Original Article

Developing and Validating Food Choice Determinants Questionnaire: An Instrument for Exploring Food Choice Determinants in Iran

Abstract

Background: This study was carried out to design and validate a questionnaire to measure the majority of factors influencing food choices among adults in Iran. **Methods:** A sequential exploratory mixed-method approach was applied to develop the initial item pool of the Food Choice Determinants Questionnaire (FCDQ) starting with a qualitative study to explore the food choice dimensions and its components. Designing the initial questionnaire using these dimensions and the 36-item Food Choice Questionnaire (FCQ) was then performed. The face, content, and construct validity were also assessed. The construct validity of the questionnaire was assessed using the exploratory factor analysis (EFA). Cronbach's alpha was applied for each main theme to examine the internal consistency. **Results:** After content and face validity process, a 60-item FCDQ was developed with total items' content validity index (CVI) of 0.69 indicating a reasonable level. The Cronbach's alpha coefficients for each of the six constructs in the scale have shown satisfactory internal consistency. **Conclusions:** This instrument is valid and reliable to measure food choice determinants in adults and could be applied to design interventions aiming to better food choice.

Keywords: *Choice behavior, decision-making, determinants, food, Iran, surveys and questionnaire*

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Introduction

There is enough evidence that unhealthy diet is a strong predictor for non-communicable diseases (NCDs) including obesity, cardiovascular diseases, some diet-related cancers, diabetes, and other disorders that, overall, are called civilization diseases.[1] NCDs are recognized as the prominent health issues, which have led to 236,000 deaths in Iran, and dietary elements were recognized as the main risk factor for NCDs.[2]

Food choice is a multifaceted process that is dependent on numerous factors with impacts on individual behaviors through many pathways leading to selection or rejection of foods. These factors vary from sensory, physiological, and psychological responses of consumers to interfaces between social, environmental, and economic effects, containing the variety of foods and food industry actions to endorse them.[3,4] It is needed to provide a valid, reliable, and culturally tailored instrument for discovering the multiple aspects of food choice. To date, many research have been conducted on food choice motives around the world, of which many of them have examined the items of Steptoe's questionnaire in the areas studied with the aim of determining the proportion of these items in factors influencing food choices.[5-12] This Food Choice Questionnaire (FCQ) as a tool that is developed in Western culture does not seem to capture many cultural background and characteristics that are specific to the Middle Eastern societies. In addition, this instrument was developed in 1995 based on the social context of that period of time and may not cover all possible aspects of food choice in today's world. Hence, this study aimed to address thought, meanings, feelings, views, habits, and cultural aspects of food choice in Iranian people, as a sample of Middle Eastern societies using a qualitative study.

Methods

Ethical considerations

Ethical issues (including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

How to cite this article: Haghighian Roudsari A, Vedadhir AA, Amiri P, Kalantari N, Omidvar N, Eini-Zinab H. Developing and validating Food Choice Determinants Questionnaire: An instrument for exploring food choice determinants in Iran. Int J Prev Med 2020;11:141.

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Study design

This study used an exploratory sequential mixed-method research design. This approach is applied to design and validate the research instrument and usually begins with a qualitative initial phase and is followed by a quantitative phase; the results of both phases are then used in the interpretative analysis.[13,14] Details of the whole procedure are as follows.

Phase 1: Identifying dimensions of the food choice determinants

Qualitative study: Because the purpose of this study was to explore the process of choosing foods in Iranian adults, a qualitative study using an in-depth interview technique with the grounded theory methodology was applied to construct a theory based on systematic data gathering and analysis inductively.[15] The participants were chosen with maximum diversity with regard to occupation, education, and socioeconomic status in Tehran, capital of Iran. The interviews were conducted using an interview protocol based on Strauss and Corbin protocol.[15] Each interview lasted between 25 and 40 min and was recorded completely, and then the key points were noted. Purposive sampling was replaced with theoretical sampling to complete the created theory and continued until the theoretical saturation. Data were managed and coded using MAXQDA 10 software.

