

Development and Validation of a Questionnaire to Uncover the Hidden Motivations Behind Adult Food Choices

Pengembangan dan Validasi Kuesioner untuk Mengungkap Motivasi Tersembunyi di Balik Pilihan Makanan pada Orang Dewasa

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Abstract: *The Covid-19 pandemic has changed the eating pattern and reasons for choosing foods among adults. To consider this change, we, therefore, adapted the original Food Choice Questionnaire (FCQ) before using it in the community. A cross-sectional study was conducted among 64 adults aged 35-64 years from December 2020 to January 2021 in Jakarta. Principal component analysis (PCA) was performed to reduce items in the original instrument with 36 questions. The Keiser Meyer Olkin (KMO) value must meet the value >0.5 to assess the feasibility of factor analysis. Question items included in the final FCQ shall have an anti-image value > 0.5 and a loading factor value > 0.4. Four focus group discussions (40 adults) were also performed to help confirm the question commonly mentioned by the subjects. Internal consistency of the scale was evaluated using Cronbach's alpha. A criteria for Cronbach's alpha was selected as 0.60. Test-retest reliability was examined by intraclass correlation coefficient (ICC). The KMO and MSA value from 36 questions met the expected criteria. We removed 16 questions that did not meet the anti-image values and the loading factor criteria from the original version of FCQ. Two questions about maintaining body weight and low-fat intake were confirmed from the FGD. The final item questions consisted of four components, namely (1) Mood and convenience, (2) Health and ethical concern, (3) Price and natural content, (4) Sensory appeal and Familiarity, weight control components. Internal validity and reliability testing showed that the adapted FCQ was valid and reliable to assess the food choice motive among adults. To conclude, the adapted FCQ for adults living in Jakarta during the Covid-19 pandemic comprised of a shorter list of 18 questions with good internal validity and reliability and can be used as a tool to assess food choice motives among adults living in Jakarta.*

Key words: Adult eating behavior, Food choice, Questionnaire validation, Dietary behavior assessment

1. INTRODUCTION

The novel coronavirus (Covid-19) that emerged in Wuhan in 2019 spread rapidly throughout the world, killing 1.4 million people. (1) Total deaths due to Covid-19 in Indonesia reached approximately 160,000 people. Increasingly, the number of cases due to Covid-19 continues to grow. (2) To cope with the increase in cases due to Covid-19 and reduce the spread of the virus, the Indonesian government then implemented a policy to conduct social distancing throughout the region since March 2020. (3) Restriction on outdoor activities have an impact on changes in physical activity and eating habit that affects health and can cause nutritional issues, as well as raise the risk of noncommunicable diseases and worsen Covid-19 disease. The period of the Covid-

19 pandemic may have modified the existing determinant during this period, as well as a negative impact on psychological well-being. People experience several stressors, such as increased anxiety, depressive mood, frustration, and family financial loss. These lifestyle changes can increase the risk of obesity, hypertension, obesity and other metabolic syndromes.(4) These psychological changes caused changes in lifestyle such as sedentary behavior, disturbed sleep, and difficulty maintaining a healthy lifestyle; such as dietary habits including making wrong food choices.(1,5,6) Recently, some researches have indicated around the world that aim to analyze in detail how people's food habits and lives have altered during social restrictions, with the majority of them demonstrating overall tendencies toward the adoption of unhealthy eating habits and worse lifestyles. Food choice motives are important factors that influence people's decisions about which foods to eat, which could be difficult. It necessitates some sort of process in selecting food in various settings and is influenced by such motivations. When deciding to consume food, people not only consider nutrition content, but also many other aspects such as appearance, lifestyle, improving mood and other aspects.(7) According to Steptoe (1995), two major factors influence an individual's food choice: individuals and environmental factors. Steptoe describes the two factors into nine dimensions, namely health, mood, natural content, ethical concern, familiarity, weight control, convenience, price, and sensory appeal.(8) The health aspect includes chronic disease prevention (e.g., high fiber, vitamins, and minerals) and other general nutrients. During the Covid-19 pandemic, people are more concerned with consuming food high in fiber, vitamins, and minerals, or keeping healthy.(8,9)

