

Development and psychometric testing of the Adolescent Healthy Lifestyle Questionnaire

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ABSTRACT

Background: Lifestyle choices and individuals' behaviors have the potential to influence health and improve the quality of life. **Objectives:** The purpose of this study was to develop and psychometrically test an instrument for measuring healthy lifestyle in Iranian adolescents. **Materials and Methods:** A comprehensive literature review related to health-promoting lifestyles was used to identify potential scale items. Data were collected from 797 school students. Construct validity was analyzed using exploratory factor analysis. Confirmatory factor analysis (CFA) was used to cross-validate. **Results:** Nine factors emerged that explained 59.8% of the variance in the 43 items. Cronbach's α coefficient Healthy Lifestyle Questionnaire was $r=0.82$. After the model was modified, the fit indices indicated that the data were an adequate-to-good fit to the proposed models. **Conclusions:** The current study provides some support to the internal and external validity of the healthy lifestyles questionnaire for Iranian adolescents.

Key words: Healthy lifestyle, Iranian adolescents, reliability, validity

INTRODUCTION

Lifestyle choices and individuals' behaviors have the potential to influence health and improve the quality of life.^[1] During the transition from childhood to adulthood, adolescents establish patterns of behavior and make lifestyle choices that affect both their current and future health.^[2,3] Compared to adults, adolescents and young adults are disproportionately affected by serious health and safety issues, such as injury,

violence, substance use, and sexual behavior.^[4] Similar to studies conducted in Western countries, previous studies have identified high rates of substance use among Iranian adolescents.^[5,6] For example, a recent study found that the majority of Iranian adolescents had used one of the following drugs at least once: Cigarette (42.3%), alcohol (37.5%), hashish (4.4%), and 4.1% for opium.^[6] The popularity of hookah use is increasing among Iranian youth.^[7] For example, Azizi's study^[8] on the cardiovascular risk factors in a sample of adolescent students in Tehran showed that 55% of students (63% of boys and 47% of girls) had experienced hookah smoking.

Adolescents have difficulty adopting behaviors that could decrease their risk of developing chronic diseases in adulthood, behaviors such as healthy eating, engaging in physical activity, and choosing not to use tobacco.^[4] Unhealthy diets and physical inactivity are major contributors to overweight and obesity, which are among the leading risk factors for many non-communicable diseases.^[9] There has been a documented increase in the prevalence of obesity among children and adolescents in Iran.^[10] A recent study of Iranian adolescents found that 52% of individuals were in the pre-adoption stages of physical activity (i.e. were not active on a regular basis).^[11]

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Injury and violence are also serious threats to the health and well-being of Iranian children and adolescents.^[12] A report from WHO revealed that almost 70% of motorcycle deaths in Iran are due to head injuries resulting from the non-use of helmets.^[13]

A strategic framework for health promotion in the Eastern Mediterranean Region was developed by the WHO Regional Office for the Eastern Mediterranean.^[14] The framework emphasized key action-oriented recommendations to strengthen the regional context by addressing risk factors such as smoking, malnutrition, and physical inactivity, as well as outcomes such as rates of obesity, diabetes, injuries, cancer, and cardiovascular diseases.^[14] There are many challenges facing the health status of Iranian youth, but currently there is no systematic monitoring of health behaviors at a population level. The monitoring of health-related lifestyle behaviors among adolescents is essential in order to identify individuals “at risk” of injury and illness. In addition, this information may be used to inform government officials and policy makers about the prevalence of such behaviors among youth. For these reasons, there is an urgent need for the development of a simple valid and reliable instrument for the assessment of adolescent health behaviors that may be used by teachers and health nurses. The primary aim of this study was to assess the psychometric properties of the Farsi language version of the Healthy Lifestyle Questionnaire (HLQ).

