Reliability and Construct Validity of the Iranian Version of Health-promoting Lifestyle Profile in a Female Adolescent Population

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Original Article

ABSTRACT

Background: Health-promoting lifestyle is receiving increasing attention concerning its prominent role in healthcare. This study examined to adapt the health-promoting lifestyle profile II culturally and to assess its psychometric properties.

Methods: In this cross-sectional study, content validity was established using translation and back-translation procedures, pilot testing of the instrument, and getting views of the expert panel. Concurrent validity was estimated with Pearson's correlation between the HPLP II, the quality of life (SF-12), self-efficacy variables, and demographic variables. Construct validity was evaluated by confirmatory factor analysis (CFA). Sample size for CFA included 500 people. HPLP II reliability was estimated with Cronbach's alpha coefficients.

Results: The content validity Index (CVI) surpassed 0.80 for the HPLP II and for four subscales. The CFA four-factor model represented an acceptable fit. Their factor loadings was more than 0.40. Correlations between the HPLP II and the subscales were acceptable. The relationships between the HPLP II, self-efficacy, SF-12 domain scores, and demographic variables were also significantly positive. Cronbach's α coefficient was 0.86 for the HPLP II and for the subscales ranged from 0.70 to 0.77.

Conclusion: The shortened HPLP II had satisfactory psychometric properties. The revised 34-item four-factor model had perfect fit. It can be used to measure health-promoting lifestyle in the Iranian female adolescents' population.

Keywords: Adolescents, confirmatory factor analysis, reliability, validity

INTRODUCTION

Today, the overall health of the community is one of the major public health challenges facing countries.[1] Based on a health promotion approach, people should be able to accept responsibility for their health and adopt a healthy lifestyle.[2] To maintain and promote health, correction and improvement of lifestyle is necessary. A healthy lifestyle is generally characterized

as a "balanced life" in which one makes "wise choices".[3] Why is a healthy lifestyle important? The first reason a healthy lifestyle is important is to remain as free of disease and illness as possible and to have as long a life expectancy as you possibly can. The second reason is that it makes life more enjoyable. When you are fit and healthy you have much more energy and a better outlook on life without having to worry about health problems. During the last century, great changes occurred in the areas of health, including demographic changes, disease patterns, cultural, political and social. The youth population is burgeoning in some countries, and in these areas and elsewhere adolescents are confronting new situations and threats to their present health, moving towards a future in which their health status is likely to be compromised. Statistics show that the largest generation of adolescents in terms of numbers, is related to the present generation. Iran, with more than 15 million young adults (10-19 years) is one of the youngest populations in the world.[4] Adolescents constitute a unique population with special healthcare needs. The health of adolescents, especially adolescent girls is one of the millennium development goals and missions of the member countries of the WHO.[5] Increasing young population and high rates of girls' mortality in Iran, indicate the importance of attention to their health plans. It should be noted that in practice, women of reproductive age become more covered in the health plans. During adolescence young people begin to explore alternative or "adult" health behaviors, including smoking, drinking alcohol, drug misuse, violence, and sexual intimacy. The continuity of these behaviors into adulthood is well documented.[6] Therefore, it is vital that community-based education services should be designed in order to help adolescents develop a healthy lifestyle and prevent risk behavior. More researches about health behaviors are conducted in the adult population that is most likely different from this population. Understanding the structure and adolescent mental attitude in practicing a certain lifestyle, gives health workers the opportunity to assess lifestyle and design appropriate preventive strategies and capabilities to improve young people and ultimately to improve their lifestyle. The HPLP-II questionnaire was developed by Walker and colleagues based on Pender's health promotion model to measure health-promoting behaviors.[7] This measure has been used widely to determine the health-promoting lifestyle in Western societies. Based on the information available, it seems that low efforts have been made on comprehensive understanding of the lifestyles among the young Iranians.[8] Therefore, it is essential to understand what is conceived by teenagers as a lifestyle and what experiences must be examined accurately. Till now no standard measure has been prepared for evaluating the lifestyle of teenagers in Iran. Thus, this study is to offer a valid and reliable measure in planning their health.

Study aims

The aim of this study was to test the HPLP-II in Iranian female adolescents. The following questions were addressed:

- Does a four-factor model for the HPLP-II fit the data well?
- Can the four-factor structure of the HPLP-II demonstrate criterion-related concurrent validity with the Iranian self-efficacy scale and the medical outcome study short form-12 scale?
- Is the four-factor structure of the HPLP-II internally consistent?

METHODS

This cross-sectional study was designed to examine the validity and reliability of the factor structure of the HPLP-II scale. In order to ensure the quality of the adopted instrument, we carried out the study phases based on the international norms.[9] The phases carried out were: First, translation into Farsi from the English version and back-translation into English; second, content analysis by a panel of specialists; and third, psychometric testing (confirmatory factor analysis, a reliability coefficient).