The mood scale includes general awareness and mood elements and relaxation and stress management. Stress and hectic schedules caused by working at home may have influenced the selection of foods with calming and comforting properties. Previous research has found that pandemics cause chronic stress, which is linked to palatable food consumption, binge eating, increased frequency of eating, and emotional eating.(8,10) Reduced mobility caused by large-scale social restrictions can affect reduced physical activity, thereby increasing the risk of weight gain, Reduced mobility caused by large-scale social restrictions can affect reduced physical activity thereby increasing the risk of weight gain, thus making the item of maintaining weight become one of the factors that are considered enough before consuming food.(3) Price is the most important factor when deciding what food to eat, notably during a pandemic. Financial burdens caused by pandemic-related job losses may necessitate more affordable food options, encouraging consumers to cut back on food purchases and save money.(11) According to the existing literature, in the absence of a measurement tool to provide a more accurate assessment of food choice motivation among adults in Indonesia. So that, to explore the most considered reason to choose food during this pandemic, we therefore, adapted the original Food Choice Questionnaire (FCQ) before using it in the community. Therefore, the aim of this study was to develop and validate a shorter adapted version of the FCQ for use among adults in Jakarta during the Covid-19 pandemic.

2. METHODS

Study design and participants

This cross-sectional study was conducted among 64 adults aged 35 – 64 years old living in Jakarta. The study took place from December 2020 to January 2021. The study was approved by the Institutional Ethics Committee, Faculty of Medicine, Universitas Indonesia. The area was chosen by using multistage random sampling, and the subjects were determined using simple random sampling.

Pre-Testing of Food Choice Questionnaire

This study consists of two phases, by asking structured questionnaires and conducting a focus group discussion (FGD). The original version of the Food Choice Questionnaire (FCQ) was asked to 64 adults in all administrative cities in DKI Jakarta. The second phase was conducted to confirm what motives that commonly mention by the subjects and support the statistical analysis result. FGD is held to 5 focus group discussions (one per administrative city) of adults in each administrative city in Jakarta, consisting of 40 subjects. The Indonesian version of the FCQ, translated by Puspadewi et al (2014) which was applied in Bogor, was used. The original FCQ comprised of 36 items in 9 dimensions, and in this study, we use a 7-point Likert scale (1= not at all important to 7= very important). The FCQ analysis was used to determine the motive for choosing food by adding the values of each statement based on the dimensions of food choice motives, which are health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity, and ethical concern. The other parts of the questionnaire were reserved for questions about sociodemographic characteristics such as age, gender, level of education, and occupational status. This research has been approved by the Ethics Committee of the Universitas Indonesia. All respondents who live in Jakarta were informed about the aim of the study and were asked to sign an informed consent. After they were agreeing to participate in the study, the respondents were asked the FCQ. The Covid-19 screening questions also will be asked to the respondent to prevent the spreading of Covid-19 viruses. All the questionnaires were conducted by face-to-face and pen and paper-based survey asked by trained enumerators. Focused group discussions were conducted among 8 – 10 participants in each sub-district. Sampling was purposeful, so the participants were included from a variety of socioeconomic backgrounds. A moderator led each focus group, who was assisted by a member of the research steering committee. The discussions were tape-recorded and transcribed verbatim. The moderator asked a series of open-ended questions about their considerations or reasons were in choosing the foods they would consume, but participants were encouraged to explore issues about food choices that were important for them. The discussions lasted one to two hours and were held in a convenient location for the participants. Then we collect the answer of the participants to support the statistical analysis.

Data analysis

Statistical analysis was performed using IBM SPSS statistic version 23.0. Factor analysis was used to reduce items in the original questionnaire. Kaiser Mayer Olkin (KMO) and Bartlett test of Sphericity or Measure Sampling Adequacy (MSA) aims to measure the sampling of the population thoroughly for each indicator. The KMO and MSA should fulfill the value by >0.5 . The item question with the anti-image value of MSA less than 0.5 will be deleted.(12) The result on FGD will be used if there were some items in the statistical result that did not meet the criteria, but the items were commonly mentioned by the participants in the FGD. The items will be included in the adapted questionnaire. Internal consistency of the scale was evaluated using Cronbach's alpha. A criteria for Cronbach's alpha was selected as 0.60. Test-retest reliability was examined by intraclass correlation coefficient (ICC). $ICC > 0.80$ indicates excellent test-retest agreement.(12) Principal component analysis (PCA) was also performed to identify the underlying factor structure of the adapted FCQ. The test-retest was conducted with a two-week interval between the initial administration and the retest, in which the same respondents completed the questionnaire again under the same conditions to assess the stability of the instrument over time.