MATERIALS AND METHODS

Instrument development

Item generation

A literature review related to HLQs^[15-19] was conducted to inform the questionnaire development. From this process, 58 items relating to the frequency of reported health behaviors were extracted. These items were combined to form seven sub-categories [life appreciation (LA), health responsibility (HR), nutrition (N), social support (SS), physical activity (PA), stress management (SM), and safety] related to health prompting and protecting behaviors and rated on a 5-point Likert scale (*never, rarely, sometimes, usually, and always*). These items were then tested for content validity with a panel of experts, which included three adolescent counselors, an instrument development expert, two health educator professors, and two public health professors, a physician at school, and two adolescent psychologists. They were asked to evaluate the initial item’s appropriateness to their associated concept domain based on the health promoting and protecting behaviors and cultural relevance; each item was rated on two 4-point rating scales (1=*Inappropriate*, 2=*Somewhat appropriate*, 3=*Quite appropriate*, and 4=*Very appropriate*; and 1=*Not relevant*, 2=*Somewhat relevant*, 3=*Quite relevant*, and 4=*Very relevant*). Those items receiving a rating of 3 or higher on either of the appropriateness scales were retained. Following the recommendations from the expert panel, some items were added, deleted, or changed. For example, the item “*Limit soft drinking*” was added to the N subscale and the items “*Avoid using tobacco*” and “*Remind myself of behaviors that are*

harmful to me, e.g. smoking” were added to the HR subscale. A pilot study was conducted with a convenience sample of 48 college and high school students to test whether the items were meaningful to adolescents and easy to comprehend. Some of the students suggested the item “*Make a schedule and set priorities*” should be changed to “*Make a schedule and set goals based on my ability*” and “*Report unusual body changes*” should be replaced by “*Report unusual body symptoms to my family*” in HR. After making the suggested changes, the final version of the instrument contained 61 items including 10 items on LA, 11 items on HR, 11 items on N, 8 items on SS, 9 items on PA, 9 items on SM, and 4 items on safety.

Sample characteristics

A stratified random sampling frame according to school districts was used to select 25 secondary schools representative of the population in Sanandaj, Iran. Eight hundred and forty-nine adolescents of age 15–19 years [Mean age (SD)=17.3 (1.8); 49% females and 51% males] provided informed consent and were included in the study. The study was approved by the educational authorities and by the institutional human participants committee. The study investigator sent a written information sheet and consent form for the parents and participants to sign. Questionnaires were administered to students in their classrooms. The data from 52 participants were not used due to missing data. The remaining 797 participants were divided randomly into two samples. Data from sample 1 [$n=382$, mean age (SD)=17.5 (1.7); 47.7% females and 52.3% males] were used to test exploratory factor analysis (EFA) and data from sample 2 [$n=415$, mean age (SD)=17.0 (1.8); 51.5% females and 49.5% males] were used to test confirmatory factor analysis (CFA). The two samples were compared across demographic variables using independent samples *t*-tests. No statistically significant differences were found.

Analytic strategy

Means, standard deviations, and EFA were calculated using SPSS® version 17.0 (SPSS Inc., Chicago, IL, USA) and CFA was conducted using AMOS 17.0 (Small Waters Corp., Chicago, IL, USA).

Exploratory factor analysis

An EFA using principal components analysis (PCA) with varimax rotation was conducted to assess the construct validity of the instrument. Two steps were used in validation: PCA with varimax rotation was performed to extract factors using loading criteria of 0.40 and above 0.40 in Step 1.^[20] in Step 2, using another sample of students ($n=415$). The reliability was assessed by internal consistency using Cronbach’s α , corrected item-total correlation at least 0.30, and test–retest stability.

Item analysis

An item analysis was used to evaluate how well each item correlated with the total score, enabling investigators to decide which items to retain.^[21] Items with correlations below 0.30 do not sufficiently contribute to the total score; those

with correlations above 0.7 indicate item redundancy.^[21] Therefore, 10 items were removed because of correlations below 0.30, including “*Work toward long-term goals*” and “*Do things make me feel good about myself*” in LA, “*Wash my hand before meals*” in HR, “*Limit salt*,” “*Limit junk food*,” and “*Choose healthy snacks*” in N, “*Keep myself from feeling lonely*” in SS, “*Change my exercise to avoid boredom*” in PA and also “*Use the pedestrian crossing when crossing the road*” and “*Wear a helmet when bicycling*” in safety. Results from the inter-item correlation matrix showed seven redundant items. After deleting these items, 44 items remained for the next steps of the analysis.

