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# Validity and Reliability of Health Promoting Lifestyle Profile II in the Iranian Elderly

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## ABSTRACT

**Background:** With increasing age, the prevalence of chronic diseases increases. Since health-promoting behaviors (HPB) are considered a basic way of preventing diseases, especially chronic diseases, it is important to assess HPB. This study examines the validity and reliability of the Health Promoting Lifestyle Profile II (HPLP-II).

**Methods:** This is a cross-sectional study which is conducted on 502 elderly individuals aged 60 and over in Tehran, Iran. In order to determine the validity, content and construct validity were used. The content validity index (CVI) was used to assess the content validity and to assess construct validity, confirmatory factor analysis (CFA), and item-total correlations were employed. For reliability, test-retest analysis was used, and the internal consistency of the HPLP-II was confirmed by Cronbach's alpha. For data analysis, SPSS-18 and Amos-7 software was used.

**Results:** The mean age of the subjects was $66.3 \pm 5.3$ years. The CVI for the revised HPLP-II and all its subscales was higher than 0.82. The CFA confirmed a six-factor model aligned with the original HPLP-II. Pearson correlation coefficients between the revised HPLP-II and their items were in range of 0.27–0.65. Cronbach's alpha of the revised HPLP-II was obtained as 0.78 and for their subscales were in the range of 0.67–0.84. Intraclass correlation coefficient was obtained 0.79 (95% confidence interval: 0.59–0.86, $P < 0.001$).

**Conclusions:** The Iranian HPLP-II scale is an appropriate tool for assessing HPBs of the Iranian elderly.

**Keywords:** Health-promoting behavior, Health Promoting Lifestyle Profile-II, reliability, the elderly, validity

## INTRODUCTION

The improvement of health conditions has enhanced longevity and consequently increased the population of

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the elderly in Iran. Iran's population is also aging at a dramatic speed.[1-3] With increasing age, the prevalence of chronic diseases increases. The most common causes of death in all age groups above 50 years are cardiovascular diseases, cancers, respiratory diseases, and accidents;[4,5] all these diseases can be prevented by health-promoting behavior (HPB).[6,7] Among the determinants of health, HPB has been acknowledged as the basic way of preventing disease, especially chronic disease, so HPB and lifestyle should be considered the main strategy to maintain and improve health.[8] A healthy lifestyle is a way of life that provides, maintains and improves the health and wellbeing of a person.[8,9] The most important HPB include healthy eating, physical activities, stress management, interpersonal communication, spiritual growth, and health responsibility. The attitude indicating it is too late to change or modify poor health behaviors in older adults is totally wrong.[10] Studies show that a higher level of HPB among elderly people correlates with a lower mortality rate.[11] To increase the level of HPB, it is necessary to evaluate these behaviors. Decision-makers on health issues, prior to any intervention aimed at promoting healthy behaviors, must first make an initial assessment of the current situation. When considering certain conditions and diseases of the elderly, the evaluation of lifestyle, especially in relation to HPB during this stage of life, is very important. Therefore, the availability of effective tools is necessary. The Health Promoting Lifestyle Profile II (HPLP-II) questionnaire is the revised version of the HPLP questionnaire and was first designed by Walker *et al.*[12] This questionnaire includes 52 items and the six-point subscale for HPB. It has been translated into different languages including Spanish, Japanese, Arabic, Chinese, and Turkish,[13-15] and its validity and reliability have been verified. In order to assess the health behaviors of older people, a comprehensive tool for measuring health behaviors is required. Furthermore, it is essential to the evaluation of the interventions effectiveness rat in research studies of related to elder.

Since the population of Iran is aging fast and there are no adequate tools to assess of health behaviors in older population in Iran, it is necessary that the tool is localized in order to measure the lifestyle of the elderly and evaluate HPB, so that it can be used in planning the health field. In this research, the validity and reliability of the HPLP-II questionnaire for the Iranian elderly were examined.

## METHODS

The population of the study was the elderly of the city of Tehran. Sampling was conducted by convenience sampling method and elderly people visiting cultural centers, parks, and health centers in two areas in the north and south of Tehran were enrolled in the study.

