Psychometric Evaluation of the Persian Version of the 'Aging Male Scales' Questionnaire

Hasan Eftekhar Ardebili, Shahla Khosravi[1], Bagher Larijani[2], Saharnaze Nedjat[3], Alireza Nikbakht Nasrabadi[4]

Department of Health Services Management, School of Public Health, Institute of Health Research, Tehran University, Tehran, Iran, [1]Department of Community Medicine, Faculty Member of Medicine, PhD candidate of Tehran School of Nursing and Midwifery ,Tehran University of Medical Sciences, Tehran, Iran, [2]Department of Endocrinology and Metabolism, Endocrinology and Metabolism Research Center, Tehran University of Medical Sciences, Tehran, Iran, [3]Department of Epidemiology and Biostatistics, School of Public Health, Knowledge Utilization Research Center, Tehran University of Medical Sciences, Tehran, Iran, [4]Department of Medical-Surgical Nursing, Tehran School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran

Correspondence to:
Shahla Kosravi,
Department of Community Medicine,
Tehran University of Medical Sciences,
Poorsina Avenue, Ghods Avenue,
Enghelab Square, Tehran, Iran.
E-mail: khosravi785@yahoo.com

Date of Submission: Sep 07, 2013

Date of Acceptance: Jun 04, 2014

How to cite this article: Ardebili HE, Khosravi S, Larijani B, Nedjat S, Nasrabadi AN. Psychometric Evaluation of the Persian Version of the 'Aging Male Scales' Questionnaire. Int J Prev Med 2014;5:1179-86.

Original Article

ABSTRACT

Background: Men, much like women, are faced with age-related menopause-like symptoms as they age. In recent years, increasing attention has been drawn to clinical research into elderly men and their health-related quality of life. The Aging Male Scales (AMS) questionnaire is an international tool for assessing the health-related quality of life in elderly men. Hence far this questionnaire has not been subjected to psychometric assessment in Iran. This study aims to evaluate the validity and reliability of the Persian version of the AMS questionnaire specific to the health of elderly men in Iran.

Methods: To validate this instrument, a cross-sectional study was conducted on 521 healthy Iranian men aged 40-65 years old, who attended the blood transfusion center clinic between February 2011 and June 2012. The English version of the AMS questionnaire was translated to Persian and then back-translated. To determine the reliability of the AMS questionnaire, internal consistency was evaluated and test-retest was done. The questionnaire was validated using convergent and structural validity methods. To assess the factor structure of the questionnaire, a correlation matrix of questions and domains was used.

Results: Cronbach's alpha was higher than 0.7 (0.73-0.88) in all domains. A Pearson's correlation coefficient of 0.87 between pretest and posttest indicated a high correlation and an acceptable reliability. The convergent validity of the questionnaire was found acceptable by calculating the correlation between the domains and items-total correlation ranging 0.40-0.85, except for question 14 that had a 0.28 correlation with the whole test. The criterion-related validity of the questionnaire in the psychological domain was confirmed with the "two-item Patient Health Questionnaire" ($r = 0.63$, $P < 0.001$).

Conclusions: According to the results, the Persian version of the AMS questionnaire has high validity and reliability and may be used to assess the health-related quality of life of men between 40 and 65 years old.

Keywords: Aging male scales, andropause, psychometrics, quality of life, reliability, validity

INTRODUCTION

Andropause, or hypogonadism, a relative disorder of androgen among older men with late-onset of clinical conditions is associated with aging, which is identified by reduced sexual hormone levels in men.[1,2] Reduced production of androgen in older men has been recognized since 1994. Although the changes in age-related sexual hormones in women have been widely studied, impairment of testosterone in men is often overlooked.[3] Progressive decline in gonadal function is part of the aging process in men. In fact, the production of testosterone in the testes continuously drops 40-year onward; between the ages 40 and 70 the mean testosterone decline is about 1%/year.[3,4] Different names such as male menopause, andropause, and late-onset hypogonadism have been used to describe these phenomena.[4,5] Andropause affects millions of men worldwide, and more are identified as the world ages. The most common symptoms in elderly men include erectile dysfunction, decreased libido, decreased physical strength, and increase in fat mass. Osteoporosis and psychological problems are other side-effects of this condition.[7,8]