Confirmatory factor analysis

The structure of the subscales was then tested in AMOS using CFA and model fit was assessed using the following indices: Chi-square index, goodness-of-fit index (GFI), adjusted goodness-of-fit (AGFI), comparative fit index (CFI), and root mean square of approximation (RMSEA). The Chi-square tests the null hypothesis that the model is a good fit of the data. While a nonsignificant Chi-square result ($P > 0.05$) indicates that the model is a good fit, it is too sensitive to sample size^[22] and additional measures are often used. The GFI provides an estimate of the proportion of variance in the variance–covariance matrix accounted for by the proposed model. The AGFI provides a GFI score adjusted for the number of parameters in the model. The CFI compares the existing model fit with a null model which assumes the indicator variables in the model are uncorrelated. GFI, AGFI, and CFI scores range from 0 to 1, with a score exceeding 0.9 indicating a good fit.^[23] The RMSEA estimates closeness-of-fit compared to the saturated model. RMSEA of 0.08, 0.05, and 0 indicates adequate, close, and exact fits, respectively [Table 3] [Appendix].^[24]

Reliability

The internal consistency was estimated using Cronbach's α coefficient after CFA. Intra-correlation coefficients (ICC) for the total scale were calculated to provide measure of stability over a 2-week period.

RESULTS

Exploratory factor analysis

A total of 43 items significantly loaded on nine factors with Eigen values greater than 1.00 and an explained variance of 59.8%. The range of factor loadings for the items as well as the Eigen values and variance explained are shown in Tables 1 and 2. The Kaiser–Meyer–Olkin (KMO) index was 0.81 for the EFA sample (Bartlett's test of sphericity was significant, $P < 0.001$), thus the obtained data were suitable for a factor analysis. All nine factors loaded on expected factors. Factor 1, LA, was the strongest factor, explaining the greatest percentage of variance (10.63%); eight items loaded on this factor: “*Attempt to correct defects* (LA5),” “*Effort to know what's important for me* (LA6),” “*Understanding and accepting strengths, weaknesses* (LA4),” “*Look forward to the future* (LA8),” “*Make an effort to feel challenged every day*

(LA7),” “*Make an effort to like myself* (LA1),” “*Make an effort to feel happy and content* (LA2),” and “*Think positively* (LA3).”

Items related to the HR loaded on factor 2 and included: “*Report unusual body changes* (HR1),” “*Discuss my health concerns* (HR2),” “*Attend educational programs* (HR7),” “*Read health information* (HR6),” “*Seek guidance when necessary* (HR8),” “*Question health professionals* (HR5),” “*Brush my teeth and use dental floss* (HR4),” and “*Check my body at least monthly* (HR3).”

Eight items that reflected the N loaded on different factors. Factor 3 contained the items “*Eat breakfast daily* (N2),” “*Limit food high in sugar* (N8),” “*Eat three regular meals each day* (N1),” “*Limit food high in fat*,” and “*Eat fruit daily as the items* (N7 and N3).” “*Eat vegetables daily* (N5),” “*Read food labels* (N4),” and “*Select foods without additives* (N6)” loaded on factor 6. Correlations between the eight items were significant ($r = 0.26–0.58$, $P < 0.001$), the Cronbach's $\alpha = 0.87$, and the item-total correlation ranged from 0.51 to 0.68, providing enough evidence to combine the two factors into a single N subscale.