Phase 2: Development and validation of the instrument

1. *Item generation:* Inductive–deductive approach was used to construct the questionnaire items. In the inductive approach, items were generated using the main concepts explored through the qualitative research using important open codes that shaped the main concepts, and in the deductive approach, we profited the 36-item FCQ designed by Steptoe *et al.*[16] as well as the "food choice process model" developed by the research group of food choice at the Cornell University using the qualitative research for American adults[17,18]
   A Likert-type scale was used with five options from "completely agreed" to "completely disagreed" for attitude-related items and "always" to "never" for practice-related items.
2. *Content validity:* Content validity of the constructed questionnaire was evaluated through two approaches: expert panel opinion (the qualitative method) and content validity index (CVI) and content validity ratio (CVR) calculation (the quantitative method).[19] The expert panel consisted of 10 experts (5 nutritionists and 5 sociologists) who assessed the initial questionnaire qualitatively in terms of "compliance with grammar," "content representativeness," "wording," and "item

allocation," and then, item modification was carried out before the quantitative content validity
   In the quantitative phase, content validity was numerically calculated using two indicators: CVI and CVR. The CVI was used to evaluate items for "simplicity," "relevancy," and "clarity," while the CVR was applied to assess "necessity" of each item. If the CVI score was less than 0.7, the item would be omitted.[20] Considering the number of the expert team members (12 persons), the acceptable CVR was above 0.56 based on the Lawshe "minimum CVR value" table.[21]
3. *Face validity:* Face validity of the questionnaire was determined by the qualitative and quantitative methods. A total of 15 adults age 30–64 years old were selected through convenience sampling and 22 experts were recruited selectively to evaluate face validity of the items in terms of "difficulty," "irrelevance," and "ambiguity." After the content and face validity phase, the questionnaire was modified
4. *Construct validity:* To determine the exact sample size for construct validity study, a pilot study was conducted on 70 volunteers age 30–64 years old living in Tehran. Based on the results of the pilot study, necessary modifications were made to the items and the sample size for construct validity study was determined. The sample size was estimated at 680 that increased to 750 taking into account the drop-outs. Multistage cluster sampling was used in Tehran with five geographical clusters of north, south, east, west, and center based on the probability proportional to size (PPS) sampling. Then, some cultural, religious, health, and therapeutic centers as well as sport clubs and grand parks were randomly selected in each area
   Exploratory factor analysis (EFA): Principal axis factoring (PAF) to extract the factors and Promax rotation with Kaiser normalization were used to explore the existing factorial pattern. The criteria used to explore the main factors were as follows: value of extraction, initial eigenvalues, rotated component matrix, percent of variance explained by each factor, and Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy. Decision on the number of factors and deleting items due to item's factor loading were made by the research team.[22]
5. *Reliability:* To examine the internal consistency of the themes (scales) of the tool, Cronbach's alpha was applied for each main theme.

Statistical analysis

At first, the normality test was conducted to check the distribution of data using the Kolmogorov–Smirnov test. Cronbach's alpha was used to evaluate the internal

consistency, and values equal to 0.7 and above were acceptable.[23] The EFA was used to explore the main themes and load the items into groups. The internal consistency coefficient was evaluated using the Bartlett's and KMO tests. Consequently, the factor pattern matrix was used using Promax rotation. The factors were chosen if their eigenvalue was more than 1 and the items with the loading factor of more than 0.5 remained in the questionnaire.[24]

Results

Phase 1: Identifying dimensions of the food choice process

Qualitative study: Theoretical saturation was attained after 33 interviews with adults age 20–64 years old. The transcripts were reviewed, and subsequently, open codes were extracted and combined in the constant comparative analysis into the conceptual concepts and themes using Strauss and Corbin style of coding[15] as presented in Table 1.