This condition is a biological syndrome associated with aging and is characterized by impaired levels of androgen leading to important changes in quality of life and negative influences on the function of different organs. Initially, hormone level reduction is presented with clinical symptoms, and several questionnaires have been developed to measure this phenomenon.[6]

According to the World Health Organization, quality of life is people's perception of their life status in terms of objectives, expectations, and priorities. Therefore, it is entirely subjective and based on an individual's perception of different aspects of life,[9] for which numerous questionnaires have been designed. The Aging Male Scale (AMS) questionnaire is used for the evaluation of quality of life specific to elderly men's hormonal changes. It was prepared for the 1st time in Germany by Professor Lothar Heinmann in 1999 in the self-assessment form in order to evaluate aging symptoms in men under different conditions, severity of the symptoms over time, and changes attained by androgen treatment. This tool was designed in response to the lack of tools for measurement of severity of aging symptoms in men and their impact on their quality of life.[10] Initially, the questionnaire was designed with 200 questions, but was reduced to 17 items in psychological, physical, and sexual domains following a causal analysis. Completion of the questionnaire is easy and uncomplicated and takes <10 min.[11]

The AMS questionnaire is well-received around the world and has been translated to various languages (31 languages) including English, French, Danish, Spanish, Portuguese, Italian, Swedish, Korean, Thai, and Japanese. Some translations are simple, and copies are available in printed form. Assessment of the tool is easy and original versions have been re-evaluated and their results have been re-published.[12] Although normal values of the standardized scores (total score and domain scores) have only been published for the German population so far, these are available for comparison. The results of comparison with other tools of elderly men's health or androgen impairment screening indicate good correlation, or, in other words, the basis for validity.[13-15] Comparing these tools with those commonly used for measuring quality of life (such as SF-36) also show a high correlation coefficient. AMS was designed as a self-administered scale (a) to assess symptoms of aging (independent from those which are disease-related) between groups of males under different conditions, (b) to evaluate the severity of symptoms over time, and (c) to measure changes pre- and post-androgen therapy.[16] The reliability of the original questionnaire was estimated at 0.88 Cronbach's alpha for the overall tool, and 0.80-0.84 for the domains. The correlation between the two tests' scores was $r = 0.86$. The internal correlation of the questions was calculated at 0.5-0.9 for all the questions except for question number 14, which scored 0.2. Several studies have shown that the total score of this questionnaire and its domains have a high correlation with each other (Cronbach's alpha >0.75).[14,15,17]

Like other tools assessing the quality of life, these tools can be used for comparing the efficacy of interventions, screening, providing clinical services, and wider research into men's health. For the development of AMS tools, it is necessary to compare the internal construct of this tool in countries with cultural and social differences, as existing results in other societies cannot be applied to clinical purposes in another.[18]

This study aims to present the psychometric evaluation results of this tool in Iran's male population for the 1st time, with regards to AMS characteristics.

METHODS

As a first step, the English version of the AMS questionnaire was translated to Persian using the forward-backward translation method. Forward translation of the questionnaire was done by two independent medical translators from English to Persian. After the research team reviewed and approved the translated version it was back-translated into English by a Persian speaking individual fluent in English, and compared with the English version. The final English version was E-mailed to one of the members of the questionnaire designing institute, ZEG Berlin (Center for Epidemiology and Health Research). The translated version was approved and the permission was granted to use the questionnaire. Furthermore, the conceptual overlap between questions was answered, which did not raise the need to alter the Persian version. Then, a number of questions on demographic details, anthropometrics, physical activity (using the metabolic equivalent of the task [MET]), lifestyle, and depression- the "two-item Patient Health Questionnaire" (PHQ-2)[19] were added to the questions.