HPLP-II Iranian Version Translation and Pilot Study

Permission for the use of the instrument was obtained from the author. The researcher and a number of experienced linguists were recruited in the HPLP-II for translation and back-translation, through the Sperber method.[10] Expert panel members were asked to evaluate the individual items, and the instrument as a whole, in terms of the item relevance and clarity in representing each

subscale according to Lynn[11] indices. According to Lynn, when there are six or more judges, the CVI should be no lower than 0.78 for an item to be judged acceptable.[11] Later, one of those qualified with Persian literature reviewed, edited and studied the consistency with the original sample. Then, content validity test was used in the target population. At this stage, 30 girls participated. We studied whether or not young people of various items perceived the questionnaires in accordance with health-promoting lifestyle goals? Whether there was a common understanding of each item among the students or not. After completion of the instrument, expressive style questions were discussed with the adolescents. Since, the HPLP sentences structure were objectively and appropriately fit, thus, this part of the research was carried out successfully. As a result, some minor changes were made in the instrument items.

Sample and setting

Kashan city with a population of about 400,000 people and with an area of approximately 8,500 hectares is in Isfahan province. This city has been home for thousands of years for people of various ethnicities so that it has been recognized as one of the oldest civilizations through the silk road.[12] The purpose of the study was to examine the psychometric properties of the HPLP-II among Iranian female students. A wide range of recommendations regarding sample size in factor analysis have been made. Comrey and Lee provided the following guidance in determining the adequacy of the sample size: 100 = poor, 200 = fair, 300 = good, 500 = very good, 1,000 or more = excellent.[13] More demanding recommendations for sample size require a minimum of 10 subjects per item[14] or just a large sample, ideally several hundred.[15] A school-based survey was conducted in Kashan province which is divided into four main regions (North - South - East - West). A two-stage probability proportional to size cluster sampling technique was used, taking into consideration school sector (private and public), the school density and the distribution of girls in each region. Thus, four public girls' schools were selected at random from lists obtained from the ministry of education in Kashan. The students were randomly selected from 12 classes. The sample included school children of Grade 9-11; written consent of their parent was obtained. The child's age was confirmed from the school registries. The final sample comprised 495 school children. Demographic characteristics of the sample are shown in Table 1.

Instrument

The health-promoting lifestyle Profile II, a revision of the HPLP developed by Walker *et al.*, was used to measure health-promoting actions. The HPLP-II is a 52-item four-point Likert scale tool based on Pender's health promotion model which contains six subscales: Spiritual growth, health responsibility(HR), physical activity (PA), nutrition (N), interpersonal relations and stress management (SM).[7] In the present study, the 34-item instrument used with four subscales includes HR, PA, N, and SM. The HPLP-II is an instrument that has been widely used to measure health-promoting lifestyles in Western healthy populations and clinical disorder groups.[7,16,17] Respondents rated the frequency with which they practiced each of the 34 behaviors on a four-point Likert scale (never, sometimes, often, and routinely).

The total HPLP-II score was the mean of all responses. Meanwhile, different scores of the individuals on each subscale will be gathered together and estimated independently. The original HPLP II has had satisfactory internal consistency in total scores and subscales ranging 0.7–0.92 with

Table 1: Descriptive Statistics in target population (n = 495)

Characteristics	Mean ± SD percentage	Number range
Age (year)	15.61±1.05	14-18
14	85	17.2
15	140	28.3
16	165	33.3
17	93	18.8
18	12	2.4
Parent Education		
0–5 years	45	9.1
6–9 years	309	62.4
12 years	110	22.4
13+ years	26	5.3
Missed	5	1
BMI (Kg/m^2)		
Slim	149	30.1
Normal	302	61
Overweight	36	7.3
Obese	8	1.6

a 2-week test–retest stability coefficient more than 0.90 for the total scale.[18] The medical outcome study short form-12 (SF-12) is a widely used scale as a general indicator of health status. Montazeri and his colleges have validated the Iranian version of this standard questionnaire in the Iranian institute for health science.[19] The SF-12 covers both physical and mental concepts by 12 questions. Each question is rated from 0 to 100 in which the higher score represents the most favorable score and the highest level of health. The perceived health competence scale (PHCS) is a measure of self-efficacy regarding general health-related behavior.[20] In this measurement were 10 items based on five point Likert scale which ranged from "completely agree" to "completely disagree". Higher score indicated a high capability of the person in control of his/her health program outcomes.

Ethical considerations

Ethical approval and permit of access to schools was obtained through the Tehran University of Medical Sciences. The adolescents and their parents were informed and written consent was gained before being included into the study. Data confidentiality and anonymity was guaranteed for volunteers participating in the study. Several trained experts were responsible for data collection. A training session was presented for interviewers to ensure the accuracy and homogeneity of data. Time of data collection for each measurement was nearly 15-20 min. All data were collected over a period of three months.

