Development and Validation of Ramadan Fasting Basic Information and Nutritional Habits Questionnaire

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A R T I C L E I N F O	**A B S T R A C T**
Article type: Research Paper	**Introduction:** Most Ramadan fasting studies are usually conducted over one-year periods and show the short-term effects of Ramadan fasting. There is no standard tool or questionnaire to evaluate people's fasting habits and Ramadan fasting long term effects. For the first time, we designed a study to develop and validate a questionnaire to evaluate people's fasting habits as a tool for the determination of short-term and long-term Ramadan fasting effects.
	Methods: After designing the questionnaire, it was sent to 10 experts in this field for judging and commenting (content validity). The validity of the questionnaire was evaluated using the Content Validity Ratio (CVR) index> 0.62, which includes the questionnaire's essentiality, relevancy, clarity, and comprehensiveness. In order to check the questionnaire reliability, the "test-retest method" was applied among 10 individuals.
	Results: After multiple drafts, the questionnaire contained 16 items, categorized into "Basic information on fasting (demographic information)", and "Fasting nutritional habits" including 13 and 3 questions, respectively. The overall CVR for relevancy, clarity, and comprehensiveness of the tool were 0.92, 0.95, 0.97, and 0.95, respectively. The Pearson correlation coefficient of the test–retest stage was 0.85.
	Conclusions: This Ramadan fasting habits questionnaire demonstrated strong content validity and test-retest reliability. It can be an appropriate instrument for the evaluation of Ramadan fasting basic information and nutritional habits in research or practice-oriented settings for the determination of short-term and long-term Ramadan fasting effects.

Introduction

Ramadan is the 9th month in Islamic calendar which is known as a month of fasting by all Muslims around the world, during which every healthy and mature Muslims fast from dawn to sunset (about 12 hours based on geographic location) to fulfill this religious obligation(1). During the month of Ramadan, which lasts between 29 to 30 days, Muslims have two large meals after sunset and before first light and they abstain from eating and drinking for the rest of the day (2). Therefore, not only eating habits changes during this month but also other factors like sleep duration and pattern get altered (3). Abstinence from eating, drinking, smoking and intercourse for such a long period of time, as well as life style alternation could affect body in many different ways (4-13).

It has been shown that caloric and dietary restrictions besides lifestyle changes during Ramadan can be considered a two-edged sword, as there is no consensus on its effects (4-9). Also, most of the related-studies are usually conducted in one-year period and show the short-term effects of Ramadan fasting (4-13). Ramadan fasting long term effects investigation require a questionnaire to evaluate people's fasting habits. New surveys must be extremely tested to ensure the validity of the instrument (14, 15). Validity is the extent to which any tool measures what it is asserted to (16). Content validity is the extent to

which items fit or show a particular domain and are assessed by quantitative methods (14, 16).

The aim of current study is to develop and validate a questionnaire to evaluate people's fasting habits and as a tool for determination of short-term and long-term Ramadan fasting effects.

Method

The present research developed and validated a Ramadan fasting questionnaire in 3 stages: (1) questionnaire development, (2) content validity, (3) reliability.

Item Generation and Development

The content questions relevant to the current study were based on expert viewpoint, related literature, and previous surveys between 2000 and 2016 (4-13).

Overall, 16 items were recognized for the primary questionnaire version. The questionnaire and the data form for rating the content were sent via e-mail to 10 experts with experience in the field of nutrition, Ramadan researches, psychometrics, and community medicine.

Content Validity

There are several techniques to test content validity. The current research applied one technique which included empirical methods for calculating the content validity ratio (CVR) and

the content validity index (CVI) (17, 18). These empirical methods have been explained below:

CVR

For calculating CVR, each item of the questionnaire was scored by the experts using a 3-point Likert scale as follows: 1. Essential, 2. Useful but not essential, and 3. Unessential. CVR values range varies between 1 and -1. The higher score shows further agreement of panelists on the necessity of an item in an instrument. The CVR formula is: CVR = (Ne - N/2)/(N/2), in which N is the total number of panel members and the Ne is the panelists numbers showing "essential". According to Lawshe's table, when there are 10 members in expert advisory panel, selected items are those with CVR= 0.62 or above (19). In other words, the content validity of the items will be verified if the CVR for each item equals to or higher than 0.62.

CVI

CVI is the most commonly offered measure of content validity. Panelists was asked to score the items according to clarity and its relevancy with structure of the underlying research in accordance with the theoretic descriptions of the structure itself and its dimensions on a 4-point grade (1: irrelevant, 2: somewhat relevant, 3: quite relevant, 4: highly relevant). Table 1 was attached to the cover letter to lead the experts for grading methodology.