The AMS is based on signs and problems, and covers physical or somato-vegetative, psychological and sexual domains. It contains 17 items in which the score increases point to point with the individuals' increased understanding of difficulties in each item. A Likert scale was used, ranging from 1 to 5 (1= does not exist, 2= mild, 3= medium, 4= relatively intense, 5= intense) based on the intensity of symptoms in each item. The total score of each domain is the sum total of scores in that domain, and the final score is the sum total of all three domain scores.[11] The score range of each domain varies from 5 to 35, with five questions each for psychology and sexual domains and seven questions for the somato-vegetative domain. As the questionnaire was meant to be completed by literate men, it was initially given to 20 educated men aged 40-65 years to complete (as lay experts) to assimilate the original study population's conditions and ascertain intelligibility and flow of questions. At this stage, depending on their responses to the questions, changes were made to the questions' wordings. A number of aspects of physical activity were also added. The time taken to complete the AMS questionnaire was approximately 6-8 min. Moreover, the time taken to complete all the questionnaires of this study was 14-16 min.

The study population consisted of healthy men attending the blood transfusion clinic who completed the AMS questionnaire between 8 and 11 a.m. (to ensure correct blood sampling times).[20] Married and literate men aged 40-65 years were included in the study, and those who'd been diagnosed with a physical or mental illness and/or had been on antidepressant drugs were excluded data were collected using demographic, AMS, and physical activity (MET) questionnaires, as well as anthropometric measurements of height, weight, waist circumference, and blood pressure. On the whole 521 men participated in the study. Needless to say, the questionnaire was self-administered, and it was completed in a private space specifically designed for this purpose in the relevant clinic.

For these data and population details, descriptive statistics including frequency, mean, and standard deviation were used. To assess the reliability of the questionnaire, internal consistency was calculated using Cronbach's alpha. Values of 0.7 or higher were considered appropriate and acceptable. Test-retest was used to assess the reliability on a sample of 72 men that completed the questionnaire, twice, with a 1-week interval. Using Pearson's correlation coefficient, correlation between test and retest for the whole questionnaire was estimated. Furthermore, Cronbach's alpha was used to measure intra-rater agreement of the tool and the correlation of the items with the total scale, where values >0.7 were considered as significant. Those who participated in the pilot study were excluded from the main one.

After determining content validity using expert panel's opinion about the necessity of the questions, their relevancy and transparency, a cross-sectional study was conducted to determine construct validity. The correlations between the tool items, between the domains, and between the domains and the total scale were evaluated.

Participation in the study was on a voluntary basis and no names were required. Participants

were assured of confidentiality and were presented with tokens of gratitude for their cooperation. After debriefing the participants on the significance of the study, its objectives and stages of execution, they were handed the questionnaires and written consent was obtained.

Statistical analysis

Statistical analysis was performed by version 19 of statistical package for the social sciences software. Results are presented as frequencies, means and standard deviations. Pearson's correlation coefficient was used to measure intra-rater agreement for correlation between test and retest and Cronbach's alpha (>0.7 were considered as significant).

Ethic approval was obtained from the Research Ethics Committee in Tehran University of Medical Sciences.

RESULTS

Of the 729 men attending the clinic who met the inclusion criteria, data were collected from 543 who wished to participate. However, due to incomplete data, 521 completed AMS questionnaires were collected together with blood samples for biological and hormonal tests. Therefore, the response rate of the study was almost 74.4%, which is considered quite good, given the cultural barriers and novelty of the subject. Participants were aged between 40 and 65 years with a mean age of 50.2. The age distribution in 5-year age groups is in percent (%): 19.2% (40-44 years), 30.6% (45-49), 26.9% (50-54), 16% (55-59), and 7.3% (60-65), respectively. The difference between the age group percentages and that of the general populations' (according to census)[21] was due to selection of literate men, given that elderly are more likely to be illiterate and to not meet the inclusion criteria. Patient demographics and disease variables are shown in Table 1. A great proportion (85.5%) of the participating men had a body mass index >25 (kg/m^2).