### Participants

To assess the validity and reliability, 10 samples are recommended for each question.[16] Therefore, 575 questionnaires were distributed, among which 502 questionnaires were completed. In order to determine the reliability of the questionnaire, 10% of subjects ($n = 52$) were chosen randomly to complete the questionnaire at 2 time intervals. Among them, five were unable to take part in the study, so a retest was completed with the participation of 47 subjects.

### Inclusion criteria
- Minimum age of 60
- Informed consent
- Ability to read Persian texts
- Speech power, not suffering from cognitive disorders.

### Exclusion criteria
- Lack of consent
- Experiencing an unfortunate event during the past month
- Taking antipsychotic drugs during the past month
- Participation in other research studies.

To assess the absence of cognitive disorders, the elderly people were assessed by the clock drawing test (CDT) before entering the study. The tree persons excluded for failing the CDT test. The CDT is valid and reliable for the elderly of Iran;[17] it is a valid instrument to identify and screen for severe cognitive disorders, particularly Alzheimer's disease.[18] Due to the easy implementation of this test[17] and since screening tests can be used to measure inclusion criteria,[19] the CDT was selected as an inclusion criterion.

### Instruments

In addition to the demographic variables questionnaire, the main tool used in this research included a second version of the health-promoting lifestyle profile (HPLP-II) that was first designed by Walker *et al.*[12] and which has been made valid and reliable by Zaidi *et al.*[20] for an adult group (under 60 years) of Iranians. The original version of this questionnaire consists of 52 items that measure HPB in six subscales (nutrition, physical activity, health responsibility, stress management interpersonal relationships, and spiritual growth). Each subscale includes of several items (nutrition: Nine items; physical activity: Eight; health responsibility: Nine, stress management: Eight, interpersonal relationships: Nine; and spiritual growth: Nine). The options for the questions are given on a four-point Likert scale (never, sometimes, often, routinely). Overall, the score for health-promoting lifestyle and behavioral aspects is calculated using the mean of responses for all 52 items and for each subscale (eight or nine items). The lowest and highest total score is 52 and 208, respectively.

The Persian version of this questionnaire was made valid and reliable by Zeidi *et al.* for the age group under 60 years.

Therefore, we avoid the repetition of the translating process, and we used it with the consent of the authors.

## Psychometric properties

The Persian version of this questionnaire was given to 10 specialists (five experts in gerontology, five specialists in health promotion) to determine its content validity index (CVI).

To determine the CVI, the three criteria of "simplicity," "relevance," and "clarity" were evaluated for each item on a four-point Likert scale.[21,22] In this way, the questions scoring <0.75 were removed. Then, as a pilot study to assess of face validity, questionnaires were given to 20 of the elderly people, and the final reforms were implemented. Then, to assess of face validity, questionnaires were given to 20 of the elderly people.

To determine the construct validity, confirmatory factor analysis (CFA) and item-total correlations were used. CFA is part of the measurement model that examines relationships between variables and the observed factors. Fitness indices that are usually used are Chi-square, goodness of fit index (GFI), the root mean square error of approximation (RMSE), normed fit index, and adjusted GFI (AGFI). Factor analysis is desirable when the Chi-square to degrees of freedom ratio is <3, the GFI and AGFI are >0.9, and the RMSE is <0.05.[23,24] To assess the sufficient number of samples for use in factor analysis, the KMO was used.

Item-total correlations were calculated to assess how the items of a scale differentiated the elders with regard to their HPB.

Next, to determine the internal consistency, Cronbach's alpha coefficient was used, and to verify the time reliability, the test-retest method was used. Correlation between the scores obtained from the two investigations in 2 weeks interval was assessed by calculating the class correlation coefficient (ICC). Accepted values for Cronbach's alpha coefficient and ICC 0.7 are more considered.[25,26]

SPSS software Version 18 (SPSS, Inc., Chicago, USA) and Amos-7 softwar (was published by Europress Software and originally written by François Lionet with Constantin Sotiropoulos) were employed. The characteristics of the subjects on the demographic variables were evaluated using independent *t*-tests and ANOVA to detect any significant differences between the two or more groups. For descriptive statistics, Pearson correlation coefficient, Cronbach's alpha, ICC, and KMO SPSS-18 software was used, and to verify the CFA, Amos-7 software was used.

