

An inventory for assessment of the health needs of Iranian female adolescents

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جرد لتقييم الاحتياجات الصحية للمراهقات الإيرانيات

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الخلاصة: يُعدُّ تقييم الاحتياجات الصحية الخطوة الأولى لتخطيط البرامج الصحية للمراهقين، ولكن لا بد من أن يكون ذلك ملائماً من الناحية الثقافية والاجتماعية للسكان المستهدفين. والغرض من هذه الدراسة إعداد أداة لتقييم الاحتياجات الصحية للمراهقات الإيرانيات وتقييم ما فيها من خصائص في القياسات النفسية. وقد طبق الباحثون تحليلاً للمضمون لاستكشاف الاحتياجات الصحية للمراهقات الإيرانيات من خلال مناقشات المجموعات البؤرية مع المراهقات، ومن خلال مقابلات مُعمَّقة مع المستجيبين الرئيسيين. وقد تعرف الباحثون على خمسة مواضيع رئيسية هي الاحتياجات الصحية التعليمية والعاطفية والاجتماعية والجسدية والروحية. وحصلوا على منسب لمستوى قياس مصداقية المضمون مقداره 0.92. كما حدد الباحثون بنية العامل بالتحليل للمكونات الرئيسية واستخلصوا خمسة عوامل مسؤولة عن 44.89% من التباين. وقد أوضح الباحثون مدى المعوِّلة التي تتمتع بها هذه الأداة باستخدام قيمة ألفا كرونباخ، وأن مقدارها 0.90 لكامل المقياس. وقد حدّد الباحثون الاتساق بمعوِّلة الاختبار - إعادة الاختبار بفترات مقدار كل منها أسبوعان (كان معامل العلاقة داخل العنقود = 0.984، و $P < 0.001$). واتضح وجود ترابط سلبي مع جرد جودة الحياة لدى الأطفال ($r = -0.06$ ، و $P < 0.001$). وتبيّن للباحثين أن الأداة ذات حساسية ثقافية مع درجة مقبولة من المصدقية والثوقية، ويمكن أن تستخدم لتخطيط الخدمات الصحية للمراهقين.

ABSTRACT Health needs assessment is a first step to planning adolescent health programmes but it needs to be socioculturally relevant to the target population. This study aimed to develop an instrument to assess the health needs of Iranian female adolescents and evaluate its psychometric properties. Content analysis was applied to explore the health needs of female adolescents through focus group discussions with adolescents and in-depth interviews with key informants. Five themes were identified: educational needs, and emotional, social, physical and spiritual health needs. A scale-level content validity index of 0.92 was obtained. The factor structure was identified by principal component analysis; 5 factors were extracted which accounted for 44.89% of the variance. Reliability of the instrument was demonstrated with a Cronbach alpha of 0.90 for the entire scale. Consistency was established with test-retest reliability with an interval of 2 weeks (intracluster correlation coefficient = 0.984, $P < 0.001$). There was a negative correlation with the Pediatric Quality of Life Inventory ($r = -0.66$, $P < 0.001$). The instrument is culturally sensitive with satisfactory validity and reliability and could be used for planning of adolescent health services.