3. RESULTS

Demographic characteristics of the participants are shown in Table.1 Majority respondents were female, 42.2% were aged 35 – 44 years old, 85,9% were married, 57.9% had middle education, and 65.6% were housewives. The results of the factor analysis based on Table.2, the Value of Kaiser-Meyer-Olkin Measure Sampling Adequacy (KMO-MSA) are >0.5, show that the number of samples used in this study has been sufficient for a minimum value and bartlett's Test of Sphericity value <0.05, so that further analysis can be done. Based on the anti-image, several items have an anti-image correlation value <0.5, namely (1) low in calories, (2) not expensive, (3) low in fat, (4) cheers me up, (5) comes from countries I approve of politically (6) like the food I ate when I was a child, (7) looks nice, (8) helps me relax, (9) keeps me healthy, (10) good for my skin/teeth/hair/ nails, etc and (11) Is what I usually eat. All these items were excluded from the analysis because they did not meet the requirements of their anti-image correlation values.

After removing several items, there are four components which present in Table.3, each of which contains 18 FCQ question items with a loading factor greater than 0.4. Component 1 consists of four-item questions about convenience and mood, component 2 consists of six item questions about health and ethical concern, component 3 consists of five-item questions about natural content and price, component 4 consists of questions about the sensory appeal, and questions about familiarity. Component 1 can explain the variable food choice motives as much as 30.4%, together with component 2, they can explain about 60% of the food choice motives variable. The new four components of the adapted FCQ can explain about 81% of the variables

Table 1. Demographic Characteristics of Adults Aged 35 – 64 Years old in Jakarta (n=64)

Characteristics	n	(%)
Gender		
Male	13	20.3
Female	51	79.7
Age (years)		
35 – 44	27	42.2
45 – 54	18	28.1
55 – 64	19	29.7
Marital Status		
Single	2	3.1
Married	55	85.9
Widow/Widower	7	11.0
Educational Attainment		
Primary ¹	22	17.2
Secondary ²	37	57.9
Higher ³	5	7.8
Occupations		

Characteristics	n	(%)
Housewife	42	65.6
Entrepreneur/trader	15	23,4
Others ⁴	7	10.9

¹ Primary education included not school, not graduated from elementary school, and graduated from elementary school

² Secondary education had graduated from junior and senior high school

³ Higher education included undergraduate and postgraduate

⁴ Other Occupations included private employee, labourer, urban village administrator officer and cadre

Table 2. KMO and Bartlett's test in 9 dimension of Food Choice Questionnaire Pre-testing

Dimension of FCQ	KMO measure of sampling adequacy	Bartlett's test of sphericity		
		Approx. Chi-square	df	Sig.
Health	0.70	49.5	10	<0.001**
Mood	0.63	97.1	15	<0.001**
Sensory Appeal	0.56	13.8	6	0.032*
Convenience	0.54	27.3	10	0.002*
Natural Content	0.57	4.4	3	0.022*
Weight Control	0.55	32.6	3	<0.001**
Price	0.51	10.3	3	0.016*
Familiarity	0.58	6.4	3	0.009*
Ethical Concern	0.57	20.9	3	<0.001**

*Significance level at p-value <0.05, ** Significance level at p-value <0.001

Table 3. Rotated Component Matrix of adapted FCQ

Item Question	Component			
	1	2	3	4
Cheers me up	0.778			
Makes me feel good	0.631			
Helps me to cope with life	0.514			
Can be bought in shops close to where I live or work	0.497			
Takes no time to prepare	0.484			
Can be cooked very simply	0.402			
Has the country of origin clearly marked		0.701		
High in fibres and roughage		0.629		
High protein		0.597		
Keep me healthy		0.544		
Contains natural ingredients			0.709	
Good value for money			0.634	
Contains no artificial ingredients			0.617	
Cheap			0.569	
Contain no additives			0.514	

Item Question	Component			
	1	2	3	4
Tastes good				0.544
Familiar				0.605
Is what I usually eat				0.416

Keyser Meyer Olkin (KMO) values >0.05 ; Bartlett's Test <0.00 ; Factor Loadings ≥ 0.40 were included in this patterns

Four key factors influenced adults' decisions in consuming food. Although the answers expressed by each participant were diverse, they also shared some of the same answers. Although the participants consisted of housewives and workers most of them chose simple and fast food in their presentation, to save their time and energy. Most participants prefer foods that are easy to serve and do not need a long time in processing. "I prefer food that is easy to cook, because there is a lot of work to be done..."

