	CFI	TLI	AIC	RMSEA 95% CI
First-order two-factor model	113.3	0.003	50	2.266	.91	.97	.97	162.22	0.061 (0.045−0.078)
Second-order two-factor model	176.72	0.001	50	3.52	0.90	0.95	0.93	256.31	0.067 (0.057−0.079)

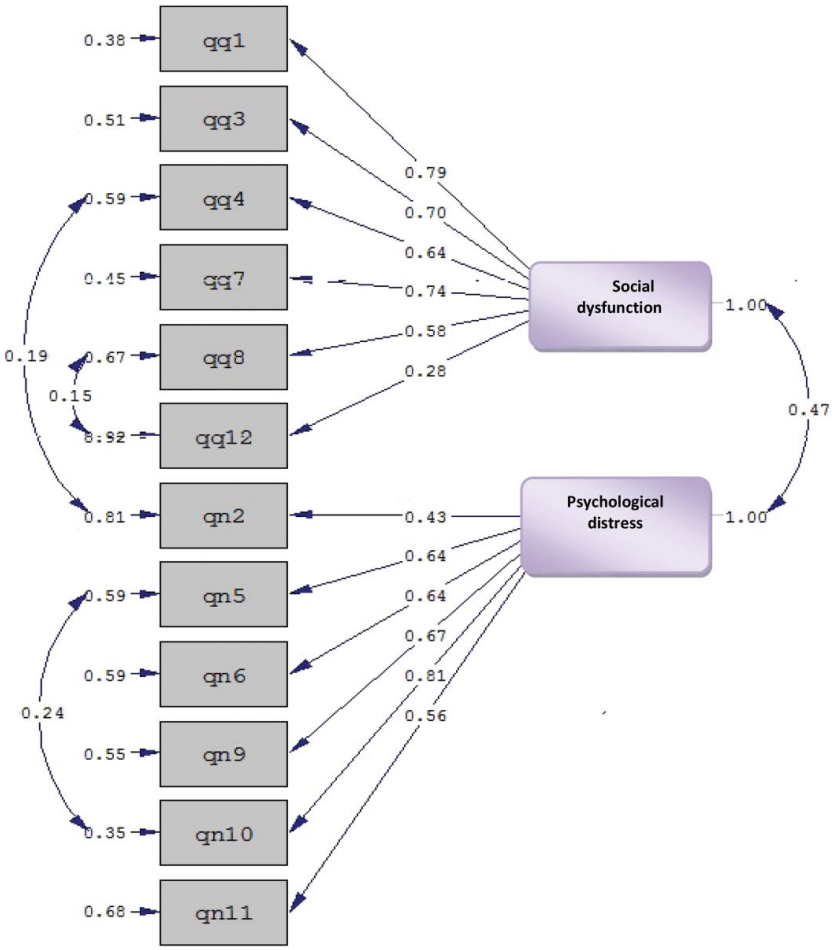

Figure 1. Confirmatory factor analysis: factor 1 assesses Social dysfunction and factor 2 assesses psychological distress.

indices. Results of the conducted CFA were also shown in Figure 1. Factor 1 in the model was used to measure social performance disturbances and included items 1, 3, 4, 7, 8 and 12, while factor 2 was used to measure mental disturbances and included items 2, 5, 6, 9, 10 and 11. In order to further confirm, second-order CFA was employed for the GHQ-12. The fit indices for this model were all within acceptable (Table 1). However, the AIC indicated that the first order was better fit.

Reliability

Cronbach's alpha coefficient was used to evaluate the validity of the entire questionnaire and also its two sub-scales (Table 2). Cronbach's alpha for Social dysfunction, psychological distress and overall score were 0.80, 0.78 and 0.82, respectively. Test−retest correlation coefficients of the Social dysfunction, psychological distress and overall score of the GHQ-12 were 0.84, 0.93 and .91, respectively.

Discussion

The main purpose of this study was to evaluate validity and reliability of 12-item General Health Questionnaire for use in the Iranian elderly population.

As expected, internal consistency of the *Persian* version of the GHQ-12 was similar to the previous studies such as Persian Language (Montazeri et al., 2003), *Spanish* (López & Dresch, 2008), *Japanese* (Minowa, 2003), *French* (Salama-Younes et al., 2009), *Sri Lankan* (Abeysena, Jayawardana, & Peiris, 2012) and *Turkish* (Kihç et al., 1997).

Test−retest reliability of the GHQ-12 was 0.91 and it was similar to the *Italian* population (Piccinelli, Bisoffi, Bon, Cunico, & Tansella, 1993). Similar results were found with other

Table 2. Reliability report of GHQ-12.

Factors	Number of items	Cronbach's alpha	Mean of inter items correlation	Spearman's rho
Social dysfunction	6	.79	.38	.84
Psychological distress	6	.77	.36	.93

studies (Ip & Martin, 2006; Quek, Low, Razack, & Loh, 2001; Tagharrobi, Sharifi, & Souki, 2015).

Psychometric properties of the GHQ-12 questionnaire have been studied in elder populations (Bun Cheung, 2002). Bun Cheung assessed applicability of the questionnaire in Britain's elder population. The study findings have shown that 12-item General Health Questionnaire version has an appropriate validity and reliability to be applied for Britain's elder population.

The finding of the current study yielded a two-factor model in application of GHQ-12 for Iranian older adults as 'Social dysfunction' (based on the items 1, 3, 4, 7, 8 and 12) and 'psychological distress' (based on the items 2, 5, 6, 9, 10 and 11). The observed similarities regarding the retained factors in the conducted studies on use of GHQ-12 might represent common general health problems among the elderly people worldwide. However, differences in the structures of the reported factors may suggest cross-cultural diversities in health status or report of health status in different countries.

Limitations

The study has some limitations that future research needs to address. First, our older adults were not representative of Iranian older adults and the generalizability of the study findings might be under scrutiny due to non-random selection of the data collection sites. Iran is multi-cultural and multi-ethnic country and cross-cultural diversity of the country's population could affect applicability of a validated scale in one part of the country to the different population sub-sample with diverse socio-cultural background. Our suggestion for future researchers, therefore, will be to select a sample from country-wide heterogeneous population.

Second, the study sample consisted of older adults from Civil Servants Pension Organization, national park and coffee shop. Therefore, the findings may not be applicable for institutionalized elderly population.

Despite the study mentioned design and scope limitations, our overall judgment is in favor of applicability of the Persian version of the GHQ-12 in the Iranian elder population.

Conclusion

The examined internal, content, face and construct validity of the translated Persian version of the 12-item General Health Questionnaire supported the scale applicability in the Iranian and other Persian speaking elderly populations.

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Disclosure statement

No potential conflict of interest was reported by the authors.

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