



NUTRITION CONSUMPTION FREQUENCIES SCALE OF CHANGE: VALIDITY AND RELIABILITY STUDY

Burhan BAŞARAN¹, Hilal PEKMEZCİ^{2*}

¹Recep Tayyip Erdoğan University, Ardesen Vocational School, 53100, Rize, Turkey

²Recep Tayyip Erdoğan University, Health Care Services Vocational School, 53100, Rize, Turkey

Abstract: The purpose of this study is to develop a scale that could evaluate the change in nutrition consumption frequencies of individuals' scientifically in disease, natural disaster and private situations and to gain it to literature by conducting validity and reliability studies of this scale. In this context, an application has been made relating with COVID-19 pandemic period which we are still living through and 3107 individuals having different demographic features (gender, marital status, age, educational status, etc.) have participated in the research. First of all literature has been reviewed and a likert type of sketch scale has been prepared. Afterwards by getting the opinion of 11 experts, context validity works have been conducted. Exploratory Factor Analysis and Confirmatory Factor Analysis were applied for structural validity. Finally, the reliability of the scale was examined by test-retest and internal consistency coefficient. The scale, which consisted of a 47-item nutrition list at the beginning, has been updated as 10 sub-dimensions and 34 items after analysis. The general Cronbach's Alpha (α) reliability coefficient of the scale was calculated as $\alpha=0.722$ (very reliable). It was concluded that the scale being prepared in the light of all these analyzes was a valid and reliable measurement tool for determining the change in the frequency of nutrition consumption of individuals. The scale can be jointly used in situations of chronic diseases such as cancer, Parkinson, diabetes, obesity, infectious diseases such as COVID-19, AIDS, swine flu, bird flu, natural disasters such as earthquakes, floods, and private situations such as pregnancy, breastfeeding, and disability.

Keywords: Nutrition, Food consumption frequency, Scale, COVID-19, Cancer

*Corresponding author: Recep Tayyip Erdoğan University, Health Care Services Vocational School, 53100, Rize, Turkey

E mail: hilalpekmezci@hotmail.com (H. PEKMEZCİ)

Burhan BAŞARAN  <https://orcid.org/0000-0001-6506-6113>

Hilal PEKMEZCİ  <https://orcid.org/0000-0003-2157-4014>

Received: July 12, 2021

Accepted: September 13, 2021

Published: January 01, 2022

Cite as: Başaran B, Pekmezci H. 2022. Nutrition consumption frequencies scale of change: validity and reliability study. BSJ Health Sci, 5(1): 9-17.

1. Introduction

Fundamental purpose of health policies is to ensure that each individual comprising the community lives a healthy life. In this context, in order to develop various policies, it is required for the state, private sector and every individual who make up the society to act together and the subject should be addressed with a holistic perspective. It is accepted by all segments of the society nowadays that positive changes in individual lifestyles such as sports and nutrition, besides the increase in the number of hospitals and service quality and the developments in early diagnosis studies, are very important in being healthy and having protection against diseases.

In the Turkish Nutrition Guide, nutrition has been defined as "a conscious behavior to take the nutrients needed by the body in sufficient amounts and at appropriate times in order to protect and improve health and to increase the quality of life". Deficient or imbalanced intake of nutrition elements can cause for various health problems to arise (TNG, 2015). Having nutrition is an action that can change not only according to the demographic characteristics, beliefs, culture or geographical conditions of the individuals, but also as per the psychological state they are in. (Rodríguez-Martín

and Meule, 2015). In this respect, literature information relating with certain private cases that can cause changes in nutrition consumption frequencies of individuals by affecting their physiological or psychological state are given below.

For example, cancer is one of the most important communal health problems in our age. Cancer, which ranks as second after cardiovascular diseases among the causes of death today, is predicted to rise to the first row in year 2040 and there will be nearly 29.5 million new cancer cases. (Ritchie and Rose, 2020, IARC, 2020). Demark-Wahnefried et al. (2005) have defined cancer diagnosis as a 'teachable moment' to motivate individuals to make behavioral changes in order to improve their health and well-being. After the diagnosis of cancer, many researchers have expressed that significant changes occurred in the nutritional habits of individuals compared to the pre-diagnosis, whereas individuals avoided risky eating habits (such as reduction in consumption of red meat and products, bread, salt, sugary foods, avoiding consumption characteristics such as grilling, frying, etc.) and they revealed a positive tendency in their nutrition intake (such as an increase in the consumption of fruits, vegetables, whole grains) in order to both contribute to the treatment process and



reduce the risk of recurrence. (Brennan et al., 2017; Gavazzi et al., 2018; Rinninella et al. 2020; Shi et al., 2020). On the other hand, following applications such as chemotherapy, malnutrition can also be seen in patients due to symptoms such as anorexia, nausea-vomiting, fatigue and mucositis, and the individual has to make a forced change in their eating habits. (Galindo et al., 2017).