In addition, factors that were also highly considered by the participants in choosing foods were foods that were low in fat. They assume that foods that are low in fat can prevent an increase in blood cholesterol levels. "Compared to foods containing coconut milk, I prefer clear-steamed foods, because I'm afraid that my cholesterol levels will increase." Another consideration that many participants expressed was choosing foods that can maintain their weight so that they do not increase quickly. This reason is generally stated by female participants. "... Yes, I am now reducing the consumption of fried foods, because I am afraid that my weight will increase, because I tend to have difficulty losing my weight"

In addition to health reasons, other reasons are widely stated by participants, namely considering the taste of food. They say that in addition to being healthy, the taste of food is also very important to them. "... If it's healthy but it doesn't taste good, I'm not interested in eating the food either." "If I'm told to choose healthy or good food, it looks like I'll have more good food."

Of the four most factors found from the results of focus group discussion, the reason for the fast presentation time and good taste in accordance with the results of statistical analysis that has been done before. Different results were found on low-fat reasons and weight control reasons were not statistically significant, but through qualitative approaches in the field, this reason is one of the factors that adults consider. So, we added these two factors into the adapted FCQ. These two question items are added to one other component, the weight control component.

Finally, after being combined with FGD results, there are 18 questions grouped into 4 components in this adapted FCQ. Internal validity and intraclass correlation coefficient (ICC) in Table.5 shows the values were higher than 0.6 and can be classified as valid and test-retest reliability test result were higher than 0.6, which indicate the new adapted FCQ have moderate reliability. According to established psychometric standards, Cronbach's alpha values of 0.60–0.69 are considered acceptable, 0.70–0.79 are good, and values above 0.80 are excellent. The Cronbach's alpha values in this study ranged from 0.636 to 0.754, which meet the acceptable to good threshold and exceed the minimum criterion of 0.60 set for this study. Regarding test-retest reliability, ICC values above 0.75 are generally considered good to excellent agreement. The ICC values in this study ranged from 0.656 to 0.789, indicating moderate to good reliability across all four components, which is consistent with the standards for questionnaire instruments used in similar validation studies

Table 5. Internal validity, test-retest reliability of the adopted FCQ

Components	Cronbach's α	Test-retest reliability ICC	p-value
Mood and Convenience	0.721	0.734	<0.001
Health and Ethical concern	0.754	0.789	<0.001
Price and Natural content	0.636	0.656	<0.001
Sensory appeal and Familiarity	0.711	0.666	<0.001

4. DISCUSSION

Current study found that of 36 question items in the original version of FCQ developed by Steptoe et al (1995), there were 18 question items that could address the reasons for food selection in adults during the covid-19 pandemic. Some of these questions are grouped into four components consisting of (1) Mood and convenience, (2) Health and ethical concern, (3) Price and natural content, (4) Sensory appeal and Familiarity, weight control components. Internal validity and test-retest reliability of adapted FCQ show that there is a strong correlation between items (>0.6).