Five items of the SS subscale loaded on factor 4 that included: “*Talk about my concerns with people close to me* (SS3),” “*Enjoy keeping in touch with relatives* (SS2),” “*Share my feelings with others* (SS1),” “*Make an effort to have good friendships* (SS4),” and “*Talk about my troubles* (SS6).” The rest of the SS items were “(SS7) *Care about other people*,” “(SS5) *If I needed help, I have people to turn to express my feeling, If I needed help*”, as well as (SS6) loaded on factor 9. Factors 4 and 9 were considered 1 scale for SS because the items showed internal subscale homogeneity: Cronbach's $\alpha = 0.83$, item-total correlation = ($r = 0.34–0.65$), and correlations between the seven items were significant ($r = 0.12–0.58$, $P < 0.01–0.001$).

Factor 3 was identified with six items from the PA subscale, including: “*Participate in sports at school* (PA3),” “*Do vigorous physical activity for 30 minutes at least 3 times each week* (PA2),” “*Take part in leisure-time activities* (PA4),” “*Do stretching exercise daily* (PA1),” “*Exercise during daily activity* (PA6),” and “*Do light-to-moderate physical activity for 30 minutes at least 3 times each week* (PA5).”

The SM items loaded to different factors. Three items of the SM subscale, “*Make an effort to identify sources of stress* (SM2),” “*Take time for relaxation* (SM1),” and “*Use helpful strategies to deal with stress* (SM3),” loaded as factor 7. The items, “*Make an effort to identify my mood changes* (SM5),” “*Talk about my stress levels* (SM6),” and “*Get regular sleep* (SM4),” loaded on factor 8. The Cronbach's $\alpha = 0.79$ and the item-total correlations were 0.44–0.62, providing enough evidence to combine the two factors into one factor for the SM subscale.

No items related to the safety subscale met the loading criteria.

Confirmatory factor analysis

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Table 1: Results of rotated factor loading analysis (n=382)

	F1	F2	F3	F4	F5	F6	F7	F8	F9
LA5: Attempt to correct my defects	0.81								
LA6: Make an effort to know what's important for me	0.80								
LA4: Understand and accept my strengths and weaknesses	0.79								
LA8: Look forward to the future	0.77								
LA7: Make an effort to feel challenged every day	0.76								
LA1: Make an effort to like myself	0.71								
LA2: Make an effort to feel happy and content	0.71								
LA3: Think positively	0.65								
HR1: Report unusual body changes		0.74							
HR2: Discuss my health concerns with health personnel		0.73							
HR7: Attend educational programs		0.69							
HR6: Make an effort to read health information		0.69							
HR8: Seek guidance when necessary		0.62							
HR5: Question health professionals		0.61							
HR4: Brush my teeth and use dental floss after meals		0.57							
HR3: Observe my body at least monthly		0.56							
N2: Eat breakfast daily			0.76						
N8: Limit food high in sugar			0.74						
N1: Eat three regular meals each day			0.72						
N7: Limit food high in fat			0.65						
N3: Eat fruit daily			0.57						
N5: Eat vegetables daily						0.82			
N4: Read food labels						0.76			
N6: Select foods without additives						0.73			
SS3: Talk about my concerns with people close to me				0.86					
SS2: Enjoy keeping in touch with relatives				0.85					
SS1: Speak and share my feelings with others				0.81					
SS4: Make an effort to have good friendships				0.64					
SS6: Talk about my troubles with people close to me				0.45					
SS7: Care about other people									0.79
SS5: If I needed help, I have people to turn to express my feeling									0.75
SS6: Talk about my troubles with people close to me									0.71
PA3: Participate in sports at school						0.78			
PA2: Do vigorous physical activity for 30 minutes at least 3 times each week						0.78			
PA4: Take part in leisure-time activities						0.74			
PA1: Do stretching exercise daily						0.69			
PA6: Exercise during daily activity						0.49			
PA5: Do light to moderate physical activity for 30 minutes at least 3 times each week						0.45			
SM2: Make an effort to identify sources of stress							0.85		
SM1: Take time for relaxation							0.81		
SM3: Use helpful strategies to deal with stress							0.78		
SM5: Make an effort to monitor my mood changes								0.83	
SM6: Talk about my stress levels								0.80	
SM4: Get regular sleep								0.64	