Phase 2: Development and validation of the instrument

1. *Item generation:* Based on the concepts derived from the qualitative study, 260 items remained after elimination of repetitive codes. After final assessment of the item pool by the research team in terms of concordance between the items and related concepts and eliminating redundant items, the total number of items was reduced to 179 Likert-type items
2. *Content validity:* Based on the numerical CVR, there were 103 items with CVRs lower than 0.56. Final decision on deletion or nondeletion of the items was made by examining the item impact method (quantitative face validity). As a result, 89 of the 179 items had the item impact method of more than 1.5, meaning that they were recognized as important by adults age 30–64 years old. Items with lower scores in both the CVR and item impact method were excluded from the study. For items that were low in one of the two indices, decisions were made based on the importance of issues and research objectives. Finally, content validity process resulted in elimination of 67 items and a modified questionnaire with 112 items
3. *Face validity:* Each participant's opinion(s) about the importance of the existing items in the questionnaire as factors affecting the process of choosing food and their feedback about the item meaning and their simplicity were used to improve clarity and comprehensibility of the items
4. *Construct validity:* The mean age of 70 adults who participated in the pilot study was 42.3 years (standard deviation, 10.2); moreover, the percentage of employed people and homemakers was 44.3 and 24.3, respectively. The majority of the participants (77.1%) were married and 70.1% of them had children. Cronbach's alpha for items in each construct of the questionnaire was above 0.7 indicating suitable interrelatedness among the items. Thus, the questionnaire was identified appropriate to carry out the main construct study. Ultimately, 722 questionnaires were completed (the valid response rate: 96.2%), and their demographic characteristics are shown in Table 2
   EFA: The results of EFA are shown in Table 3. Regarding the sociocultural determinant construct in the Food Choice Determinants Questionnaire (FCDQ), due to the widespread concept of this construct, factor analysis was carried out independently for each theme.
5. *Reliability:* The Cronbach's alpha coefficients for each of the six constructs are presented in Table 3.

Discussion

This study was the first effort to design and assess an instrument for measuring the process of food choice among adults in the sociocultural context of Iran. All the aspects and characteristics of the process of choosing food were designed according to the participants' quotes in the qualitative study and then studied in the form of items in this questionnaire. FCDQ was designed based on the social and cultural backgrounds of the Iranian society. All the psychometric phases of the instrument development including face, content, and construct validity were completely undertaken for the questionnaire. EFA was used to evaluate construct validity of the tool. Considering that the constructs obtained from the qualitative study were conceptually separate from each other, the EFA was performed by the principal component analysis using

Table 1: Main constructs and themes extracted from the qualitative study (Phase 1)

Main constructs	Themes
Food choice	Quantity of choice
	Agency in choice
	Rationality of choice
Perceived desirability	Economic feasibility
	Physical health
	Needs and satisfaction of children
Environmental and ecological characteristics	Climate conditions and seasonal considerations
	Living environment situation
Food features and characteristics	Appearance and sensory aspects of food
	Food health indicators
	Food content
Sociocultural determinants	Social norms and structures
	Ways for knowledge promotion
	Family structure
	Modernization and nutrition transition
Individual habitus and characteristics	Background and biological characters
	Childhood habitus
	Mood and mental conditions
	Food tendency and interest
	Physical activity

Table 2: Demographic details of the adults who participated in the construct validity study (*n*=722)

Continuous characteristics	Male		Female		Total	P
	No.	Mean±SD	No.	Mean±SD	Mean±SD	
Age (years)	268	43.1±9.8	454	41.6±9.1	42.1±9.4	0.03
Household size	240	3.3±1.1	433	3.4±1.1	3.4±1.1	0.1
No. of children	185	1.9±1.01	344	1.9±0.9	1.9±0.9	0.7
Duration of stay in Tehran	262	31.6±14.6	441	32.3±14.3	32±14.4	0.4
Categorical characteristics	**Male *n* (%)**		**Female *n* (%)**		**Total**	**P**
Education						<0.001
Illiterate	0 (0)		4 (0.9)		4 (0.6)	
Primary school	13 (4.9)		16 (3.5)		29 (4)	
High school	71 (26.7)		171 (37.9)		242 (33.8)	
Undergraduate	117 (44)		196 (43.5)		313 (43.7)	
Graduate	65 (24.4)		64 (14.2)		129 (18)	
Marital status						0.1
Single	50 (18.7)		70 (15.4)		120 (16.6)	
Married	213 (79.5)		360 (79.3)		573 (79.4)	
Divorced/widowed	5 (1.9)		24 (5.3)		29 (4)	