Data analysis

Data were analyzed using SPSS software Version 18.[21] Descriptive statistics were used to describe demographic characteristics of samples under investigation. Internal consistency HPLP-34 was assessed using Cronbach's alpha. For factor analysis data, CFA was used using LISREL 8.80 software.[22] This analysis used structural equation modeling to test the model structure. A model with good fit test will be with criteria such as (1) the likelihood-ratio Chi-square statistics would be insignificant, indicating no differences between the predicted and actual models; (2) the comparative fit index (CFI) and normed fit index (NFI) values would be greater than 0.90; and (3) the root mean square error of approximation (RMSEA) would be less than 0.05.[23] Criterion-related validity was indicated by significant correlations between QOL, perceived self-efficacy, and demographic backgrounds with lifestyle among the target population.

RESULTS

Validation of the factor structure of the HPLP-II

The CVI for the total and the four subscales' instrument was 0.84, 0.80, 0.86, 0.83, and 0.88 respectively. The initial CFA used a four-factor measurement model. The CFA of the 34-item HPLP-II yielded a good estimate of fit ($\chi^2 = 6.34$, df = 2, $P = 0.420$, CFI = 0.99, NFI = 0.99, RMSEA = 0.066). Correlations between the shortened form of HPLP-II and the four subscales ranged from 0.73 to 0.80 [Table 2]. The factor structure was examined in the total HPLP-II and the four subscales. All factors were significantly loaded on their respective latent factors (0.60–0.73 in lifestyle, 0.57–0.98 in N, 0.57–0.88 in HR, 0.44–0.82 in PA, and 0.61–0.94 in SM). All items showed load factor above 0.40 averagely [Table 2]. Criterion validity was demonstrated by significant correlations with concurrent measures of HPLP-II, self-efficacy and QOL. Findings showed that the HR subscale had significant and positive associations with the total HPLP-II ($r = 0.80$, $P < 0.001$), N subscale had significant and positive associations with the total HPLP-II ($r = 0.73$, $P < 0.001$), PA subscale had significant and positive associations with the total HPLP-II ($r = 0.75$, $P < 0.001$), and SM subscale had significant and positive associations with the total HPLP-II ($r = 0.74$, $P < 0.001$).

The total HPLP-II and QOL showed a significant relationship ($r = 0.24$, $P < 0.001$), as did the total HPLP-II and self-efficacy ($r = 0.48$, $P < 0.001$). The relationships between the subscales, HPLP-II and QOL domain scores were significant and positive with a relationship with self-efficacy. The findings supported the construct validity of HPLP-II in the sample of the Iranian female students.

Reliability

All Cronbach's α values indicated the final instrument's satisfactory internal consistency (total, 0.86; N, 0.70; PA, 0.75; HR, 0.77; SM, 0.71) [Table 3].

Table 2: The four-factor measurement model of the 34-item HPLP-II in the target population

Scale	Indicators	Factor loading (*P* value)	Fit indices			
			χ^2 (df, p)	CFI	NFI	RMSEA
HPLP-II	Health responsibility	0.73[b]	6.34 (2, 0.4)	0.99	0.99	0.06
34-item	Physical activity	0.65[b]				
	Nutrition	0.62[b]				
	Stress management	0.60[b]				
HR	Item 3	0.88[a]	50.08 (24, 0.001)	0.99	0.98	0.04
	Item 9	0.81[b]				
	Item 15	0.57[b]				
	Item 21	0.62[b]				
	Item 27	0.85[b]				
	Item 33	0.86[b]				
	Item 39	0.60[b]				
	Item 45	0.81[b]				
	Item 51	0.76[b]				
PA	Item 4	0.45[a]	29.65 (15, 0.01)	0.99	0.98	0.04
	Item 10	0.44[b]				
	Item 16	0.82[b]				
	Item 22	0.76[b]				
	Item 28	0.78[b]				
	Item 34	0.77[b]				
	Item 40	0.48[b]				
	Item 46	0.55[b]				
N	Item 2	0.65[a]	37.53 (23, 0.02)	0.98	0.95	0.03
	Item 8	0.52[b]				
	Item 14	0.67[b]				
	Item 20	0.59[b]				
	Item 26	0.76[b]				
	Item 32	0.73[b]				
	Item 38	0.57[b]				
	Item 44	0.49[b]				
	Item 50	0.87[b]				
SM	Item 5	0.70[a]	20.56 (13, 0.08)	0.99	0.99	0.03
	Item 11	0.55[b]				
	Item 17	0.61[b]				
	Item 23	0.76[b]				
	Item 29	0.53[b]				
	Item 35	0.75[b]				
	Item 41	0.68[b]				
	Item 47	0.94[b]				