Inventaire pour l'évaluation des besoins sanitaires des adolescentes iraniennes

RÉSUMÉ L'évaluation des besoins sanitaires est la première étape vers des programmes de santé de l'adolescent. Toutefois, ces programmes doivent être socialement et culturellement adaptés à la population ciblée. La présente étude visait à mettre au point un instrument d'évaluation des besoins sanitaires des adolescentes iraniennes et à en mesurer ses propriétés psychométriques. Une analyse de contenu a été menée sur les besoins sanitaires des adolescentes au moyen de groupes de discussions thématiques avec ces dernières et d'entretiens approfondis avec des informateurs clés. Cinq thèmes ont été dégagés : les besoins en matière d'éducation, et les besoins sanitaires d'ordre émotionnel, social, physique et spirituel. Un indice de validité de contenu de l'échelle de 0,92 a été obtenu. La structure factorielle a été identifiée par une analyse des composantes principales ; cinq facteurs ont été extraits, représentant 44,89 % de la variance. La fiabilité de l'instrument a été démontrée par un coefficient alpha de Cronbach de 0,90 pour l'ensemble de l'échelle. La cohérence a été établie à l'aide de la fiabilité de test-retest à deux semaines d'intervalle (coefficient de corrélation dans les groupes = 0,984, $P < 0,001$). Il existait une corrélation négative avec le *Pediatric Quality of Life Inventory* ($r = -0,66$, $P < 0,001$). L'instrument est culturellement adapté, doté d'une validité et d'une fiabilité satisfaisantes et peut être utilisé pour la programmation de services sanitaires dédiés aux adolescentes.

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Introduction

Adolescence is an important period in human life as many physical, emotional and social changes occur and individuals prepared themselves for adulthood [1]. Adolescents are the largest population in the world [2]. They also represent 21.6% of the Iranian total population [3].

Attention to adolescent health, especially female adolescents, is one of the most important strategies to achieve the Millennium Development Goals [4]. The first step to planning a comprehensive adolescent health programme is health needs assessment, which is a diagnostic method for suggesting appropriate strategies to meet their needs [5]. Health needs assessment is fundamental to identifying appropriate services, prioritizing the services and determining proper distribution of the services for the target populations [6].

Health policy-makers seek culturally appropriate and acceptable programmes to meet adolescents' needs. However, development of such a programme requires adequate information about their needs through an appropriate questionnaire. Experts in psychometry agree that questions on such a questionnaire should be directly extracted from statements of the target groups in order to assure the suitability of content and language. The content of such tools should be culturally appropriate for the community with which the tool will be used. The use in any other community would not be culturally appropriate and may create problem, even if the translation is precise [7].

Since health needs are related to social, cultural and economic conditions of communities and given the lack of a valid and reliable questionnaire for adolescent health needs assessment in the Islamic Republic of Iran, this study aimed to develop an inventory for Iranian female adolescents' health needs assessment (IFAHNA), and assess its psychometric properties.

Methods

This was a methodological study using both qualitative and quantitative approaches. It was performed in 2 stages.

The approval of the ethical committee of Shahid Beheshti University of Medical Sciences was obtained for the study.

Stage 1

The first stage was an exploratory study to define the concept and dimensions of health needs. It was based on adolescents' perspectives which were taken from focus group discussions (FGDs) with adolescents and in-depth interviews with key informants conducted in Farsi and a detailed literature review. Maximum diversity was considered in the sampling process. Adolescents were recruited from different age groups and from urban and rural areas of Sari County (northern Islamic Republic of Iran) between July and March 2010. Participants were selected using a multi-stage cluster sampling method. Since urban and rural areas of Sari have their own social, cultural and economic features, we divided Sari County into 2 areas (urban and rural) as 2 main clusters. Subsequently, some schools were selected from each cluster using simple random sampling with the assistance of table of random numbers. Finally, in each school, healthy, 12–19-year-old female volunteers were recruited with assistance of schools' counsellors and invited to share their experiences in FGDs. The key informants were selected from parents and teachers of the adolescents as well as health providers to access wider information about female adolescents. The sampling process was continued until data saturation was reached.

Eight FGDs (in groups of 6–8 girls) and 11 interviews with key informants were conducted. FGDs were conducted by the first author as the facilitator and a note taker (a midwife) in the school counsellor's office or in a room in the

health centre. In-depth interviews with key informants were carried out at their workplace or home as they wished.

The aims and procedure of the study were explained to the participants before interviews or group discussions. Consent was taken from participants for recording the interviews. The discussions were begun with a question about the health needs of adolescents and continued with a few exploratory questions to access deeper information. The average duration of interviews was 60–90 minutes.