SD=Standard deviation

Promax rotation for the six constructs separately. After performing the validity and reliability steps, the FCQ comprised 60 items within six areas as shown in Table 3. Because the questionnaire was designed using the grounded theory methodology and validated in Tehran's adult society for the first time, it is a valid and reliable questionnaire to examine the determinants of food choices.

The findings of the existing studies revealed that the food choice process has many aspects such as social, cultural, economic, and individual aspects. Moreover, as observed in the literature, there also exist other aspects in relation to food choice that should be deliberated as a latent and complex concept with multiple dimensions that suggest the necessity of a multidimensional tool.[25] The only quantitative tool in the field of food choice in its general sense is the questionnaire designed by Steptoe *et al*. that has been designed over the past 20 years and developed in a different social and cultural context than the Iranian society.[16] This tool consisted of nine concepts: health, moods, convenience, sensory appeals, and natural content of food, price, weight control, familiarity, and ethical considerations. Our newly developed questionnaire contained the mentioned concepts, as well as some additional concepts, for example, organic food choice, cost-effectiveness, and agency in choice, climate condition, and seasonal consideration. The factors recognized with the factor analysis in the 60 items in this research questionnaire included organic selection, quality, cost-effectiveness, health, diversity, agency, habitus and life experiences, seasonal climatic conditions, understanding the role of traditional foods, inspiration from traditional medicine, social relations, occupational constraints, knowledge promotion, family structure, turning points in changing food habits, trajectories in food patterns, provision of children's

need and satisfaction, economic feasibility, and food health indicators. Many of these new concepts or themes were derived from the changes taken place in people's lifestyle in recent years.

Individual food systems are mental processes in which people influence food choices on how and what to eat in certain conditions.[17,26] As the "individual habitus and characters" theme was loaded with one factor including four items, it led to lower internal consistency values (equal to 0.63); however, this value was close to 0.7.[24] The lower reliability detected for the construct "environmental and ecological characteristics" consisted of two items which resulted in lower reliability (equal to 0.21). Due to the distinct subthemes of the construct "sociocultural determinants," its overall value for the construct was lower than 0.7 (equal to 0.54); however, the lower value of reliability will not certainly deny the importance of this construct. In addition, the sociocultural items of the tool were valuable from the point of view of the expert panel and research team.

The FCDQ was developed and validated using mixed-method design which permits to explore participants' views deeply. In addition, this study was conducted in the adult age group which is now a large population in Iranian society. As previously pointed out, because the items of the questionnaire were developed based on the participants' statements and experiences, they are most closely associated with the mentality of the population in the community.

Conclusions

The FCDQ is a valid and reliable tool to evaluate the determinants of food choice in adults and can be used

Table 3: Factor analysis results and item statistics of food choice dimensions in the adults (*n*=722)