[a]= P < .05, [b]*P* < .001, χ^2 = Chi-square; CFI = Comparative fit index; NFI = Normed fit index; RMSEA = Root mean square error of approximation, [a]Reference group with factor loading set to 1.0 in the construct variance to fix the model, HR = Healt responsibility, PA= Physiacal activity, N= Nutrition, SM= Stress management

DISCUSSION

Health-promoting lifestyle among adolescents has become the focus of research worldwide. Life in schools is a transitional period, offering good opportunities for establishing health-promoting lifestyles. Most researches on health-promoting behaviors have been undertaken in the US and European countries.[24] However, data on health-promoting lifestyles among female students in Kashan are limited. To our knowledge, this is

Table 3: Correlation matrix on sub-scales and mean, standard deviation, and internal consistency

	1	2	3	4	5	6	7	8	9
SEfi	1/00								
MCS	0/53[a]	1/00							
PCS	0/12[a]	0/28[a]	1/00						
QOL	0/88[a]	0/87[a]	0/22[a]	1/00					
N	0/14[a]	0/25[a]	0/22[a]	0/23[a]	1/00				
PA	0/08[b]	0/21[a]	0/28[a]	0/16[a]	0/36[a]	1/00			
HR	0/03[b]	0/17[a]	0/28[a]	0/07[b]	0/46[a]	0/49[a]	1/00		
SM	0/16[a]	0/33[a]	0/31[a]	0/28[a]	0/41[a]	0/40[a]	0/41[a]	1/00	
HPLP	0/11[a]	0/32[a]	0/36[a]	0/24[a]	0/72[a]	0/77[a]	0/78[a]	0/75[a]	1/00
Mean	69/58	62/01	3/46	65/79	2/56	1/97	2/02	2/62	2/29
Std Dev	18/73	18/28	0/44	16/21	0/47	0/57	0/52	0/55	0/40
Range	4.17-100	0-100	1.75-4.88	12.5-100	1.33-3.89	1-4	1-3.67	1.12-4	1.26-3.76
Alpha coefficient	0/70	0/74	0/81	0/80	0/70	0/75	0/77	0/71	0/86

[a]$P < 0.05$; [b]$P \leq 0.0001$; SEfi = Self-efficacy, MCS = Mental component summary; PCS = Physical component summary, QOL= Quality of life, HR = Healt responsibility, PA= Physiacal activity, N= Nutrition, SM= Stress management, HPLP= Health promoting Lifestyle profile, Std Dev=Standard deviation,

the first study to investigate health-promoting behaviors of female students in Kashan using a standardized scale. Our purpose in this study was to demonstrate appropriate internal consistency and construct validity of the scale, as well as its cultural consistency. The four-factor structure of the HPLP-II produced by the CFA was consistent with the original HPLP-II. The HPLP-II (34 items) showed an optimal internal consistency over than 0.8. Correlations between subscales of HPLP-II together represent homogeneity among all the items. Since in Western societies the original HPLP-II with six subscales is used more, the results of this study could not be compared with other studies in the Western societies.[25-27] As expected, the HPLP-II had a positive relationship with QOL and self-efficacy. Lifestyle had a significant and positive relationship with QOL. The findings were consistent with the results of other studies.[28-30] Self-efficacy had been strongly influenced by lifestyle. Similar results were found in other studies proving that the perceived self-efficacy was the strongest determinants in the health-promoting lifestyles.[26,31,32] In addition, the positive relationships found between the HPLP-II, age, Grade, body mass index (BMI) and parent educational level are consistent with the results of other studies.[31,33,34] However, the correlations were relatively weak, which may indicate that these factors are not good measures of a healthy lifestyle among Iranian female students. Thus, it is recommended that future studies of the concurrent validity of the Iranian HPLP-II include cognitive-perceptual factors, such as perceived benefits and barriers, which independently predict healthy lifestyles. The strength of this study is a large sample size.

CONCLUSION

Therefore, our sample size was sufficient to build the specified factor structure. The current study had several limitations. First, this study lacks adolescent male participation. This may limit the generalizability of the results to other students. One factor that may have affected the reliability of the HPLP-II, and a second limitation of this study, is that the seating arrangements during administration allowed students to sit very close to one another, despite instructions to spread themselves out. This resulted in decreased privacy and an increase in talking during the administration. It is possible that having students sit at individual desks would have led to different responses and increased reliability. Thirdly, this study relied entirely on self-report measures, which risks self-report bias. In reality, how a person wishes to think and how he actually thinks may not be the same, and the perception of certain events may not translate into reality as well. Despite limitations, this study is unique in that it is the first study to assess the factor

structure of gender-specific behaviors among Iranian adolescents. Having an understanding of the lifestyle patterns among female students can provide important information for meeting changing health promotion needs. Also, it would allow professionals to better understand reasons for different cognitions and behaviors, which could contribute to future culture-specific interventions.

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