LA = Life appreciation, HR = Health responsibility, N = Nutrition, SS = Social support, PA = Physical activity, SM = Stress management

coefficient was above the recommended value of 3, the Bollen–Stine bootstrap procedure was used to test model fit instead of the Chi-square and bias corrected regression coefficients were reported.^[22] The results from the CFA are presented in Table 1. Following the removal of item 3 from the LA subscale, the model provided a good fit to the data ($\chi^2=38.94$, $df=14$, $P=0.024$, $GFI=0.97$, $AGFI=0.94$, $CFI=0.98$, and $RMSEA=0.07$). The HR subscale included eight items and

provided a good fit to the data ($\chi^2=35.40$, $df=20$, $P=0.018$, $GFI=0.98$, $AGFI=0.96$, $CFI=0.98$, and $RMSEA=0.05$). Items 7 and 5 were removed from the SS subscale resulting in adequate model fit ($\chi^2=28.62$, $df=5$, $P=0.001$, $GFI=0.97$, $AGFI=0.91$, $CFI=0.97$, and $RMSEA=0.11$). No items were removed from the PA subscale and the model provided a good fit to the data ($\chi^2=29.90$, $df=9$, $P=0.018$, $GFI=0.98$, $AGFI=0.94$, $CFI=0.96$, and $RMSEA=0.08$). Following the

removal of items 5 and 6 from the SM subscale, the model provided an excellent fit to the data ($\chi^2=1.90$, $df=2$, $P=0.388$, $GFI=0.97$, $AGFI=0.99$, $CFI=1.00$, and $RMSEA=0.00$). The final nutrition scale included six items and was a reasonable fit to the data ($\chi^2=41.84$, $df=9$, $P<0.001$, $GFI=0.96$, $AGFI=0.92$, $CFI=0.95$, and $RMSEA=0.09$).

Reliability

Cronbach's α for the total scale was 0.82 and the indices ranged from 0.75 to 0.87 for the final version of the HLQ-36 items. All corrected item-total correlations that calculated again for LA, HR, N, SS, PA, and HR were above 0.30, and the values did not increase by more than 0.010 in Cronbach's α if any of the items was deleted.^[20] The ICC for the total scale was $r=0.88$, $P<0.001$, and the subscale ICC values ranged from 0.76 to 0.90 ($n=95$). Table 4 shows the coefficients for the six subscales retained for the final version of the questionnaire.

DISCUSSION

The purpose of this study was to develop and test the psychometric properties of an Iranian health-promoting lifestyle questionnaire for adolescents. This is the first study that applied EFA and CFA for measuring health behaviors among Iranian youth. The previous studies^[15-17,19] used EFA only to identify factors related to health-promoting behaviors.

Six factors related to healthy lifestyles were identified from the EFA. These results are similar to the previous studies that also identified six factors related to health-promoting concepts in Taiwanese^[13] and American adolescents,^[17] respectively.

Table 2: Eigen values, cumulative percentage of variance explained by six factors on the adolescent healthy lifestyle scale (n=382)

Factor	Factor label	Eigen value	Variance explained	Cumulative percentage
1	Life appreciation	5.498	10.63	10.63
2	Health responsibility	4.582	8.13	18.76
3	Nutrition	4.111	7.462	26.230
4	Social support	3.387	6.811	33.041
5	Physical activity	2.541	6.723	39.764
6	Nutrition	1.987	5.410	45.174
7	Stress management	1.356	5.243	50.418
8	Stress management	1.294	5.243	50.418
9	Social support	1.126	4.647	59.808

Table 3: Construct validity of the AHL subscales (n=415)