Main constructs, items**	Rotated component matrix	Eigenvalue	Explained variance (%)
Food choice		3.38	22.57
Q9 - I buy organic food more than ordinary food.	0.8		
Q13 - I buy organic food to ensure they are not contaminated.	0.8		
Q22 - When choosing food, I will consider both quality and cost of food.	0.63	1.93	12.88
Q21 - To choose better foods, I reduce the cost of my life.	0.57		
Q12 - I eat foods which have health ingredients.	0.54		
Q18 - I choose high-quality foods, even if I can only buy small portions.	0.46		
Q14 - When choosing foods, I would rather include all food groups, namely, bread and rice, vegetables, meat, fruits, milk, and dairy products.	0.43		
Q19 - I try to buy cheaper types of foods.	0.69	1.29	8.59
Q20 - I use soybeans instead of meat to reduce family expenses.	0.61		
Q6 - When choosing foods, the price does not matter to me.	0.71	1.23	8.22
Q7 - While choosing high-quality foods, I do not pay attention to the price.	0.64		
Q10 - To maintain my health, I try not to overeat.	0.64	1.09	7.31
Q11 - I do not choose foods for fun.	0.52		
Q15 - I include a variety of traditional and modern foods in my diet.	0.58	1	6.67
Q16 - I use both domestic and industrial foods.	0.5		
KMO: 0.757 Bartlett's test of sphericity: 1832.69 Cumulative %: 66.26 Cronbach's alpha coefficient: 0.68			
Individual habitus and characters			
Q27 - I have learned from my mother to eat regularly since childhood.	0.64	1.83	45.74
Q26 - My taste is influenced by the family in which I grew up.	0.54		
Q28 - When I am happy, I am more motivated to follow my food interests.	0.52		
Q33 - I usually cook foods that I know how to make.	0.38		
KMO: 0.671 Bartlett's test of sphericity: 274.76 Cumulative %: 45.74 Cronbach's alpha coefficient: 0.63			
Environmental and ecological characteristics			
Q35 - Some of my food habits are related to the region where I passed my childhood.	0.34	1.12	55.99
Q36 - In summer, I consume more amount and variety of vegetables.	0.34		
KMO: 0.500 Bartlett's test of sphericity: 10.16 Cumulative %: 55.99 Cronbach's alpha coefficient: 0.21			
Sociocultural determinants			
Q41 - Traditional foods have impact on human health and well-being.	0.85	1.91	47.97
Q40 - I believe traditional foods are more nutritious.	0.84		
Q44 - I choose foods that are in agreement with my nature.	0.73	1.34	33.62
Q43 - I also pay attention to traditional medicine while choosing and preparing foods.	0.73		
KMO: 0.527 Bartlett's test of sphericity: 777.37 Cumulative %: 81.59			
Q51 - I eat more at parties, feasts, and occasions.	0.88	2.27	45.54
Q52 - I eat more kinds of foods when I am in holidays and trips.	0.75		
Q50 - I consume variety of foods and beverages at parties.	0.7		
Q48 - Because of being employed, I make simple and fast foods.	0.9	1.71	34.2
Q49 - I am not satisfied with my workplace foods but I have to eat them.	0.84		
KMO: 0.612 Bartlett's test of sphericity: 1412.92 Cumulative %: 79.74			
Q59 - Television advertisement is a way of knowing foods and food manufacturers.	0.58	1.48	49.34
Q58 - A lot of my knowledge about foods and different food recipes is obtained from television programs.	0.51		
Q60 - The Internet plays an important role in increasing food knowledge	0.38		
KMO: 0.594 Bartlett's test of sphericity: 114.47 Cumulative %: 49.34			
Q61 - If my financial situation is good, I choose more various foods.	0.53	1.28	64.25
Q65 - Being together with family members at dinner table has made dinner more important for us.	0.53		
KMO: 0.500 Bartlett's test of sphericity: 59.32 Cumulative %: 64.25			
Q74 - Changes in my diet have occurred since pregnancy (for women)*.	0.85	2.22	37.02
Q73 - Changes in my diet have occurred since I served the military service (for men)*.	0.66		
Q77 - Changes in my diet have occurred since I started working.	0.55		
Q75 - Changes in my diet have occurred after marriage.	0.23		

Contd...

Table 3: Contd...