Table 1. The table added to the cover letter to guide experts for scoring method

Relevancy	Clarity
1: not relevant	1: not clear
2: item need some revision	2: item need some revision
3: relevant but need minor revision	3: clear but need minor revision
4: very relevant	4: very clear

There are 2 kinds of CVI: item level CVI (I-CVIs) and the scale level CVI (S-CVI) (18). I-CVI is calculated as the number of experts who rate the relevancy of each item as 3 or 4, divided by the experts' number. Values between 0 and 1 while I-CVI is higher than 0.79, the item is relevant, between 0.70 and 0.79, the item requires editing, and if the value is less than 0.70 the item is removed (18). Likewise, S-CVI is computed by the number of items in an instrument that have got a rating of "very relevant" (18). Two techniques are existed to calculate S-CVI including, the Average CVI (S-CVI/Ave) and the Universal Agreement (UA) among experts (S-CVI/UA), the first is a less conservative technique

(18). S-CVI/UA is computed via summing all items with I-CVI =1 divided by the total number of items, whereas S-CVI/Ave is computed via dividing the sum of I-CVIs by the total number of items (18). A S-CVI/Ave ≥ 0.9 and S-CVI/UA ≥ 0.8 show great content validity (20).

Asking panel members to review the tool for comprehensiveness would be the final phase for estimating the content validity. The panelists are asked to determine whether the instrument's items and each of its dimensions are a perfect and comprehensive sample of content as far as the theoretic meanings of the concepts and its dimensions are concerned. Is it necessary to add or remove any item? Regarding members'

judgment, agreement proportion is assessed for the comprehensiveness of each dimension and the whole tool. Therefore, the number of experts who found the tool comprehensiveness as desirable is divided by the total number of experts.

Reliability of the Questionnaire

The test–retest method was used to determine the reliability of the questionnaire under the same conditions at different times. The questionnaire was provided to 10 employees of Mashhad University of Medical Sciences and was required to fill out the questionnaire. After 10 days, the questionnaire was provided to the same employees, and they again filled in the questionnaire. Then, statistical analysis was carried out by SPSS software (IBM Corp. Released 2019. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp). To assess the reliability of all questions via the test–retest technique, Pearson correlation coefficient was used to evaluate the agreement between primary and secondary responses. Pearson correlation coefficient is commonly used to describe the direction and strength of the linear relationship

between variables and it assesses the linear relationship between quantitative variables (21). This coefficient ranges between −1 and 1 which explains the linear dependence degree between two quantitative variables. Pearson's correlation coefficient is calculated as below (22):

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n \sum x^2 - (\sum x)^2][n \sum y^2 - (\sum y)^2]}}$$

In this formula, r is the Pearson correlation coefficient, n is the valid responses number, x shows the score of an item, and y shows the total score of each respondent with valid responses; Assuming that the distribution of both variables (x and y) are normal. The values of r are distributed as follows: r = 0 to 0.25, very low correlation; r = 0.26 to 0.49, low correlation; r = 0.5 to 0.69, moderate correlation; r = 0.7 to 0.89, high or strong correlation; r = 0.9–1.0, very high or very strong correlation (23).

Ethics

The study was approved by the Ethics Committee of Mashhad University of Medical Sciences (decision number IR.MUMS.fm.REC.1396.293).

Table 2. Content validity and test-retest reliability for Ramadan fasting basic information and nutritional habits questionnaire.

Number	Question	Content validity			Test-Retest Reliability*	
		CVR	Relevancy	Clarity	Pearson Correlation	P value
	Basic information on fasting (demographic information)					
1	Gender and age	1	1	1	1	<0.001
2	Have you ever fasted during your lifetime? a) YES, I have fasted for at least one day so far b) NO, I have never fasted	1	0.9	1	1	0.003
3	**In general**, what times of the year have you fasted? a) I have fasted only in the month of Ramadan b) I have fasted only outside of Ramadan c) In addition to Ramadan, I have fasted at least one day at other times of the year	1	1	1	1	<0.001
4	How has your fasting status been in the past five years? [table: Year / How many days have you fasted in Ramadan? / How many days have you fasted outside of Ramadan? / About how many days of your fasting days were without sahari meal?] * Please answer the questions in this table as long as you remember. * If you do not remember, please enter the number 100 in the table.	0.8	0.9	0.9	1	<0.001
5	If you have not fasted in the last 5 years, what was the reason? a) Chronic underlying disease	1	1	0.9	0.723	0.006