Reliability

First, Cronbach's alpha for internal consistency of 17 AMS questions was calculated, and then it was calculated for each domain. The overall value of alpha was found to be 0.88 and no significant change was observed by elimination of each item. Changes ranged from 0.86 to 0.88. Cronbach's alpha was 0.78, 0.78, and 0.73 for physical, psychological, and sexual domains, respectively. These results indicate high consistency and acceptability of the tool.

To assess consistency using test-retest, the Persian version of AMS was re-distributed after 1-week among 72 people of the study population selected randomly. Upon re-evaluation Pearson's coefficient of reliability was 0.93 (confidence interval =0.95), with a range of 0.89-0.96. The reliability of the sexual domain was found to be the lowest of all three domains. Reliability results are presented in Table 2.

Table 1: Demographic characteristics of the study sample (*n*=521)

Characteristics	*n*[a]	Mean (SD)
Age (years)	520	50.8 (5.75)
BMI[c] (kg/m^2)	520	28.27 (3.93)
Waist circumference (cm)	518	103.533 (9.52)
MAP[d] (mmHg)	515	89.59 (8.93)
	***n*[c]**	**Percentage**
Occupational status (employed)	517	17
Education (high school diploma)	520	25.8
Smoking (yes)	520	26.2
Diabetes (FBS>126) (yes)	465	10.1
Water-pipe consumption (yes)	520	11.2

n[a]: Number of men who had no missing variables which were used as independent variables for analysis, *n*[b]: Proportion of all the 521 men who provided information on a certain parameter, [c]Body mass index, [d]Mean arterial pressure. SD=Standard deviation, FBS=Fasting blood sugar

Table 2: Internal consistency coefficients (α) for the AMS scale and test-retest coefficients (Pearson's correlation coefficient *r*) for the AMS scale: Total score and scores for the psychological, somatic, and sexual sub-scales

	Mean (SD)	Cronbach's alpha (*n*=521)	Test-retest pearson's correlation (*r*)** (*n*=71)
Total score	29.8 (9.6)	0.88	0.87
Psychological score	12.04 (4.3)	0.78	0.79
Somatic score	8.76 (3.7)	0.78	0.85
Sexual score	8.29 (3.3)	0.73	0.79

**Correlation is significant at the 0.01 level (2-tailed), ***This estimate was computed assuming the interaction effect is absent, because it is not estimable otherwise SD=Standard deviation, AMS=Aging male scales

The results show that the response rate for all items is between 93% and 100%. Missing data on all items except item 11 (depressive mood: Feeling down, sad, on the verge of tears, lack of drive, mood swing, feeling nothing is of any use), between 0% and 4%, respectively. Most missing data were observed in response to item number 11, which was about 7%.

Validity

To assess the validity of the questionnaire, first the content validity was studied using the opinions of eight faculty members for all questions on the cases of transparency: (1) Unknown and obscure, (2) somewhat obscure, (3) transparent and clear, (4) very clear and specific and suitability: (1) Poor, (2) somewhat poor, (3) suitable, (4) very suitable.

To determine construct validity of the questionnaire, correlations between the questions of each domain were calculated using item-scale correlation (ISC). ISC evaluates the correlation of questions in each domain with that particular domain. A correlation coefficient of 0.4 and higher was considered acceptable. After elimination of a question, the overall score was calculated and the correlation between the score of the question with the overall score and also with its own domain and other domains were calculated. The results are presented in Table 3. The results indicate that other than item 14 (reduced beard growth) all questions had higher than 0.4 correlation coefficients with the overall score. The internal validity shows that each question had the highest correlation coefficient with its own domain ($P < 0.001$) and all coefficients were higher than 0.4.

The relationship between tool domains and the overall score provides important patterns for evaluation of the tool. Ideally, the correlation between domains (assuming independence from each other) compared with the correlation between overall score and domains should lean towards zero, because, domains play a significant role in the overall score.[18] However, this holds true only theoretically. Table 4 shows that the correlation between sub-domains with one another (0.5-0.6) is lower compared with the correlation between sub-domains and the overall score (0.7-0.9).