Main constructs, items**	Rotated component matrix	Eigenvalue	Explained variance (%)
Q70 - To save time, I consume fast foods.	0.79	1.46	24.38
Q71 - I prefer to buy more outdoor foods.	0.78		
KMO: 0.573 Bartlett's test of sphericity: 1009.21 Cumulative %: 61.40			
Cronbach's alpha coefficient for sociocultural determinants: 0.54			
Perceived desirability			
Q93 - I choose fast foods due to my children's interests.	0.94	4.55	45.52
Q94 - For the sake of my children, I might choose foods despite my interests.	0.94		
Q90 - When choosing foods, I pay attention to the interest and taste of my children.	0.93		
Q91 - When choosing foods, I pay attention to my children's physical needs and health	0.93		
Q92 - I consider my food choices to prevent obesity in my children.	0.93		
Q88 - Benefits and disadvantages of foods and their impact on my health are important to me.	0.8	2.21	22.09
Q89 - By choosing simple foods, I take care of my health.	0.69		
Q87 - When choosing foods, I pay attention to my health and food restrictions.	0.65		
Q81 - The quality of foods which I choose largely depends on my family income.	0.79	1.43	14.37
Q80 - The amount of food I consume depends on my family income.	0.79		
KMO: 0.857 Bartlett's test of sphericity: 5846.11 Cumulative %: 81.99 Cronbach's alpha coefficient: 0.84			
Food features and characteristics			
Q105 - At the time of buying foods, I pay attention to expiration dates.	0.8	4.64	42.18
Q104 - It is important for me to choose foods with the quality standard mark.	0.79		
Q101 - It is important for me to choose vegetables that are not contaminated.	0.76		
Q102 - It is important for me to choose hormone-free meat and poultry.	0.61		
Q99 - At the time of choosing foods, I pay attention to their freshness.	0.55		
Q112 - Food properties are important for me.	0.53		
Q100 - I pay attention to food appearance and new packaging, especially in case of meat and poultry.	0.43		
Q96 - The color, odor, and appearance of foods, especially meat, poultry and fish, are very important for me in choosing food.	0.8	1.18	10.76
Q95 - The appearance, decoration, and stylish packaging design for foods are important for me.	0.64		
KMO: 0.871 Bartlett's test of sphericity: 2141.45 Cumulative %: 58.63 Cronbach's alpha coefficient: 0.84			

*Since these items are especially for men and women, they were discarded in the Cronbach's alpha calculation. **Sig <0.0001

to assess the main determinants of food choice for future researches and accessible to conduct similar study design in a different setting and sociocultural context.

Declaration of participants consent

The authors certify that they have obtained all appropriate consent forms. The participants understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflicts of interest

There are no conflicts of interest.

References

1. Global status report on noncommunicable diseases. World Health Organization; 2014. Report No.: 9241564857.
2. Peykari N, Hashemi H, Dinarvand R, Haji-Aghajani M, Malekzadeh R, Sadrolsadat A, *et al.* National action plan for non-communicable diseases prevention and control in Iran; A response to emerging epidemic. J Diabetes Metab Disord 2017;16:3.
3. Buttriss J, Stanner S, McKevith B, Nugent A, Kelly C, Phillips F, *et al.* A Critical Review of the Psychosocial Basis of Food Choice and Identification of Tools to Effect Positive Food Choice. London: Food Standards Agency; 2004.
4. Wądołowska L, Babicz-Zielińska E, Czarnocińska J. Food

choice models and their relation with food preferences and eating frequency in the Polish population: POFPRES study. Food Policy 2008;33:122-34.

5. Dikmen D, İnan-Eroğlu E, Göktaş Z, Barut-Uyar B, Karabulut E. Validation of a Turkish version of the food choice questionnaire. Food Quality and Preference 2016;52:81-6.

6. Cabral D, de Almeida MDV, Cunha LM. Food Choice Questionnaire in an African country—Application and validation in Cape Verde. Food Quality Preference 2017;62:90-5.

7. Eertmans A, Victoir A, Notelaers G, Vansant G, Van den Bergh O. The Food Choice Questionnaire: Factorial invariant over western urban populations? Food Quality Preference 2006;17:344-52.

