

Developing and validating questionnaires to assess knowledge, attitude, and performance toward obesity among Iranian adults and adolescents: TABASSOM study

Parastoo Golshiri⁽¹⁾, Parastoo Yarmohammadi⁽²⁾, Nizal Sarrafzadegan⁽³⁾,
Shahnaz Shahrokhi⁽⁴⁾, Mehrdad Yazdani⁽⁵⁾, Masoud Pourmoghaddas⁽⁶⁾

Abstract

BACKGROUND: The present study describes the methods of developing and validating two questionnaires that will be used to investigate the knowledge, attitude and practice of adults, children and adolescents regarding obesity.

METHODS: To design the questionnaires, we used the components of the Health Belief Model. The questionnaire for adults consisted of 6 sections with 50 questions. The questionnaire for children and adolescents included 7 sections and 52 questions. The questionnaires were assessed for face validity, content validity, and clarity of the items. To determine the internal consistency reliability of the questionnaires, Cronbach's alpha coefficient was measured for 100 questionnaires. Using the correlation coefficient, we determined the equivalent reliability of the study tools.

RESULTS: The Cronbach's alpha coefficient ranged between 0.60 and 0.80 for the whole questionnaires. The Cronbach's alpha coefficient of the questionnaires for adults, children and adolescents were respectively 0.72 and 0.60 for awareness. The corresponding values for attitude were 0.70 and 0.75. Using Pearson's correlation coefficient, the interobserver reliability was determined to be significant ($r \geq 0.80$; $P < 0.001$).

CONCLUSION: Our study tools had adequate reliability and validity. They are thus suitable for assessing the knowledge, attitude, and practices of Iranian adults, and children and adolescents in toward obesity.

Keywords: Validation Questionnaire, Obesity, Knowledge, Attitude, Behaviors.

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Introduction

Lifestyle changes can contribute to the development of risk factors of non-communicable diseases (NCDs) such as diabetes, hyperlipidemia, hypertension, overweight, and obesity.^{1,2} Obesity is an important NCD risk factor. Various studies have implicated weight gain in the pathophysiology of hypertension, diabetes, cardiovascular disease (CVD) and cancers.³⁻⁶ Moreover, obesity can lead to increased mortality and disability and rising costs of treatment in most communities.⁷ Annually, 300-587 thousand deaths worldwide are attributed to obesity. Obesity is considered as the second important preventable cause of death worldwide.^{8,9} The high prevalence of weight gain and obesity in Iran

(42.8% in men and 57% in women) is an important contributor to NCD in this country.¹⁰

In 2001, comprehensive interventions were initiated as part of the Isfahan Healthy Heart Program (IHHP) to improve lifestyle, modify CVD risk factors, and reduce NCD-related mortality.¹¹ IHHP interventions were designed to be practical and sustainable and to offer the possibility of integration.¹² In 2010, Isfahan Cardiovascular Research Center (ICRC) initiated a new program titled "TABASSOM" aiming to prevent and reduce the prevalence of overweight/obesity in Isfahan, Iran. This program had a 2-year design and consisted of 3 phases. The first phase was the implementation of a qualitative study to determine the

1- Associate Professor, Department of Community Medicine, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran.

2- PhD Candidate, Department of Health Education and Health Promotion, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran.

3- Professor, Isfahan Cardiovascular Research Center, Isfahan Cardiovascular Research Institute, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran.

4- Specialist in Community Medicine, Rehabilitation Research Center, Isfahan Cardiovascular Research Institute, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran.

5- Research Fellow, Isfahan Cardiovascular Research Center, Isfahan Cardiovascular Research Institute, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran.

6- Professor, Department of Cardiology, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran.

Correspondence To: Nizal Sarrafzadegan, Email: nsarrafzadegan@gmail.com

indicators that could be used in developing the questionnaires. The questionnaires were then designed and a descriptive analytical study was carried out on the general population. The second phase consisted of community-level multidisciplinary interventions and specific interventions for overweight or obese people. In the third phase, the same questionnaires, that were completed in the first phase, will be completed. Given the necessity of using a valid and reliable tool for achieving the study objectives, the researchers initially conducted a project to design two questionnaires for assessment of knowledge, attitudes, and practices of adults, and children and adolescents (6-14 years). Therefore, the aim of the present study was to report the design and methodology of evaluating the validity and reliability of the two questionnaires used in TABASSOM study.