Variables	Items (n)	χ^2	df	P	GFI	AGFI	CFI	RMSEA	Loadings
Life appreciation	7	38.94	14	0.024	0.97	0.94	0.98	0.07	0.62–0.81
Health responsibility	8	35.40	20	0.018	0.98	0.96	0.98	0.05	0.52–0.70
Nutrition	6	41.84	9	0.000	0.96	0.92	0.95	0.09	0.54–0.79
Social support	5	28.62	5	0.001	0.97	0.91	0.97	0.11	0.56–0.88
Physical activity	6	29.90	9	0.018	0.98	0.94	0.96	0.08	0.41–0.78
Stress management	4	1.90	2	0.388	0.97	0.99	10.00	0.00	0.42–0.84

ICC = Intra-class correlation for 1-week test-retest reliability conducted for the current study, items (n) = Number of items in scale, χ^2 = Chi-square, P = Probability, df = Degrees of freedom, GFI = Goodness of fit index, AGFI = Adjusted goodness of fit index, CFI = Comparative fit index, loadings = Range of item loadings

However, an early study by Gillis^[16] identified seven factors related to health-promoting and health-protecting behaviors.

Compared to previous research, our study has identified a number of cultural differences in the relationships between health behaviors among Iranian youth. For example, the item "Avoid using tobacco products" was related to HR in Iranian adolescents, but in Canadian and Taiwanese adolescents it was related to the safety construct. Identifying cross-cultural differences is important for understanding and promoting health behaviors among youth. A unique aspect of this research was that it included an HR subscale which included items not present in the existing healthy lifestyle profiles for adolescents or adults,^[15-19] e.g., "Remind people that their behavior is hurting me, e.g. smoking" and "Can say no to people who are doing bad things." The ecological approach posits the holistic view of health.^[25] Sometimes, a person's health is influenced by those around him/her, e.g. the dangers of second-hand smoke. Therefore, reminding others that their behaviors can have a detrimental impact on those around them is a kind of HR. Although the above two items did not meet the loading criteria, there is a need to further explore this type of HR.

Cultural diversity may explain many of the differences in the dietary behaviors of children, adolescents, and adults, observed internationally. In this study and in the^[16] study, the items "Read food labels" and "Select foods without additives" were related to the nutrition subscale in the EFA. However, in the Taiwanese study, both items were related to the HR subscale.^[15] While the items "Eat vegetables" and "Read food labels" loaded in the EFA process, they were removed from the scales as part of the CFA because they significantly reduced the model fit.

Due to potential item redundancy between the following items, "If I needed help, I have people to turn to express my feeling" and "Talk about my concerns with people close to me," the item "I have people to turn to express my feelings" was removed in the CFA process. Giving and receiving social support are different, so the item "Care about other people" in CFA may be interpreted as the concept that is associated with giving social support rather than receiving it. It may justify removing this item in CFA, while in Taiwanese culture getting and receiving social support are related.

Table 4: Item-total correlation and Cronbach's α for subscales ($n=415$)

Scales	No. items	Item-total subscale correlation	Cronbach's α
Life appreciation	7	0.37–0.71	0.84
Health responsibility	8	0.44–0.62	0.82
Nutrition	6	0.51–0.70	0.87
Social support	5	0.33–0.70	0.84
Physical activity	6	0.38–0.64	0.75
Stress management	4	0.45–0.62	0.79

Following feedback from the expert panel, several items were removed so that they would be acceptable to Iranian adolescents. For this reason, the items “Use protection if sexually active” and “Avoid alcohol use” were removed from the safety subscale. Because alcohol use among Iranians is uncommon and sexual behavior generally does not occur before marriage, the inclusion of these was considered inappropriate by the expert panel. None of the health protection items emerged in the EFA. The safety subscale included the items, “Use a seat belt,” “Use a bridge when passing highways,” “Wear a helmet when bicycling,” and “Use the pedestrian crossing when crossing the street.” This is not surprising because the frequency of these behaviors is low in Iran. Consequently, the safety subscale was not included in the final health behavior scale.