Assurances were given to all elderly that their information would be kept completely confidential.

In the current study, assured to subjects that their information will remain confidential.

## RESULTS

A total of 502 questionnaires were completed by the elderly subjects. The mean age of the subjects was 66.3 ± 5.3 years. About 48% (241 subjects) of them were men, and 52% (261 subjects) were female. Other demographic information details of the subjects are shown in Table 1.

In order to have a sufficient number of samples for use in factor analysis, the KMO value was obtained as 0.943. The approved number of samples and also the significance obtained by the Bartlett's test was <0.05, which indicates that factor analysis is appropriate.

The CFA revealed a six-factor model whose results, along with fit indices for the revised HPLP-II version, are given in the table [Table 2].

The CVI for the construct on interpersonal relationships was 0.86; for healthy eating, 0.84; for taking health responsibility, 0.84; for physical activity, 0.82; for stress management, 0.82; for spiritual growth, 0.83; and for total questions, it was 0.84. In investigating the face validity, the questionnaire was given to 20 elderly people as a pilot, and at this stage, some modifications were made. For example, in Questions 3, 15, and 39, the term "health team" was replaced by "health staff." Question 9 ("I follow programs related to health through watching TV or reading") was modified to "I follow programs related to health through watching TV or reading "Teletext."

Cronbach's alpha values indicate good internal consistency of the questionnaire. Cronbach's alpha for

### Table 1: Participant characteristics (*n*=502)

| Characteristics | *n* (%) |
| --- | --- |
| Age (year) | |
| Mean±SD | 66.3±5.3 |
| Range | 60-86 |
| Gender | |
| Female | 261 (51.99) |
| Male | 241 (48.01) |
| Marital status | |
| Married | 353 (70.32) |
| Single | 132 (26.29) |
| Divorced | 17 (3.39) |
| Employment status | |
| Retired | 302 (60.16) |
| Employed | 147 (29.28) |
| Unemployment | 53 (10.56) |
| Level of education | |
| 0-6* | 193 (38.45) |
| 7-12** | 207 (41.23) |
| 13 and more*** | 102 (20.32) |

*Primary school, **Guidance school and high school, ***College education. SD=Standard deviation

**Table 2: The six-factor measurement model of the Health Promoting Lifestyle Profile-II items and its fit indices**

| Scale | Indicators | Factor loading (P) | Fit indices | | | |
|---|---|---|---|---|---|---|
| | | | $\chi^2$ (df, P) | NFI | AGFI | RMSEA |
| HPLP-52 | HR | 0.79 (<0.001) | 5.26 (5, 0.26) | 0.98 | 0.943 | 0.026 |
| | PA | 0.65 (<0.001) | | | | |
| | N | 0.79 (<0.001) | | | | |
| | SG | 0.69 (<0.001) | | | | |
| | IR | 0.63 (<0.001) | | | | |
| | SM | 0.68 (<0.001) | | | | |
| HR[a] | Item 3 | 0.69 (<0.001) | 23.29 (15, 0.41) | 0.98 | 0.931 | <0.001 |
| | Item 9 | 0.57 (<0.001) | | | | |
| | Item 15 | 0.64 (<0.001) | | | | |
| | Item 21 | 0.50 (<0.001) | | | | |
| | Item 27 | 0.61 (<0.001) | | | | |
| | Item 33 | 0.49 (<0.001) | | | | |
| | Item 39 | 0.59 (<0.01) | | | | |
| | Item 45 | 0.59 (<0.01) | | | | |
| | Item 51 | 0.56 (<0.01) | | | | |
| PA[b] | Item 4 | 0.67 (<0.001) | 19.66 (18, 0.29) | 0.98 | 0.914 | 0.012 |
| | Item 10 | 0.26 (<0.001) | | | | |
| | Item 16 | 0.68 (<0.001) | | | | |
| | Item 22 | 0.61 (<0.01) | | | | |
| | Item 28 | 0.67 (<0.001) | | | | |
| | Item 34 | 0.63 (<0.001) | | | | |
| | Item 40 | 0.53 (<0.001) | | | | |
| | Item 46 | 0.62 (<0.001) | | | | |
| N[c] | Item 2 | 0.69 (<0.001) | 290.29 (15, 0.41) | 0.98 | 0.943 | <0.001 |
| | Item 8 | 0.65 (<0.001) | | | | |
| | Item 14 | 0.41 (<0.01) | | | | |
| | Item 20 | 0.42 (<0.01) | | | | |
| | Item 26 | 0.45 (<0.001) | | | | |
| | Item 32 | 0.47 (<0.01) | | | | |
| | Item 38 | 0.49 (<0.01) | | | | |
| | Item 44 | 0.57 (<0.01) | | | | |
| | Item 50 | 0.61 (<0.001) | | | | |
| SG[d] | Item 6 | 0.31 (<0.01) | 24.26 (23, 0.23) | 0.97 | 0.921 | 0.014 |
| | Item 12 | 0.68 (<0.001) | | | | |
| | Item 18 | 0.61 (<0.01) | | | | |
| | Item 24 | 0.61 (<0.01) | | | | |
| | Item 30 | 0.29 (<0.01) | | | | |
| | Item 36 | 0.65 (<0.01) | | | | |
| | Item 42 | 0.69 (<0.01) | | | | |
| | Item 48 | 0.55 (<0.01) | | | | |
| | Item 52 | 0.27 (<0.01) | | | | |
| IR[e] | Item 1 | 0.43 (<0.01) | 20.17 (25, 0.019) | 0.97 | 0.912 | 0.041 |
| | Item 7 | 0.41 (<0.01) | | | | |
| | Item 13 | 0.52 (<0.01) | | | | |
| | Item 19 | 0.69 (<0.001) | | | | |
| | Item 25 | 0.69 (<0.001) | | | | |
| | Item 31 | 0.67 (<0.01) | | | | |
| | Item 37 | 0.74 (<0.001) | | | | |
| | Item 43 | 0.69 (<0.001) | | | | |