Number	Question	Content validity			Test-Retest Reliability*	
		CVR	Relevancy	Clarity	Pearson Correlation	P value
	b) Acute illness or surgery in Ramadan c) Pregnancy d) Breastfeeding e) Weakness and fatigue f) Travel g) Individual unwillingness for any reason					
6	Have you ever fasted without a doctor's permission when you are sick? a) Yes b) No	0.8	1	1	1	<0.001
7	Have you had a history of acute problems (those mentioned in the next question) that led to going to the emergency room during Ramadan fasting? a) YES b) NO	1	1	1	1	<0.001
8	In case of an acute problem, which case happened during Ramadan fasting? a) Myocardial Infarction b) Stroke c) Loss of consciousness **In diabetic patients:** d) Symptomatic severe hypoglycemia e) Diabetic ketoacidosis (DKA) f) Hyperosmolar Hyperglycemic State (HHS) g) Please name other problems…	1	1	0.8	0.848	0.004
9	At what age did you fast for the first time?	1	1	1	0.962	<0.001
10	Since what age have you fasted at least 20 days of Ramadan almost regularly?	1	0.9	0.9	0.835	0.003
11	**In general**, have your parents were fasting? a) YES b) NO (for any reason) c) I don't know	0.8	0.8	1	0.791	0.011
12	**If you know**, did your mother fast during your fetal period? a) YES b) NO c) I don't know	0.8	0.9	1	0.377	0.317
13	**If you know**, did your mother fast during the first year after your birth (while breastfeeding)? a) YES b) NO c) I don't know	0.8	1	1	0.243	0.217
	Fasting nutritional habits					
1	If you fast, when do you **generally** break your fast? a) After the Azan or less than an hour after the Maghrib Azan b) Between one and two hours after Maghrib Azan c) More than two hours after Maghrib Azan	1	0.9	1	0.896	0.001
2	If you fast, what do you generally break the fast with? (What is the first thing you eat to break the fast?) a) Tea b) Milk c) Fruit juice d) Water e) Beverage f) Date g) Soup h) Dessert i) Solid food j) Other (please name) …	0.8	0.9	1	0.899	0.001
3	**In general**, which of the following meals do your meals include in Ramadan? a) Eftar + Sahari b) Eftar+Sahari+Dinner c) Eftar + Dinner d) Eftar	1	1	1	1	<0.001

*Pearson Correlation

Results

After multiple drafts, the questionnaire consisting of 16 items was developed, categorized into "***Basic information on fasting (demographic information)***", and "***Fasting nutritional habits***" including 13 and 3 questions respectively.

Content Validity

All experts' feedbacks on essentiality, relevancy, clarity, and comprehensiveness of the 16 questions were collected in 4 weeks (response rate= 100%). The CVR, relevancy, clarity, and comprehensiveness of the final instrument were 0.92, 0.95, 0.97 and 0.95 respectively. Table 2 shows the CVR, clarity and relevancy of each item.

Reliability

The test–retest reliability was applied to assess the reliability. The Pearson correlation coefficient (r = 0.85) represented the good reliability of the questionnaire.

Discussion

In this research, a questionnaire was developed to address the short-term and long-term Ramadan fasting effects. This questionnaire has excellent content validity and substantial test-retest reliability as an instrument that can be used to examine Ramadan fasting basic information and nutritional habits. To the best of our knowledge, there is no other questionnaire available for evaluating people's fasting habits. There are around 1.9 billion Muslims around the world (24). Fasting is mandatory for all Muslim adults. Regarding the season and geographic location, fasting period may last up to 20 hours (25). However, no questionnaire is exited to evaluate people's fasting habits and determine the of short-term and long-term Ramadan fasting effects.

The Lawshe methodology is one of the most acceptable instruments for determining content validity (26). Considering that 5-10 experts were sufficient (27), the content validity was determined by a group of 10 expert specialists. Lawshe CVRs of 1.0 showed the consensus of the experts. All questions were essential.

The test-retest Pearson Correlation for the entire questionnaire was acceptable. This tool will produce repeated and consistent measurements for evaluation of Ramadan fasting basic information and nutritional habits and will be consistent for a given individual. Of note, In 2 questions (**If you know**, did your mother fast during your fetal period?; **If you know**, did your mother fast during the first year after your birth (while breastfeeding)?), the P value was above 0.05, which indicates that the answers were not reliable. It is possible that after the initial filling of the questionnaire, they asked their mother and their answer is different when filling the questionnaire again. The purpose of raising these questions is to evaluate the long-term effect of a mother's fasting during pregnancy and breastfeeding on the child's health. Another limitation of current study is that according to the questionnaire items, this questionnaire may only be used in Iran or countries with similar dietary habits not for examining dietary habits of Muslims residing in other regions with different dietary habits.

Implications

This Ramadan fasting questionnaire shows strong content validity and test-retest reliability. It is an appropriate instrument for evaluation of Ramadan fasting basic information and nutritional habits in research or practice-oriented settings for determination of short-term and long-term Ramadan fasting effects.

Funding

Conflict of Interest

There is no conflict of interest to declare.

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