The results from this study demonstrated that the instrument has acceptable internal consistency and test–retest reliability in a large sample of Iranian adolescents. All six subscales showed promising results for reliability, with Cronbach's α ranging from 0.75 to 0.87. Gillis and Chen's studies found Cronbach's α to be 0.91 and 0.93 for the overall scale and ranged from 0.60–0.88 to 0.74–0.87, respectively.^[16,15] While the Cronbach alpha for Hendrick's total scale was .92 and the subscales ranged from 0.64 - 0.76^[17]. The comparisons of the reliability of the Iranian HLQ in the present study with that reported in the previous studies show acceptable α coefficient of 0.82 (ranged from 0.75 to 0.87).

Implication for research and practice

No items related to the safety subscale loaded in EFA process. This research was conducted in Sanandaj and does not have many over passes or road crossings. This may have influenced our results and may limit the generalizability of our findings. Therefore, it is necessary to continue refining and testing this scale with other samples of adolescents in different cities in Iran. This may help to determine the items related to the safety and nutrition subscales. We generated the items by literature review and obtained confirmation of items by an expert panel, but the extraction of items as related to health prompting as well as health protecting behaviors may also be necessary.

CONCLUSIONS

The final instrument after CFA contained 36 items: 7 items in the LA, 8 items in the HR, 6 items in the nutrition, 5 items in the social support, 6 items in the physical activity, and 4 items

Appendix

Items retained for the final Farsi version of HLQ

Life appreciation

1. Attempt to correct defects
2. Make an effort to know what's important for me
3. Understanding and accepting strengths and weaknesses
4. Look forward to the future
5. Make an effort to feel challenged every day
6. Make an effort to like myself
7. Make an effort to feel happy and content

Health responsibility

1. Report unusual body changes
2. Discuss my health concerns with health personnel
3. Attend educational programs
4. Make an effort to read health information
5. Seek guidance when necessary
6. Question health professionals
7. Brush teeth and use dental floss after meals
8. Observe my body at least monthly

Nutrition

1. Eat breakfast daily
2. Limit food high in sugar
3. Eat three regular meals each day
4. Limit food high in fat
5. Eat fruit daily
6. Select foods without additives

Social support

1. Talk about my concerns with people close to me
2. Enjoy keeping in touch with relatives
3. Speak and share my feelings with others
4. Make effort to have good friendship
5. Talk about my troubles with people close to me

Physical activity

1. Participate in sports at school
2. Exercise vigorously for 30 minutes $\times 3$ weekly
3. Take part in leisure-time activities
4. Do stretching exercise daily
5. Exercise during daily activity
6. Do light/moderate exercise for 30 minutes $\times 3$ weekly

Stress management

1. Make an effort to identify the source of stress
2. Take time for relaxation
3. Use helpful strategies to deal with stress
4. Get regular sleep

in the stress management subscale. In summary, this study has provided preliminary support for the construct validity and reliability of the HLQ in an Iranian youth population. The HLQ should be tested in other populations that share similar culture because it is still in the developing stage.