**Table 2: Contd...**

| Scale | Indicators | Factor loading (P) | Fit indices | | | |
|---|---|---|---|---|---|---|
| | | | $\chi^2$ (df, P) | NFI | AGFI | RMSEA |
| | Item 49 | 0.66 (<0.001) | | | | |
| SM[f] | Item 5 | 0.69 (<0.001) | 23.46 (16, 0.18) | 0.97 | 0.923 | 0.024 |
| | Item 11 | 0.59 (<0.01) | | | | |
| | Item 17 | 0.69 (<0.001) | | | | |
| | Item 23 | 0.52 (<0.01) | | | | |
| | Item 29 | 0.57 (<0.01) | | | | |
| | Item 35 | 0.69 (<0.001) | | | | |
| | Item 41 | 0.61 (<0.001) | | | | |
| | Item 47 | 0.58 (<0.01) | | | | |

[a]Health responsibility, [b]Physical activity, [c]Nutrition, [d]Spiritual growth, eInterpersonal relationships, [f]Stress management. HPLP=Health Promoting Lifestyle Profile, NFI=Normed fit index, AGFI=Adjusted goodness of fit index, RMSEA=Root mean square error of approximation

HPLP-II was measured as 0.78. For all subscales of the questionnaire, it was in the range of 0.73–0.84.

All subscales within HPLPII had a direct and significant correlation with others ($0.64 > r > 0.40$). In other hand, these subscales had direct and significant correlation with the revised HPLP-II version ($0.51 < r < 0.71$) and item-total correlations calculated as 0.27–0.65 [Table 3].

To confirm the reliability of the HPLP-II questionnaire, ICC = 0.79 was achieved (95% confidence interval: 0.59–0.86, $P < 0.001$) and its domain for all factors was calculated as 0.76–0.88.

## DISCUSSION

This study was conducted with the aim of investigating the HPLP-II psychometric questionnaire in the Iranian elderly population.

Using factor analysis, six main factors were approved. Other studies have also reached six factors in their factor analysis.[23] The manner of factors' loading was very similar to that seen in studies in other countries.[27,28] The factors obtained from the present study are similar original version. All these factors had direct and significant correlation with the revised HPLP-II version ($0.51 < r < 0.71$), which represents the internal cohesion of the questionnaire. The relationship between factors and each other varied from $r = 0.36$ to $r = 0.63$.