All the discussions and interviews were recorded and notes were taken. The transcriptions of the discussions/interviews were analysed by the content analysis method. The analysis of transcriptions started with the first FGD. Data collection ran parallel throughout the study. Each interview was re-read several times to gain a feeling of completeness. Transcriptions of the interviews were broken to semantic units and then to the smallest meaningful units (codes) after several reviews. The statements developed from the transcriptions and extracted codes formed the primary statements. These statements as well as the others extracted from a review of related tools, articles and books on adolescent health needs were used to develop the final instrument (in Farsi).

Stage 2

In the second stage the validity and reliability of the IFAHNA questionnaire were assessed. Validity was assessed using content-, face-, construct- (exploratory factor analysis) and criterion- (concurrent) validity.

Based on purposeful sampling, 15 faculty members of Iranian universities assessed the content validity of IFAHNA. They were experts in reproductive health, midwifery, obstetrics and gynaecology, health education, nursing, community health and psychology. The assessment was based on the Waltz & Bausell content validity index (CVI)

[8]. The experts scored the relevancy, clarity and simplicity of each statement in IFAHNA using a Likert-type scale [8]. The CVI for each statement was calculated by dividing the number of agreed experts (who scored 3 and 4 on the Likert scale) by the total number of experts. The statement was accepted if the CVI was ≥ 0.79 [9]. To assess face validity, the experts and 10 adolescents (recruited by purposeful sampling) assessed the significance of the statements in IFAHNA. The assessment was based on the item impact method. This method selects items that are most frequently perceived as important by participants on a 5-point scale. The item impact was determined from the proportion of participants who identified it as important and the mean importance score attributed to this item (impact score = frequency \times importance). Each statement was accepted if the impact score was ≥ 1.5 [10]. In this regard, the participants wrote down their judgement of each statement for clarity and fluency.

Construct validity of IFAHNA was assessed using exploratory factor analysis to ascertain categories of statements (as the variables) with highest relevance. The required number of respondents for factor analysis was 3–10 for each statement. However, a total 100–200 can be enough to calculate the necessary correlation coefficient [11]. Therefore, 200 female adolescents from middle and high schools of Sari County were recruited for the study by cluster sampling. The Kaiser-Meyer Olkin test was used to assess the sampling adequacy [11].

The Pediatric Quality of Life Inventory 4.0 (PQLI) was used to assess the criterion (concurrent) validity of IFAHNA [12] after assessment of content, face and construct validity. PQLI has 23 statements in 4 dimensions of sexual, emotional, social and school practice and it is scored using a Likert-type scale. Higher scores demonstrate lower quality of life [12]. This tool has

been translated into several languages, including Farsi, and the psychometric properties of PQLI have been assessed by Iranian researchers; they showed an acceptable validity and reliability of PQLI to measure Iranian adolescents' quality of life [13,14]. PQLI was used as the inventory because there is a negative correlation between quality of life and the health needs of people [15]. To assess criterion validity, 60 female adolescents, recruited using convenience sampling method, completed both IFAHNA and PQLI concurrently. For the final analysis, 3 questionnaires were excluded due to missing data.

Principal content analysis was used to extract hidden factors in IFAHNA. Scree plot and eigenvalue methods were used to determine the factors that constructed IFAHNA. A minimum value of 0.40 was considered the acceptable minimum factor loading to retain a statement in an extracted factor following factor analysis.

Internal consistency and test–retest reliability methods were used to assess the reliability of IFAHNA. Reliability means internal consistency and stability of the tool for measuring a variable [16]. The Cronbach alpha coefficient was used to assess internal consistency of IFAHNA. This coefficient shows appropriateness of a group of statements for a construct in a questionnaire. An acceptable coefficient for internal consistency is 0.7–0.8 or more [17]. The Cronbach alpha was measured twice: before factor analysis it was calculated for 200 forms of IFAHNA completed by the above-mentioned respondents; after factor analysis it was calculated for 20 forms of IFAHNA which were completed by 20 adolescents to determine test–retest reliability. These 20 adolescents were also recruited using convenience sampling method. The Cronbach alpha coefficient was measured for each factor and also for the whole questionnaire.