8. Januszewska R, Pieniak Z, Verbeke W. Food choice questionnaire revisited in four countries. Does it still measure the same? Appetite 2011;57:94-8.

9. Fotopoulos C, Krystallis A, Vassallo M, Pagiaslis A. Food Choice Questionnaire (FCQ) revisited. Suggestions for the development of an enhanced general food motivation model. Appetite 2009;52:199-208.

10. Pieniak Z, Verbeke W, Vanhonacker F, Guerrero L, Hersleth M. Association between traditional food consumption and motives for food choice in six European countries. Appetite 2009;53:101-8.

11. Milošević J, Žeželj I, Gorton M, Barjolle D. Understanding the motives for food choice in Western Balkan Countries. Appetite 2012;58:205-14.

12. Markovina J, Stewart-Knox BJ, Rankin A, Gibney M, de Almeida MD, Fischer A, *et al.* Food4Me study: Validity and reliability of Food Choice Questionnaire in 9 European countries. Food Quality Preference 2015;45:26-32.

13. Creswell JW. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Sage Publications; 2013.

14. Creswell JW, Clark VLP. Designing and Conducting Mixed Methods Research. Wiley Online Library; 2007.

15. Corbin J, Strauss A. Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory. Sage Publications; 2014.

16. Steptoe A, Pollard TM, Wardle J. Development of a measure of the motives underlying the selection of food: The food choice questionnaire. Appetite 1995;25:267-84.

17. Furst T, Connors M, Bisogni C, Sobal J, Falk L. Food choice a conceptual model of the process. Appetite 1996;26:247-65.

18. Winter Falk L, Bisogni CA, Sobal J. Food choice processes of older adults: A qualitative investigation. J Nutr Educ 1996;28:257-65.

19. Munro BH. Statistical Methods for Health Care Research. Wolters Kluwer Health; 2005.

20. Yaghmale F. Content validity and its estimation. J Med Educ 2003;3:25-7.

21. Lawshe CH. A qualitative approach to content validity. Pers Psychol 1975;25:563-75.

22. Courtney MGR, Gordon M. Determining the number of factors to retain in EFA: Using the SPSS R-Menu v2. 0 to make more judicious estimations. Pract Assess Res Eval 2013;18:1-14.

23. Bland JM, Altman DG. Statistics notes: Cronbach's alpha. BMJ 1997;314:572.

24. George D, Mallery P. SPSS for Windows Step by Step: A Simple Guide and Reference, 11.0 atualização (4ª edição). Boston, MA: Allyn & Bacon; 2003.

25. Shepherd R. Overview of factors influencing food choice. BNF Nutr Bull 1990;15(Suppl 1):12-30.

26. Connors MM, Bisogni CA, Sobal J, Devine C. Managing values in personal food systems. Appetite 2001;36:189-200.

Appendix: Food Choice Determinants Questionnaire (FCDQ)