Materials and Methods

To design the questionnaires for adults and children and adolescents, we initially searched the literature, including textbooks, dissertations, scientific publications, and websites thoroughly for similar tools used in previous studies. Then, we designed the preliminary framework of the two questionnaires using the studied resources, experts' opinions, the Health Belief Model, and the results of the qualitative study performed earlier as part of the first stage of the TABASSOM study for determining the factors implicated as the causes of obesity according to the population beliefs in Isfahan, Iran.¹³

The knowledge section of the questionnaire was designed using scientific textbooks on the causes, complications, treatment, and prevention of obesity in the two groups of adults and children/adolescents. The attitude section was designed based on the Health Belief Model.¹⁴ This model offers an appropriate structure for determining health-related behaviors and has been extensively used in behavioral studies. The Health Belief Model comprises components of perceived susceptibility and perceived severity (which jointly make perceived threat), perceived benefits, perceived barriers, and self-efficacy.¹⁴ It is also consistent with the results of the primary qualitative study for finding the factors influencing obesity in people. All constructs of the Health belief Model were used to assess the questionnaire for adults, but self-efficacy was eliminated for children and adolescents. The answers regarding attitude were designed based on a 5-point Likert scale.

To evaluate behavior, we assessed the practices of people towards obesity and finally assessed cues to action. Cues to action investigate the factors which encourage individuals to adopt appropriate actions.¹⁴

The items in this questionnaire measured the influence of family members and friends of the obese individuals and the use of information resources for reducing weight. The questionnaires were completed by interviewers in face-to-face interviews. For children/adolescents, the questionnaires were completed in face-to-face interviews with mothers. All subjects had given their written consent prior to participating in the study. To keep the information confidential, questionnaires were anonymous and the research group organized training workshops for the interviewers to explain the right method of completing the forms and answering the questions. They were also provided with written instructions.

The questionnaire for adults was designed with the following 6 sections:

1. Demographic questions: This part collected the name of the interviewer, general details of the interviewee and demographic variables such as sex, age, marital status, number of household members, education, job, monthly household income, housing status, number of automobiles owned by the family, health insurance status, and physical assessments including height, weight, and waist circumference.

2. Questions about the knowledge of the subjects regarding overweight and obesity: Causes, treatment, and prevention of obesity/weight gain were included. The questions were designed in a "closed" format. The questionnaire for adults contained 11 knowledge-related questions with 3 options of "I don't know", "False", and "True".

3. Attitude questions: These 23 closed questions were designed in 5 categories of perceived threats (5 questions), perceived benefits (3 questions), perceived barriers (7 questions), and self-efficacy (8 questions). They were based on a 5-point Likert scale (totally agree, agree, no idea, disagree, and totally disagree). Depending on directness or indirectness of the questions, scores ranged from 1 (totally disagree) to 5 (totally agree).

4. Assessment of the attitude about physical appearance: This part consisted of 6 questions (5 closed and 1 open questions).

5. Assessment of obese individuals: It included 9 questions.

6. Assessment of cues to action: This section was designed as 5 closed questions and a final open question regarding the method of providing information about overweight and obesity.

The questionnaire for children and adolescents consisted of 7 sections as follows:

1. Demographic questions: This part was similar to the questionnaire for adults.

2. Questions about knowledge of parents

toward obesity and overweight: This part included causes, complications, and prevention of overweight and obesity in 14 questions.

3. Items about parents' attitude: According to the Health Belief Model, 16 closed questions were designed based on a 5-point Likert scale. The questions measured perceived threats (4 questions), perceived benefits (3 questions), and perceived barriers (9 questions). Because parents answered these questions, self-efficacy component was not used.

4. Questions about parents' attitude toward their children's physical appearance: This part included 3 closed questions.

5. Statements about dietary behaviors toward obesity and overweight: In this section, 10 questions evaluated the child or adolescent's behaviors and 7 items evaluated parents' dietary behavior.