The stability of IFAHNA was also assessed using test–retest reliability

measurement: 21 female adolescents completed the IFAHNA forms twice with a 2-week interval. The intraclass correlation index was used to compare scores of test–retest of IFAHNA. Stable scores following test–retest of a tool indicate a stable tool [18]. The appropriate time interval for test–retest can be between 2 weeks to 1 month [19].

Analysis

Exploratory factor analysis, the Cronbach alpha coefficient, intraclass correlation index and Wilcoxon test were used for data analysis using SPSS, version 17.

Results

Content analysis of transcriptions of the interviews (with adolescents and key informants) demonstrated 5 main themes, namely educational needs, and emotional, social, spiritual and physical health needs. Extracted codes and an extensive literature review on adolescent health were used to make the preliminary tool with 135 statements. Then, similar statements were omitted or combined by the researchers in 3 assessment sessions, resulting in a questionnaire with 117 statements with a 5-point Likert scale (completely agree, agree, don't know, disagree and completely disagree).

Statements with a CVI of < 0.79 were omitted reducing the questionnaire to 102 statements. The scale-level CVI (S-CVI) of IFAHNA was 0.92; S-CVI > 0.92 indicates an acceptable validity of an instrument [20].

With regard to exploratory factor analysis, an acceptable level of 0.814 was obtained [11]. Correlation matrix was calculated using the Bartlett test of sphericity giving a value of 6542 ($P < 0.001$).

With principal content analysis, 21 factors with an eigenvalue > 1 were determined. They could explain 73.13% of the variance.

Because of the low explainability of the final created factors, and in order to make the questionnaire simple and understandable, and more consistent with the extracted concepts and dimensions of the needs, exploratory factor analysis was performed again limiting factor extraction to 5 factors, and using a varimax rotation method, which is an orthogonal rotation method usually used for making construct factors simple and explainable [11]. Finally, 5 factors were accepted that could explain 44.89% of the variance (Table 1). At this stage 40 statements were deleted because they did not achieve a minimum factor load of 0.40. Thus in the end, 62 statements remained in 5 constructs. These constructs were: emotional health needs (18 statements), social health needs (14 statements), physical health needs (14 statements), educational needs (11 statements) and spiritual health needs (5 statements) (Table 2).

Some statements could include in more than one construct. These statements were reconsidered and included in a construct based on their factor load and meaning. Therefore, the final number of the questions in emotional health needs, social health needs and educational needs were changed to 16, 15 and 12 respectively. The statements were scored using a 5-point Likert scale: completely disagree, disagree, neutral, agree and completely agree; scored 1, 2, 3, 4, 5 respectively. The total score of each construct was the average score of its statements. The total score of the

IFAHNA was the average score of its constructs.

Criterion validity assessment of IFAHNA demonstrated a correlation between the scores of the IFAHNA and PQLI questionnaires ($r = -0.66, P < 0.001$).

Cronbach alpha coefficient which assessed reliability of IFAHNA was $r = 0.94$. Cronbach alpha was calculated again after factor analysis to assess the reliability of IFAHNA and gave correlation value of 0.90 for the whole of IFAHNA; for the subscales of the inventory the value were: educational needs (0.90), emotional health needs (0.77), social health needs (0.73), spiritual health needs (0.70) and physical health needs (0.70). The intraclass correlation coefficient calculated to assess stability of IFAHNA was 0.984 ($P < 0.001$). The Wilcoxon test demonstrated no significant differences between the scores of test-retest of IFAHNA ($P = 0.327$).

Discussion

IFAHNA is an innovation in the Islamic Republic of Iran as it is the first local, culturally-sensitive inventory developed to assess the health needs of female adolescents for which its psychometric properties were carefully evaluated. Our study demonstrates that IFAHNA is a valid and reliable instrument for doing this. The conceptual framework for the study was the concept of health needs which were obtained from FGDs with

adolescents, both urban and rural, and in-depth interviews with key informants as well as from a wide review of relevant literature.