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REFERENCES

1. Lyons R, Langille L. Healthy lifestyle: Strengthening the effectiveness of lifestyle approaches to improve health. Edmonton (AB): Health Canada. Available from: <http://www.phac-aspc.gc.ca/phsp/pdf/lifestyle.pdf>. [Last accessed on 2000].
2. Telama R. Tracking of physical activity from childhood to adulthood: A review. *Obes Facts* 2009;2:187-95.
3. Nader PR, Bradley RH, Houts RM, McRitchie SL, O'Brien M. Moderate-to-vigorous physical activity from ages 9 to 15 years. *JAMA* 2008;300:295-305.
4. Center for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Adolescent and School Health, Health Resources and Services Administration, Maternal and Child Health Bureau, Office of Adolescent Health. Executive Summary-Improving the Health of Adolescents and Young Adults: A Guide for States and Communities. Atlanta, GA, 2004.
5. Massomi M, Shahesmaeil A, Mirzazadeh A, Tavakoli M, Ali AZ. Opium addiction and severity of coronary artery disease; a case-control study. *J Res Med Sci* 2010;15:27-32.
6. Pourshahbaz A, Shamloo S, Jazayeri A. R., Ghazi Tabatabaei M. Structural relations of psychological risk and protective factors of drug abuse in adolescents. *Social Welfare* 2006;5:31-54.
7. Mohammad K, Noorbala AA, Majd Zadeh SR, Karimlou M. Trend of smoking prevalence in Iran (1991-1999) based on two national health surveys. *Hakim J* 2001;3:290-4.
8. Azizi F, Mirmiran P, Azadbakht L. Predictors of cardiovascular risk factors in Tehranian adolescents: Tehran lipid and glucose study. *Int J Vitam Nutr Res* 2004;74:307-12.
9. Kelishadi R, Alikhani S, Delavari A, Alaedini F, Safaie A, Hojatzadeh E. Obesity and associated lifestyle behaviours in Iran: Findings from the First National Non-communicable Disease Risk Factor Surveillance Survey. *Public Health Nutr* 2008;11:246-51.
10. Ayatollahi SM, Mostajabi F. Prevalence of obesity among school children in Iran. *Obes Rev* 2007;8:289-91.
11. Taymoori P, Niknam SH, Berry T, Ghofranipour F, Kazemnejad A. Application Stage of Change exercise behavior among Iranian adolescents. *East Mediterr Health J*. 2009;15:785-95.
12. Zamani-Alavijeh F, Niknami S, Mohammadi E, Montazeri A, Ghofranipour F, Ahmadi F, *et al.* Motorcyclists' reactions to safety helmet law: A qualitative study. *BMC Public Health* 2009;9:393-401.
13. Peden M, Scurfield R, Sleet D, Mathers C. World Report on Road Traffic Injury Prevention. Available from: <http://www.who.int/publications/2004/9241562609.pdf>. Geneva, Switzerland: WHO Publications. [Last accessed on 2004].
14. World Health Organization: A strategy for health promotion in the Eastern Mediterranean Region 2006-2013. Cairo: WHO Regional Office for the Eastern Mediterranean, 2008.
15. Chen MY, Yang RJ, Liou YM. Adolescent health promotion scale: Development and psychometric testing. *Public Health Nurs* 2003;20:104-10.
16. Gillis AJ. The Adolescent Lifestyle Questionnaire: Development and psychometric testing. *Can J Nurs Res* 1997;29:29-46.
17. Hendricks C, Murdaugh C, Pender N. The Adolescent Lifestyle Profile: Development and psychometric characteristics. *J Natl Black Nurses Assoc* 2006;17:1-5.
18. Pinar R, Celik R, Bahcecik N. Reliability and construct validity of the Health-Promoting Lifestyle Profile II in an adult Turkish population. *Nurs Res* 2009;58:184-93.
19. Walker SN, Sechrist KR, Pender NJ. The Health-Promoting Lifestyle Profile: Development and psychometric characteristics. *Nurs Res* 1987;36:76-81.
20. Nunnally JC. *Psychometric Theory*. 2nd ed. New York: McGraw-Hill; 1978.
21. Ferketich S. Focus on psychometrics: Aspects of item analysis. *Res Nurs Health* 1991;14:165-8.
22. Bollen KA. *Structural equations with latent variables*. New York: John Wiley and Sons; 1989.
23. Hu L, Bentler PM. Cutoff criteria for fit indices in covariance structure analysis: Conventional criteria versus new alternatives. *Struct Equ Modeling* 1999;6:1-55.
24. Bollen KA, Stine RA. Bootstrapping goodness of fit measures in structural equation models. *Sociol Methods Res* 1992;21:205-29.
25. Pender NJ, Murdaugh C, Parsons M. *A Health Promotion in Nursing Practice*. 4th ed. Upper Saddle River, NJ: Prentice-Hall Health Inc; 2002.

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