6. Five questions were designed for obese and overweight children or adolescents who have tried to lose weight.

7. Three questions asked about cues to action.

The validity and reliability of the questionnaires were determined as follows:

Assessing item clarity

The questionnaires were given to 10 people (including overweight and obese people) to answer. Based on the feedback received from them, the necessary changes were made to improve clarity of items. Those people were not part of the statistical population.

Assessing face validity

To assess face validity, the questionnaires were given to a number of lecturers of the Department of Health Education, Statistics and Epidemiology of the School of Health and the Department of Social Medicine of the School of Medicine (Isfahan University of Medical Sciences) and the managers of this project at Isfahan Cardiovascular Research Center. They were asked to comment on the soundness of the questionnaires based on the research objectives. All comments were addressed, and the face validity of the questionnaires was confirmed.

Assessing Content Validity

In order to enjoy greater content validity, test contents must be designed to be reflective of the targets for which they are made.¹⁵ The same group of experts assessed both the face validity of the tools and their contents. Hence we ensured proportionality of each item with the component considered for assessing it. Based on the views and suggestions of the experts, changes were made to the tools and content validity of the questionnaires was finally confirmed.

Assessing Internal Reliability

One of the methods widely used for assessing internal

validity of tests is Cronbach's alpha coefficient, which is an estimate of the test's consistency coefficient.¹⁵ To determine the internal consistency of components, we performed an initial assessment of 100 adults and 100 parents of children and adolescents who were selected in the city of Isfahan using cluster sampling method. The questionnaires were completed by interviews and scores corresponding to the questions were separately entered in SPSS¹⁵. These individuals were not included as main participants. In addition, a split-half model was used to study the internal reliability of the tools.

Determining Equivalent Reliability

There were 6 interviewers who performed the interviews in this study. To determine equivalent validity (including assessing the correlation between scores achieved by two measurements from parallel forms)¹⁵ of these 6 interviewers, 5 subjects were selected for every 2 interviewers. The first 3 interviewers were asked to conduct interviews with 5 individuals. After 6 days, the next 3 interviewers interviewed the same subjects again. This way, each subject had two questionnaires filled (30 questionnaires in total). Pearson's correlation coefficient was measured to determine the interobserver reliability which is indicative of the equivalent reliability of study tools.

Results

The results of the preliminary study, which was conducted to determine the internal reliability of questionnaires showed the mean age of the adults (100 individuals) to be 32.14 ± 14.79 years (range: 25-63 years). Males and singles constituted 51% and 48% of the studied population, respectively. The majority of households (32%) had 4 members. The highest educational degree was high school diploma in both women (63.3%) and men (53%).

Evaluating children and adolescents (100 individuals) revealed their mean age to be 9.82 ± 2.40 years (range: 6-14 years). Half (50%) of these subjects were female and the largest household size was 4 members (57%). Most fathers (38%) and mothers (44%) had high school diplomas. The majority of fathers (45%) were self-employed and 94% of mothers were housewives.

The results of the validating stage of the study showed that compatibility of the content with reliable scientific textbooks was approved by all members of the expert panel whose comments were used to apply necessary changes in the

tools. Cronbach's alpha coefficient of the whole questionnaire ranged between 0.60 and 0.80 (Tables 1 and 2). It is worth noting that Cronbach's alpha was not measured for behavioral assessment questions since they merely addressed people's actions towards obesity/overweight through a qualitative design.

Cronbach's alpha coefficient was determined for some questions with quantitative design in the questionnaire for children and adolescents. In the main project, dietary behaviors and physical activity were separately evaluated, which is out of the scope of this report. Using the split-half method, the correlation coefficients for both questionnaires were calculated to be greater than 0.60. Pearson's correlation coefficient was employed to determine the interobserver reliability. It was reported as significant ($r \geq 0.8$; $P < 0.001$) for knowledge ($r = 0.90$), perceived threat ($r = 0.85$) perceived benefits ($r = 0.93$), perceived barriers ($r = 0.80$), and self-efficacy ($r = 0.87$). These figures indicate that the used scales had sufficient equivalent reliability, the interviewers had no significant effects on the results of calculation, and application of the tools by different individuals for similar subjects would yield in similar results.