Construct validity of IFAHNA using factor analysis showed 5 factors in female health needs: social, emotional, physical and spiritual health needs as well as educational needs. This method has been used previously in a study in Midwestern urban adolescents in Kansas City, United States [21]. The authors developed a preliminary questionnaire after a literature review, followed by assessment of the content validity of the preliminary questionnaire by physicians, nurses, teachers and adolescents. Then construct validity was assessed by 219 high-school students and finally, using factor analysis method, 4 factors were obtained: sexual, health, mental and drug abuse. In addition, reliability of this questionnaire was shown by Cronbach alpha coefficient (0.512–0.802) and Pearson correlation coefficient ($r = 0.309$ –0.860). Similar to our study, physical and psychosocial arose as 2 factors of their instrument. However, unlike our study, the 2 other factors found were sexual health needs and drug abuse. These differences may have arisen firstly from different social and cultural backgrounds of the participating adolescents and secondly from different the age groups of the subjects of 2 studies. IFAHNA was developed based on the adolescents' and key informants' own definitions and explanations about the concept of health needs, which stems from their own culture,

Table 1 Results of the principal components analysis – factors and variance explained

Component	Total variance explained					
	Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	13.04	21.03	21.03	7.10	11.46	11.46
2	4.54	7.32	28.36	6.19	9.98	21.45
3	4.24	6.84	35.20	5.67	9.15	30.59
4	3.34	5.39	40.59	5.27	8.50	39.10
5	2.66	4.29	44.89	3.58	5.78	44.89

Table 2 Results of the principal component analysis – factor loadings for each item within identified components

	Statement	Factor loading				
		1	2	3	4	5
1	My counsellor should keep my secrets	0.725				
2	Education should be integrated with extracurricular and hobby programmes	0.693				
3	My decisions should be important in the family	0.686				
4	My family and friends should be kind to me	0.659				
5	My teachers and school principal should inform me of my mistakes calmly	0.640				
6	If I refer to my counsellor, people should not misjudge me	0.628				
7	There should not be any discrimination among school students	0.607				
8	School examination should not create any anxiety in me	0.594				
9	Equality for all should be respected through law enforcement	0.592				
10	Adolescent health services need to be adequately publicised	0.578				
11	The curriculum should not so full as to create stress in students	0.560				
12	Health education programmes can be held as group discussions	0.542				
13	My counsellor should not laugh at or blame me	0.529				
14	Adolescent health services should be available and accessible	0.519	0.437			
15	I need to receive the necessary information from mass media ^a	0.489		0.432		
16	Educational programmes in the community should be of interest to me	0.481				
17	I should be calm and tranquil	0.469				
18	My counsellor should be female	0.465				
19	My family should have friendly behaviour with me		0.669			
20	If my family advise me, they should explain the reasons		0.630			
21	My parents should set aside a few hours for me every day		0.624			
22	My parents should not discriminate between their children		0.619			
23	My parents should have appropriate relations with each other		0.615			
24	My parents should not tell my secrets to others		0.595			
25	I need to be accepted by my peer group		0.587			
26	My parents should give me enough money		0.551			
27	My parents should counsel me about my future career, education, life		0.549			
28	Facilities related to adolescents' hobbies should be affordable	0.476	0.544			
29	Experts should be invited to schools to address adolescent health problems		0.544			
30	My parents should choose an appropriate name for me		0.526			
31	My parents should give me freedom and just monitor me without being too strict		0.518			
32	Communities should have an organization to support abused or violated adolescents		0.428			
33	I should be informed about pubertal health			0.769		
34	I should be informed about personal health			0.768		
35	Health information and education should be understandable to me			0.764		
36	I should be trained in life skills			0.733		
37	I should be informed about appropriate nutrition			0.702		
38	I should be informed about common diseases			0.734		
39	I should be informed about sexual health			0.594		
40	I should receive adequate education to prevent incorrect information		0.539	0.544		
41	I should be informed about the acceptable use of medias ^b			0.481		