One of the factors influencing physiological state of individuals, depending on gender, is related with pregnancy and breast-feeding. Pregnancy is a delicate condition in which fetal growth is added to the current metabolism pattern of the individual. Breastfeeding is a physiological event required for the growth and development of the baby (TNG, 2015). During pregnancy process, immune system gets suppressed and mother's defense mechanism against diseases is weakened. (Sherer et al., 2017; Dong et al., 2019). Sufficient intake of energy and nutrients during pregnancy supports mother's immune system and also reduces risk of premature birth, late birth, intrauterine fetal growth, low birth weight and chronic diseases that may occur in the later stages of the baby. (Davis et al., 2015; Blumfield et al., 2015). On the contrary, feeding with a high-calorie diet during pregnancy period gives rise to problems of excess weight and obesity, hence causing deterioration in the health of the mother and fetus. (Poston et al., 2016, Morrison and Regnault, 2016) Energy and nutrient needs during breastfeeding are higher than during pregnancy period. (Sparling et al., 2017; Pudjirahaju et al., 2018). Because breast milk consists of the mother's available nutrition stores and consumed nutrition (Innis, 2014; Segura et al., 2016). During this period, the mother adopts a special diet according to her own needs and the development of her baby. (Jeong et al., 2017). Pregnancy and breastfeeding are also among the most stressful periods of women. (Ferguson et al., 2019; Xiao et al., 2020).

COVID-19 which has come out in Wuhan/China in December 2019 and which is announced to be a global pandemic by WHO on 11th of March, 2020 continues to threaten the countries, health systems and communities. In this period, it is emphasized by experts in written and visual media that it bears critical importance for individuals to take their own protection measures and to have a strong immune system to be able to protect against pandemic. Many researchers also stated that sufficient and balanced nutrition, physical activity and regular sleep will strengthen the immune system, and that strong immune system will create an important barrier against catching the epidemics caused by viruses including COVID-19, and will contribute to the achievement of better clinical results by increasing the effectiveness of the treatment. (Singer et al., 2019; Barazzoni et al., 2020; Zhang and Liu, 2020; Wang et al., 2020; WHO, 2020). Hence, individuals are more interested in nutrition that will strengthen their immune systems during epidemic periods. Another situation that

should be considered during the epidemic period is the effect of quarantine conditions on the psychology of individuals and their access to food. It was stated that intake of macro-nutrients containing more carbohydrates, fats and proteins will increase in such periods but that there may be restrictions in their access to fresh fruits and vegetables, as a result of which there may be problems relating with having sufficient and balanced nutrition, due to which they may prefer to consume nutritional supplements. (Moynihan et al., 2015; Caccialanza et al. 2020; WHO, 2020).

Individuals can demonstrate different positive/negative attitudes and behaviors in relation to their nutrition habits depending on reflection of preferences originating from demographical aspects with the psychological and physiological impact caused by each condition defined above. When the literature is examined, it has been observed that in case of many diseases, there are specific scales for the diet of that disease, but in case of chronic diseases such as cancer, Parkinson's, diabetes, obesity, infectious diseases such as COVID-19, AIDS, swine flu, bird flu, natural disasters such as earthquakes, floods, and private situations such as pregnancy, breastfeeding and disability, a comprehensive scale that can be used jointly could not be found. The aim of this study is to develop a scale that can scientifically evaluate the change in the frequency of nutrition consumption of individuals in incidents of diseases, natural disasters and private situations and to gain this scale to literature by carrying out validity and reliability studies.

2. Material and Methods

2.1. Study on "Nutrition Consumption Frequencies Scale of Change"

Preparation of a draft scale form: Within context of scale development study, a draft form containing 2 sections has been prepared. First section consists of information for the purpose of the study and questions to determine the demographic characteristics of the individual, whereas the second section consists of questions about determining the change in the frequency of food consumption of individuals in special circumstances (chronic / infectious disease, natural disaster, pregnancy, breastfeeding). Nutrition stated in second section have been selected from the nutrition defined in Turkish Nutrition Guide (TNG, 2015) and Turkish Nutrition and Health (TNG, 2015) report, as being known to be the nutrition which are consumed in daily lives. In this context, a list of 47 items was prepared. Nutrition consumption frequencies have been defined in the form of 5 likerts as follows: "I don't consume", "Frequently (1+ per day)", "Generally (1+ per week)", "Occasionally (1+ per month)" and "Rare (1+ per year)".