No.	Items	Scale
	Food choice dimension	
1	When choosing foods, their price does not matter for me.	Always □ Often □ Sometimes □ Rarely □ Never □
2	While choosing high-quality foods, I do not pay attention to price.	Always □ Often □ Sometimes □ Rarely □ Never □
3	I buy organic food more than ordinary food.	Always □ Often □ Sometimes □ Rarely □ Never □
4	To maintain my health, I try not to overeat.	Always □ Often □ Sometimes □ Rarely □ Never □
5	I do not choose foods for fun.	Always □ Often □ Sometimes □ Rarely □ Never □
6	I choose foods which have health ingredients.	Always □ Often □ Sometimes □ Rarely □ Never □
7	I buy organic food to ensure they are not contaminated.	Always □ Often □ Sometimes □ Rarely □ Never □
8	When choosing foods, I would rather include all food groups, namely, bread and rice, vegetables, meat, fruits, milk, and dairy products.	Always □ Often □ Sometimes □ Rarely □ Never □
9	I include a variety of traditional and modern foods in my diet.	Always □ Often □ Sometimes □ Rarely □ Never □
10	I use both domestic and industrial foods.	Always □ Often □ Sometimes □ Rarely □ Never □
11	I choose high-quality foods, even if I can only buy small portions.	Always □ Often □ Sometimes □ Rarely □ Never □
12	I try to buy cheaper type of foods.	Always □ Often □ Sometimes □ Rarely □ Never □
13	I use soybeans instead of meat to reduce family expenses.	Always □ Often □ Sometimes □ Rarely □ Never □
14	To choose better foods, I reduce the cost of my life.	Always □ Often □ Sometimes □ Rarely □ Never □
15	When choosing food, I will consider both quality and cost of food	Always □ Often □ Sometimes □ Rarely □ Never □
	Individual habitus and characters dimension	
16	My taste is formed from my childhood and beside my family.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
17	I have learned from my mother to eat regularly since childhood.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
18	When I am happy, I am more motivated to follow my food interests.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
19	I usually cook foods that I know how to make.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
	Environmental and ecological characteristics dimension	
20	Some of my food habits are related to the region where I passed my childhood.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
21	In summer, I consume more amount and variety of vegetables.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
	Sociocultural determinants dimension	
22	I believe traditional foods have more nutritious.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
23	Traditional foods have impact on human health and well-being.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
24	I also pay attention to traditional medicine while choosing and preparing foods.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
25	I choose foods that are agreement with my nature.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
26	Because of being employed, I make simple and fast foods.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
27	I'm not satisfied with my workplace foods but I have to eat them.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
28	I consume variety of foods and beverages at parties.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
29	I eat more at parties, feasts, and occasions.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
30	I eat more kinds of foods when I am in holidays and trips.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
31	A lot of my knowledge about foods and the different food recipes is obtained from television programs.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
32	Television advertisement is a way of knowing foods and food manufacturers.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □

Contd...

Contd....

33	The Internet plays an important role in increasing food knowledge.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
34	If my financial situation is good, I choose more various foods.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
35	Being together with family member at dinner table has made dinner more important for us.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
36	To save time, I consume fast foods.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
37	I prefer to buy more outdoor foods.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
38	Changes in my diet have occurred since I served the military Service (for men).*	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
39	Changes in my diet have occurred since pregnancy (for women).*	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
40	Changes in my diet have occurred after marriage.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
41	Changes in my diet have occurred since I started working.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □

Perceived desirability dimension

42	The amount of my selected food depends on my family income.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
43	The quality of foods which I choose largely depends on my family income.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
44	When choosing foods, I pay attention to my health and food restrictions.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
45	Benefits and disadvantages of foods and their impact on my health are important to me.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
46	By choosing simple foods, I take care of my health.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
47	When choosing the foods, I pay attention to the interest and taste of my children.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
48	When choosing foods, I pay attention to my children's physical needs and health.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
49	I consider my food choices to prevent obesity in my children.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
50	I choose fast foods due to my children's interests.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
51	For the sake of my children, I might choose foods despite my interests.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □

Food features and characteristics dimension

52	The appearance, decoration, and stylish of foods are important for me.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
53	The color, odor, and appearance of foods, especially meat, poultry and fish, are very important for me in choosing food.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
54	At the time of choosing foods, I pay attention to their freshness.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
55	I pay attention to the appearance and new packaging foods, especially in case of meat and poultry.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
56	It is important for me to choose vegetables that are not contaminated.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
57	It is important for me to choose hormone-free meat and poultry.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
58	It is important for me to choose foods with quality standard mark.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
59	At the time of buying foods, I pay attention to expiration dates.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □
60	The food properties are important for me.	Strongly agree □ Agree □ Undecided □ Disagree □ Strongly disagree □

*Since these items are especially for men and women, they were discarded in the Cronbach's alpha calculation. **Sig<0.0001