Table 2 Results of the principal component analysis – factor loadings for each item within identified components (concluded)

	Statement	Factor loading				
		1	2	3	4	5
42	I should be informed about possible undesired consequences of relationships with boyfriends			0.462		
43	Educational programmes should be regular and continuous			0.417		
44	I should have access to safe water				0.738	
45	I should have accesses to sports' facilities				0.704	
46	I should brush my teeth every nigh				0.650	
57	I should eat fruit and vegetables 2 to 4 times a day				0.636	
48	My environment should be clean				0.630	
49	I should not have any barriers to exercising out of the home (e.g. riding a bicycle, walking)				0.619	
50	I should eat meat and legumes 2-3 times a day				0.606	
51	I should eat milk and dairy products 1-2 times a day				0.595	
52	I should be allowed to engage in a sport if I am interested				0.594	
53	I like meals that look attractive and appetising				0.535	
54	I should eat breakfast every day				0.520	
55	I should have free meals in school				0.495	
56	I should sleep 8 hours in 24 hours				0.446	
57	I should have a bath/shower at least twice a week				0.441	
58	I need a get positive cognitive images of religion					0.672
59	I need prayer and fasting to keep me calm					0.668
60	I need God to be my haven					0.653
61	Religious issues should explained to me with reasons					0.623
62	I seek to improve my life by relying on God		0.475			0.623

^aTelevision, radio and news papers.

^bMobile telephones, Internet, etc.

and it is necessary for the development of health needs assessment tools appropriate to the target population [22]. Nevertheless, although sexual health needs was not obtained as a factor in IFAHNA, there were some statements about adolescents' educational need regarding "sexual health" or "relationship with males" which demonstrated adolescents' needs related to sexual health. We did not aim to assess addiction to drugs so this factor could not be extracted as a factor from our study.

Content validity of IFAHNA was assessed by the experts. Content validity assessment of questionnaires by experts is one of the best ways to develop an evidenced-based questionnaire with appropriate content [23] and many other studies have used content validity

assessment by experts to confirm their developed questionnaires [24,25].

In evaluating the psychometric properties of an instrument, it is also necessary to evaluate the reliability of a tool. A reliable tool increases the ability of a study to demonstrate real differences and relations [19]. IFAHNA had an acceptable internal consistency and stability. Similar studies which developed a tool in the area of adolescent health have used internal consistency and stability to demonstrate satisfactory reliability of their tool [26,27].

There was a significant negative correlation between scores of IFAHNA and PQLI. This finding is consistent with results of other studies which assessed correlation between health needs and quality of life. For example, it has been demonstrated that there is

a significant negative correlation between scores of the health needs of heart disease patients and their scores on a quality of life questionnaire ($P < 0.01$, $r = -0.65$) [28].

The most important difference of IFAHNA with other related tools is its statements about female adolescents' spiritual needs, such as the need to rely on God, for God to be a haven and to achieve calm through prayer, which were extracted from the interview transcriptions. It shows that female adolescents consider part of their health derives from seeking and making a relationship with God. At the same time they want religion to be explained rationally.

One of the limitations was that all the procedures for developing the inventory were conducted in Sari in the

north of the country. The participants provided their understanding of adolescents' health needs' meaning based on their own sociocultural characteristics which may be somewhat different from the rest of Iranian ethnicities. In addition, we did not correlate the scale against other adolescent health scales as we could not find any similar scales that had been tested for psychometric properties in Farsi.

To conclude, IFAHNA is the first validated, culturally-sensitive tool

designed to assess the health needs of female adolescents in the Islamic Republic of Iran. The development of this inventory has implications for policy and practice. The use of IFAHNA, which can be completed in 10 to 15 minutes and uses simple language and terms that are understandable to adolescents in or out of school, could be an important step to identifying Iranian female adolescents' health needs. Identifying needs is an important in order to direct health services, prioritization in health

promotion programmes and resource allocation.

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