Table 1. Cronbach's alpha coefficient of knowledge, attitude, and behaviors in the two questionnaires for adults and children/adolescents

	Adults' Questionnaire	Children and Adolescents' Questionnaire
Knowledge	72	60
Attitude	70	75
Behaviors*	-	61

* The reason for not being assessed is given in the text.

Table 2. Cronbach's alpha coefficient of the two questionnaires based on various components of the attitude

	Adults' Questionnaire	Children and Adolescents' Questionnaire
Perceived Threat	70	70
Perceived Benefits	80	80
Perceived Barriers	60	64
Self-Efficacy*	66	-

* The reason for not being assessed is given in the text.

Discussion

One of the most important steps in developing a new tool is to assess its reliability and validity. In this study, the validity of the tools was demonstrated by content validity through the help of a group of experts. In general, evaluating the validity of the tools showed that all four subscales and the whole questionnaire had an acceptable internal correlation coefficient. These findings were consistent with the results of the Story study which assessed weight reduction and attitudes toward body size, diet, and physical activity among primary school children.¹⁶ In this study, Cronbach's alpha coefficient was calculated as 0.50 to 0.80. In fact, alpha was 0.46 for children's intention to consume food products with low fat and sugar, 0.64 for children's sense of self-efficacy to consume food products with low fat and sugar content, 0.61 for their self-efficacy to do physical activity, and 0.77 for having attempted to reduce weight.

Although a large sample size was used in the Story et al. study, it is still recommended to perform further studies on other populations to better determine the validity of the questionnaire.¹⁶ However, their questionnaire was designed based on the cognitive social model, and the subjects were children with a mean age of 8.6 years. Swift et al. studied the knowledge of adolescents over 13 years of age regarding the health risks of obesity. They found a Cronbach's alpha coefficient of over 0.70 which is similar to our study.¹⁷ The Swift et al study designed responses as "True", "False", and "I don't know". We therefore believe that the design of the questionnaire can be used to assess the knowledge of adolescents and their parents. Similar to our study, Swift et al. claimed that their questionnaire could reliably show the relationship between awareness about obesity health risks and weight control behaviors.¹⁷ In addition, since the questionnaire in the study by Swift et al.¹⁷ can be used in both cognitive social and health belief models, some of their questions were used in the present study. Lin and Lee studied the relationship between knowledge and attitude regarding diet among 1937 elderly people. They reported a Cronbach's alpha coefficient of 0.87 for the relationship between knowledge toward nutrition and diseases. The alpha was 0.69 and 0.86 for general nutrition attitudes and dietary behaviors, respectively. They used a 3-point Likert style in 48 knowledge-related questions whose options included "True", "False", and "I don't know". Attitude questions were divided into 3 sections of diet, health care, and healthy food which were designed as a 3-level option scale.¹⁸ Likewise, Lin et al. performed a study on two

groups of children (1-3 years old and 4-6 years old) and found Cronbach's alpha of 0.72 and 0.76 for knowledge, 0.65 and 0.68 for attitude, and 0.62 and 0.65 for dietary behavior, respectively.¹⁹

One of the strengths of our questionnaire was using the Health Belief Model in designing the questionnaire. This makes it possible for researchers to evaluate factors related to health and plan interventions accordingly. Furthermore, the important role of family members in changing behaviors related to obesity was addressed. On the other hand, including self-efficacy in the questionnaire emphasized the role of individuals in using their own abilities to adopt obesity-preventive measures. Moreover, the inclusion of items to evaluate dietary behaviors in this questionnaire allows effective evaluation of the effects of educational and dietary interventions. Finally, the use of indigenous indicators in evaluating people's performance toward obesity management and preventive behaviors makes this tool appropriate for researchers to use in studying social and cultural factors.

Conclusion

The present study was conducted on a group of male and female adults and children/adolescents in Isfahan, Iran to determine the validity and reliability of the developed questionnaires. The researchers recommend using these questionnaires as valid tools in other societies with similar cultural and socioeconomic status.

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Conflict of Interests

Authors have no conflict of interests.

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