For convergent validity, comparison of tools with similar objectives of application and credibility confirm the interpretation of results

Table 3: Internal structure of AMS and its domains

	Item number	Psycho[a]	Somat[b]	Sex[c]	Total score
Burned out	13	0.66			0.51
Depressive, mood	11	0.67			0.52
Irritability, increased	6	0.76			0.54
Anxious, more	8	0.73			0.56
Nervousness, more	7	0.82			0.63
Joint complaints, more	2		0.69		0.45
Sweating, increased	3		0.49		0.38
Sleep, need for more	5		0.70		0.56
Well-being, impaired	1		0.67		0.50
Sleep disturbances, more	4		0.70		0.54
Muscular weakness	10		0.69		0.55
Physical exhaustion	9		0.66		0.60
Sexual potency, impaired	15			0.85	0.56
Morning erections, less	16			0.81	0.44
Libido, disturbed	17			0.81	0.52
Passed peak	12			0.61	0.51
Decreased beard growth	14			0.41	0.27

*A correlation coefficient of 0.4 and higher was considered acceptable, [a]Psycho=Psychology domains, [b]Somat=Somato-vegetative, [c]Sex=Sexual domains. AMS=Aging male scales

Table 4: Total score-domain score correlation of the AMS scale

Domains	Score (%)		
	Psychological	Somatic	Sexual
Total score	85	88	78
Psychological score	-	65	51
Somatic score	-	-	53

AMS=Aging male scales

obtained. Reduced quality of life is accompanied by depression,[22] which appears to measure the psychological domain of the AMS questionnaire. To this end, correlation coefficient between the scores of psychology domain with those of depression was considered for validity. In this study, participants completed both questionnaires PQH2 and AMS. The PHQ-2 can be a useful and time-saving tool for primary care physicians screening depression.[23] Using the eta coefficient, the

correlation between depression and psychological domain of the AMS tool was statistically significant (0.63 with $P < 0.001$).

DISCUSSION AND CONCLUSIONS

In recent years, great interest has been shown in clinical research of elderly men syndrome and consequently in health-related quality of life and symptoms of this phenomenon. Many studies have been conducted on the assessment of validity and reliability of the AMS tool in elderly men.[11-13] And, it is widely used around the world. However, as its consistency and reliability have not been evaluated in this country, it cannot be used for research and clinical purposes. In this study, the Persian version was evaluated taking into consideration the cultural aspects of society. Regardless of the possibility of bias, the inclusion criteria considered were being "literate" and "married," because AMS is a self-administered questionnaire and includes certain questions on sexual behaviors, and the study had to be domesticized to local cultural values. Therefore, the percentage of people over 60-year-old was less than the general population of the 2011 census.[21]

This questionnaire has an acceptable reliability in terms of intra-rater agreement, with a Cronbach's alpha of 0.88 for the total score, and a range of alpha between 0.73 and 0.78 for all three domains. For the concurrent test-retest, reliability analysis with correlation coefficients of domains for total AMS score and subscales were calculated. The overall tool, psychological, physical, and sexual domain correlation coefficients were found to be 0.93, 0.92, 0.88, and 0.88, respectively ($P < 0.001$). The aforementioned values were significant, indicating the reliability of the AMS and its domains after 1-week. Myon *et al*.'s results concur with those of this study, where intra-rater agreement of the questionnaire in total and in all three domains was between 0.7 and 0.9.[14] These values do not differ much from those reported by European, Asian, and other national studies conducted at different times. Thus, indicating that the tool is highly consistent.[15,17] The results of the test-retest analysis performed by the designers of the questionnaire in Germany yielded the following values: Pearson's correlation coefficient of the total score was 0.86 and was between 0.8 and 0.85 for the three domains. These results are consistent with those found in our study.[24,17] The correlation coefficient of test-retest supports consistency of the tool and the three domains, although larger samples are needed for conclusive results in these respects.