Context validity: Opinion of experts was obtained with regards to context validity of content. Davis (1992) technique was used to evaluate expert opinions. A minimum of 3 and a maximum of 20 experts are recommended in this technique. In Davis technique,

expert opinions are graded in the form of a quartet comprised of: "(a) Very suitable", "(b) Appropriate but small changes are needed", "(c) It needs to be brought into proper shape", "(d) Not suitable". In this technique, number of experts who mark (a) and (b) options is divided by the total number of experts in order to obtain the "content validity index (CVI)" for the item.

Pilot study (Pre-trial): In this part of the study, the opinions of 50 participants were taken to investigate the inclusiveness of the Items in the draft scale form and to detect errors.

Collection of data: Draft scale form being prepared in order to determine the scale's reliability and validity, has been applied to individuals who have participated in our research between 15th of March -15th of May, 2020 in Turkey, as volunteers who have not been diagnosed with COVID-19, being older than 12 years and having ability to understand form of expression and comprising different demographic characteristics. In order to obtain data relating with period before the COVID 19 epidemic, backward reminder method has been used. In this context, electronic questionnaire has been prepared and data have been collected by sharing the link (https://sites.google.com/erdogan.edu.tr/kovid19salgini_beslenme/) with the public.

Analysis of data: By transferring the study data into IBM SPSS Statistics 23 (Armonk, New York U.S.A) and IBM SPSS Amos 21 (Meadville, PA U.S.A) programs, analysis have been completed. Analysis process of the research data has been examined under three headings. First of all, the content validity of the scale to be developed in the

study has been examined. In the second stage, the data set consisting of 3107 people has been divided into two and Exploratory Factor Analysis (EFA) was applied to the data of 1500 people being randomly selected. Data relating with the remaining 1607 people have been analyzed by using Confirmatory Factor Analysis (CFA). Reliability of the scale being formed as a result of CFA has been analyzed by test-retest and Cronbach's alpha internal consistency coefficient.

3. Results and Discussion

First implementation of the scale prepared within the scope of the research was carried out to determine whether there was a change in the frequency of nutrition consumption of individuals before and during the COVID-19 outbreak or not. In this context, 3107 people participated in the research.

3.1. Context Validity

An Expert Opinion Form has been prepared in order to evaluate the context validity of the "Nutrition Consumption Frequencies Scale" and 11 expert (food engineer and dietitian) opinions were received. Experts examined the items in the scale in terms of understandability, serving the purpose, being differentiated and cultural appropriateness and they evaluated each item in the form of: "(a) Very appropriate", "(b) Appropriate but small changes required", "(c) It should be brought into the appropriate shape", "(d) Not suitable" and they have expressed their opinions and CGI was calculated (Table 1).

Table 1. Distribution of expert opinions and obtaining context validity indexes

Item No	(d) Not appropriate	(c) Requires to be made appropriate	(b) Appropriate but small changes are required	(a) Highly appropriate	CVI
Item 1	-	-	2	9	1.00
Item 2	-	-	2	9	1.00
Item 3	-	1	1	9	0.91
Item 4	1	-	-	10	0.91
Item 5	-	1	4	6	0.91
Item 6	-	-	-	-	1.00
Item 7	-	1	1	9	0.91
Item 8	-	1	-	10	0.91
Item 9	-	2	3	6	0.82
Item 10	-	1	-	10	0.91
Item 11	-	1	1	9	0.91
Item 12	-	1	-	10	0.91
Item 13	-	1	2	8	0.91
Item 14	-	1	-	10	0.91
Item 15	-	1	4	6	0.91
Item 16	-	1	3	7	0.91
Item 17	-	1	-	10	0.91
Item 18	-	2	3	6	0.82
Item 19	-	1	-	10	0.91
Item 20	-	1	-	10	0.91
Item 21	-	1	1	9	0.91
Item 22	-	-	-	11	1.00

Table 1. Distribution of expert opinions and obtaining context validity indexes (continue)