The study found that during this pandemic, people considered four aspects of health before deciding on choosing the foods they would consume, namely nutritious foods, high in fibres and roughage, high in protein and foods that could make them healthier. Increasing the consumption of fruit and vegetable during pandemic was found in Lampung and Samarinda based in the former study.(3,15) The health aspect includes chronic disease prevention (e.g, high protein, fibres, vitamins and minerals) and other general nutrients.(16) These findings are in line with the former study conducted by Glabska et al in 2020 that found during the Covid-19 pandemic, people are more concerned about selecting food based on health, notably high in fiber, vitamin, and minerals, or keeping healthy.(9) Similar result also shown on the study conducted in Spanish, fresh vegetables were purchased in greater quantities and people are likely perceived to be healthier during pandemic. The consumption of fruit, vegetables, and legumes was reported to increase by 25% of the population and a decrease in butter and margarine use during the lockdown period. (17,18) Different results were found in adults in France whose consumption of high-fiber foods decreased, but there was an increase in consumption of snacks and frozen foods.(19) These findings imply that the health dimension of the adapted FCQ is particularly relevant in the context of the Covid-19 pandemic in Indonesia, and that public health interventions should prioritize promoting awareness of nutritious food choices to support immune function and overall health during periods of social restriction. The mood scale includes elements of general awareness and mood, as well as relaxation and stress management. In the adapted FCQ, mood aspect such as helps to cope with life and makes me feel good were included. Concerns about mood and body weight have arisen because of the food-related changes observed in relation to the mandatory change in lifestyles (staying at home or not being allowed to exercise outside).(18) Stress and hectic schedules caused by working conditions may be reasons why foods with calming and comforting properties were chosen.(20) Pandemics have been linked to the consumption of appetizing foods, binge eating, increased frequency of eating, and emotional eating among women according to previous study.(10)

Simultaneously, for weight control as a determinant of food choices during the COVID-19 pandemic, all the evaluated items, including those associated with fat content and weight control potential, were declared more important. One of the consequences of quarantine during this pandemic is weight gain. According to previous research, respondents in Lampung increased their eating consumption by 43.5% and their snack consumption by 51.8% in 2020.(3) Item question related fat content become one of the factors considered by adults, especially women because the prevalence of dyslipidemia is higher in women compared to men, which is 20.7% and 6.8%.(21) Other studies have discovered elevated triglyceride and LDL levels during pandemics caused by stress factors that emerge during lockdowns.(22) Convenience is also a major consideration; of the five question items in the original version of the FCQ, three are included in the FCQ that have been adapted, namely (1) can be bought in shops close to where I live or work, (2) Takes no time to prepare and (3) can be cooked very simply. This is an important consideration because, during the Covid-19 situation, daily routines have changed significantly because of the pandemic, many people are working from home and discovering that it takes longer than expected. Choosing and preparing food can be difficult for these people, especially if it is now required three or more times per day. The solution to this quandary is to eat foods that are easy to prepare.(11)

Price is also an important factor in determining food choice, particularly among the low-income population. Financial burdens resulting from pandemic-related job losses and shut-downs may involve more affordable food options, encouraging consumers to reduce food purchases and save money during the pandemic.(11) On contrary, people tend to bought more expensive food during pandemic to increase their diet quality based on study conducted in France during the lockdown.(6) Item question about sensory appeal that include in adapted FCQ is about the taste of the food. The taste of food is one of the factors considered related to good food can improve mood and as a cope to reduce the stress caused during this pandemic. Similar determinants have been identified by adult populations in various studies; for example, manufacturing workers in Brazil identified sensory appeal and price as the most important determinants.(23) On Canales' study, which was conducted on a group of Spanish high school students, found that adolescents chose their food based on sensory appeal and price.(24) Adults from Polish revealed that sensory appeal perceived as less important during the Covid-19 pandemic than before.

Understanding the factors that influence food choice may help to promote the consumption of healthy foods and a healthy lifestyle, especially among adults. Another issue that must be addressed, particularly in terms of necessary national policies, is the possibility that changes observed in food choice determinants will be sustained or only temporary in the future. Without further investigation following the Covid -19 pandemic, we will not be able to determine whether this global crisis will permanently alter the general approach, as well as the individual values and priorities of populations. Although the current study provided novel information about food choice determinants in an adult's population during the Covid-19 pandemic, some limitations must be highlighted. The study was only conducted in one area of the country, and while it provided detailed information about that population, it should be replicated throughout the country. At the same time, it is critical to examine food choice determinants in representative groups, and while the current study included a greater proportion of females than males, this may have influenced the representativeness of the studied group. Further research needs to be done to determine the validity of the FCQ with the same and the other age groups such as adolescents and elderly people.

5. CONCLUSION

The adapted FCQ for adults living in Jakarta during Covid-19 pandemic comprised of 18 questions. According to the findings of this study based on internal validity and test-retest ICC, this tool is acceptable and could be used to assess the reasons for food choice among adults in Jakarta during the COVID-19 pandemic.

CONFLICT OF INTEREST

The authors declare that there were no conflicts of interest in this study.

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