Item-scale correlation was used to assess the validity of this tool. The results showed that the correlation of all questions with their own domain was over 0.4. Except for item 14, the correlation of each item with the whole questionnaire was 0.4 and higher ($P < 0.001$), which are acceptable standards.[25] However, the 'reduced beard growth' item had the highest correlation with its own domain and hence it was not omitted. It should however be kept in mind in future revisions. Items 12 and 14 of sexual domain were considered not to be very suitable according to a study by Daig *et al*.[18] The results obtained for correlation of each domain with the total score and with other domains are important parts of evaluation of a tool. In this study, the correlation of each domain with the total score was high (0.75-0.87), while the correlation of domains with each other ranged from 0.51 to 0.65 for the three domains. According to results of factor analysis, it appears that domains are independent from each other and this difference is less than expected. The correlation between physical and psychological domains is more than that between other domains, which supports the strong effect of psychological health on physical health. Usually, the sub-domains are not independent from each other in the AMS tool. This is also evident from the results of the French version of AMS and comparison with other parts of Europe carried out by Myon *et al*., who believe that results of sub-domains ought not to be independent from each other.[14] In the re-assessment of the tool by the original designers of the questionnaire, the correlation between domains is reported to be 0.5-0.7. Similar results have been observed in other studies on the general population and individuals with hypogonadism,[17,26] which confirms the similarity of this tool in different countries.

In general, the Persian version of AMS appears to have an acceptable reliability and validity in the study population. The intra-rater agreement, item-total correlation in total score and score for each domain, and the observed pattern in item-total correlation of domains and consistency of results in re-tests bear witness to these findings.

Given the short time it takes, and simplicity and transparency of questions, this tool can be used to screen androgen deficiency in clinical practice and follow-ups of interventions, treatments or consultations to assess therapeutic effects with high certainty.

Limitations

Once of the limitations of the current study is its simple sampling. This is due to the absence of health centers for men and andrology clinics for healthy or even unhealthy men. To use this tool for screening and clinical diagnosis purposes, we recommend examining its validity in more representative populations; because the people referring to the Blood Transfusion Organization are different from the general population in terms of their age and the importance they give to health. This study showed an acceptable validity and reliability. However, it would be a further step toward validating the Persian tool if the quality of health in men with andropause symptoms would be examined with a couple of tools and then the results of the Iranian population were compared.

ACKNOWLEDGMENTS

This research was conducted with Tehran University of Medical Sciences financial support. We would like to extend our gratitude to the research team members, our colleagues at the Blood Transfusion Organization, and the men who participated in the study.