In respect of the relationship between HPLP-II and demographic data, the results showed that marital status and level of education have a direct and significant correlation with the acquired score on HPLP-II. These findings are consistent with other studies.[29,30]

The married elderly had better self-care practices, and this is definitely related to the family's role in emotional, ethical, and informational support.[31] On the other hand, increasing education correlates with increasing awareness,

**Table 3: Cronbach's alpha coefficients and correlation of subscales**

|  | HR | PA | N | SG | IR | SM |
|---|---|---|---|---|---|---|
| HR | 1.00 |  |  |  |  |  |
| PA | 0.37 | 1.00 |  |  |  |  |
| N | 0.43 | 0.43 | 1.00 |  |  |  |
| SG | 0.46 | 0.37 | 0.45 | 1.00 |  |  |
| IR | 0.47 | 0.46 | 0.36 | 0.63 | 1.00 |  |
| SM | 0.47 | 0.52 | 0.51 | 0.49 | 0.58 | 1.00 |
| HPLP-II | 0.62 | 0.71 | 0.64 | 0.51 | 0.52 | 0.54 |
| Cronbach's alpha | 0.83 | 0.84 | 0.81 | 0.67 | 0.77 | 0.79 |
| Correlation items - total | 0.42-0.63 | 0.39-0.64 | 0.43-0.65 | 0.27-0.63 | 0.37-0.54 | 0.36-0.53 |

HR=Health responsibility, PA=Physical activity, N=Nutrition, SG=Spiritual growth, IR=Interpersonal relationships, SM=Stress management, HPLP-II=Health Promoting Lifestyle Profile-II

health responsibility, self-efficacy, and ability to judge and decide. When knowledge and awareness are present, better performance is expected.[32]

The present study showed the good reliability of the HPLP-II questionnaire. The ICC of 0.79 indicates that the reliability of the questionnaire is appropriate. Hulme *et al.* reported the reliability of test-retest of the original version as 0.91, which is little higher than that of the present study.[13] Cronbach's alpha coefficient for the HPLP-II in the present study was obtained as 0.78, which is indicative of good internal consistency. Furthermore, Cronbach's alpha coefficients for its subscales were suitable too, as in other studies.[23,33]

The results of the present study showed a high correlation between the subscale of spiritual growth and interpersonal relationships ($r = 0.63$); this correlation has been demonstrated in the study by Pinar *et al.* too.[34] In addition, in this study, the correlation between the subscales of stress management and spiritual growth was also high ($r = 0.62$), as also seen in the study by Stochert.[35] On the other hand, relatively high correlation was observed between stress management and interpersonal relationships ($r = 0.58$). Generally, the three subscales of spiritual growth, interpersonal relationships and stress management were highly correlated with each other. This is consistent with other studies.[8,35] An average correlation is seen between other subscales, indicating the independency of subscales and the distinguishing power of subscales in the assessment of a variety of HPB.

Items 10 (exercise vigorously), 30 (long-term goals), and 52 (exposure to new experiences and challenges) had Pearson correlation coefficients under 0.3 that indicate these items have less correlation with HPB in Iranian elderly population.

The Iranian HPLPII-II scale is an appropriate tool for assessing HPB of the Iranian elderly.

The first limitation of this study was that the sampling method was convenience sampling; random sampling was not possible in this study. Another limitation of this study was that the illiterate elderly were not investigated. Given that the population of illiterate elderly in Iran is high, psychometric examination of tools for the illiterate elderly is recommended.

Regarding the large number of questions in the questionnaire, the possibility of elderly people is unable to answer all the questions. Hence, recommended that in future studies, a shortened version of this tool is subject to psychometric investigation. Moreover, given that in the present study, it was not possible to go to subjects' homes and that they were instead selected from people who went to cultural centers, health centers, parks, etc., it is recommended that the generalizability of this study be examined in relation to the disabled elderly who lack the ability to engage in physical or social activities.

## CONCLUSIONS

Overall, the findings of the validity index, construct validity, factor analysis, Cronbach's alpha coefficients and ICC indications show that the HPLPII-48 is a suitable tool to assess HPB in elderly Iranians who can, at least, read and write.

### Conflicts of interest
There are no conflicts of interest.

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