REFERENCES

1. Brawer MK. Testosterone replacement in men with andropause: An overview. Rev Urol 2004;6 Suppl 6:S9-15.
2. Hochreiter WW, Ackermann DK, Brütsch HP. Andropause. Ther Umsch 2005;62:821-6.
3. Staerman F, Léon P. Andropause (androgen deficiency of the aging male): Diagnosis and management. Minerva Med 2012;103:333-42.
4. McGill JJ, Shoskes DA, Sabanegh ES. Androgen deficiency in older men: Indications, advantages, and pitfalls of testosterone replacement therapy. Cleve Clin J Med 2012;79:797-806.
5. Delev DP, Kostadinova II, Kostadinov ID. Androgen deficiency: Diagnostic approaches, benefits, and risks of testosterone replacement therapy, a review. EJCMO 2012.
6. Carrier S. Office-based assessment of the suspected hypogonadal male. Curr Sex Health Rep 2006;3:45-50.
7. Corona G, Ferruccio N, Morittu S, Forti G, Maggi M. Recognising late-onset hypogonadism: A difficult task for sexual health care. J Mens Health 2009;6.
8. Hall SA, Esche GR, Araujo AB, Travison TG, Clark RV, Williams RE, *et al*. Correlates of low testosterone and symptomatic androgen deficiency in a population-based sample. J Clin Endocrinol Metab 2008;93:3870-7.
9. Bonomi AE, Patrick DL, Bushnell DM, Martin M. Validation of the United States' version of the World Health Organization Quality of Life (WHOQOL) instrument. J Clin Epidemiol 2000;53:1-12.
10. Heinemann LA. Aging Males' symptoms scale: A standardized instrument for the practice. J Endocrinol Invest 2005;28:34-8.
11. Heinemann LA. Development of AMS Scale_Review as PRO.doc-Aging Males Symptoms Scale (AMS) Development of the Scale1. Status Report by the Developer of the Scale. Available from: www.fda.gov/cder/guidance/5460dft.pdf. [Last Accessed on 2006 Jun].
12. Heinemann LA, Saad F, Zimmermann T, Novak A, Myon E, Badia X, *et al*. The Aging Males' Symptoms (AMS) scale: Update and compilation of international versions. Health Qual Life Outcomes 2003;1:15.
13. Heinemann LA, Saad F, Pöllänen P. Measurement of quality of life specific for aging males. In: Schneider HP, editor. Hormone Replacement Therapy and Quality of Life. London, New York, Washington: Parthenon Publishing Group; 2002. p. 63-83.
14. Myon E, Martin N, Taïeb C. The French Aging Males' Symptoms (AMS) scale: Methodological review. Health Qual Life Outcomes 2005;3:20.
15. Kobayashi K, Hashimoto K, Kato R, Tanaka T, Hirose T, Masumori N, *et al*. The aging males' symptoms scale for Japanese men: Reliability and applicability of the Japanese version. Int J Impot Res 2008;20:544-8.
16. Heinemann LA, Saad F, Thiele K, Wood-Dauphinee S. The Aging Males' Symptoms rating scale: cultural and linguistic validation into English. Aging Male 2001;4:14-22.
17. Rabah DM, Altaweel W, Arafa MA. Clinical assessment and validation of an Arabic Aging Male Symptoms questionnaire in patients with androgen deficiency. Aging Male 2011;14:33-6.
18. Daig I, Heinemann LA, Kim S, Leungwattanakij S, Badia X, Myon E, *et al*. The Aging Males' Symptoms (AMS) scale: Review of its methodological characteristics. Health Qual Life Outcomes 2003;1:77.
19. Kroenke K, Spitzer RL, Williams JB. The patient health questionnaire-2: Validity of a two-item depression screener. Med Care 2003;41:1284-92.
20. Rogers LC. The role of the laboratory in diagnosing

the role of the laboratory in diagnosing andropause (male menopause). 2005;36:771-3.
21. Statistical Center of Iran. National Statistical Information: Selected Statistical Information according to Census 2011 .Available from: http:// www.sci.org.ir/portal/faces/public/sci/sci.gozide. [Last Accessed on 2006 Jun].
22. Soh J, Ishida Y, Naito Y, Ochiai A, Naya Y, Mizutani Y, *et al*. Correlations of AMS score, depression score and hormonal levels with the manifestations of partial androgen decline in the aging male (PADAM). Aging Male 2004.
23. Arroll B, Goodyear-Smith F, Crengle S, Gunn J, Kerse N, Fishman T, *et al*. Validation of PHQ-2 and PHQ-9 to screen for major depression in the primary care population. Ann Fam Med 2010;8:348-53.
24. Heinemann LA, Saad F, Heinemann K, Thai DM. Can results of the Aging Males' Symptoms (AMS) scale predict those of screening scales for androgen deficiency? Aging Male 2004;7:211-8.
25. Kline P. A Handbook of Test Construction. 5th ed. London: Routledge; 2008. p. 48-62.
26. Akinyemi A, Bamiwuye O, Inathaniel T, Ijadunola K, Fatusi A. The Nigerian Aging Males' Symptoms scale. Experience in elderly males. Aging Male 2008;11:89-93.

Source of Support: Tehran University of Medical Sciences,,
Conflict of Interest: None declared.