Item No	(d) Not appropriate	(c) Requires to be made appropriate	(b) Appropriate but small changes are required	(a) Highly appropriate	CVI
Item 23	-	-	-	11	1.00
Item 24	-	-	-	11	1.00
Item 25	-	-	-	11	1.00
Item 26	-	1	-	10	0.91
Item 27*	-	3	3	5	0.73
Item 28*	-	3	2	6	0.73
Item 29	-	1	1	9	0.91
Item 30	-	-	-	11	1.00
Item 31	-	-	-	11	1.00
Item 32	-	-	-	11	1.00
Item 33	-	-	-	11	1.00
Item 34	-	1	1	9	0.91
Item 35	1	-	2	8	0.91
Item 36	-	2	3	6	0.82
Item 37	1	1	4	5	0.82
Item 38	-	1	-	10	0.91
Item 39	-	-	-	11	1.00
Item 40	-	1	2	8	0.91
Item 41	-	1	2	8	0.91
Item 42	-	1	2	8	0.91
Item 43	-	1	3	7	0.91
Item 44	-	2	2	7	0.82
Item 45	-	2	2	7	0.82
Item 46	1	1	2	7	0.82
Item 47*	1	2	2	6	0.73

CVI= context validity index, *items excluded from scale.

In Davis (1992) technique, if the CVI value is greater than 0.80, it means that the item is sufficient in terms of context validity, but if it is less than 0.80, these items should be excluded from the study. When Table 1 is examined, it is seen that the context validity rates of 3 items have been calculated below 0.80 (0.73), and context validity rates for the remaining items have been calculated between 0.80-1. Accordingly, the items excluded from the scale were identified as being Item 27 (canned foods), Item 28 (pickled foods) and Item 47 (beta glucan nutritional supplement). Besides, necessary arrangements have been made to make articles 7, 18, 21 and 36 become more understandable. By excluding the 3 items from the scale, it can be stated that the remaining 44 items are suitable for Turkish culture, and that they represent the area to be measured, and that the context validity is ensured.

3.2. Pilot Study (Pre-trial)

To be able to evaluate the understandability of the scale, whose language and context validity studies have been completed, a pilot study was realized on a group of 50 people who have the characteristics of the sample group and were not included in the study. After the pilot application, it was seen that the "Nutrition Consumption Frequencies Scale of Change" was understandable and the scale was given its final form.

3.3. Structural Validity

3.3.1. Exploratory factor analysis (EFA)

Conformity of the scale data for homogeneous and factor analysis has been examined using the Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett's sphericity test. Exploratory factor analysis results of the scale are shown in Table 2.

Table 2. KMO value of the scale and Bartlett's test of sphericity results

Kaiser Meyer Olkin (KMO)		0,783
Bartlett Sphericity Test	χ^2	10311.250
	SD	561
	P	0.000

If KMO value is above 0.50 it is considered as an "acceptable" sample size, if it is between 0.50-0.70 it is considered as "normal", if it is between 0.70-0.80 it is considered as "good", if it is between 0.80-0.90, it is considered as "very good" and if it is greater than 0.90, it is interpreted as a "perfect" sample size (Kaiser, 1974). When Table 2 is examined, it is seen that KMO value is calculated as 0.783 being "good". As a result of the Bartlett Sphericity test, it was concluded that there were significantly high relationships between variables and that the data were convenient for factor analysis (P <

0.001).

Factor loadings and explanatory ratios of 44 items in the scale were determined using Principal Component method and Varimax rotation method, which is a type of orthogonal rotation (Table 3, Table 4).

Scale consisting of 44 items, was divided into 10 sub-dimensions as a result of EFA analysis. When Table 3 is examined it is seen that Factor 1 explains 10.88% of total variance, Factor 2 explains 6.18% of total variance,

Factor 3 explains 6.14% of total variance, Factor 4 explains 5.57% of total variance, Factor 5 explains 4% of total variance. Factor 6 explains 4.86% of the total variance, Factor 7 explains 4.58% of the total variance, Factor 8 explains 4.43% of the total variance, Factor 9 explains 4.26% of the total variance, Factor 10 explains 3.87% of the total variance. Factors explain 55.64% of the total variance all together.

Table 3. Variance explanation table of the scale

	Initial Eigenvalues			Total factor loads (transformed)		
	Total	Explained variance %	Accumulated %	Total	Explained variance %	Accumulated %
Factor 1	4.08	11.99	11.99	3.70	10.88	10.88
Factor 2	3.02	8.89	20.88	2.10	6.18	17.06
Factor 3	2.54	7.48	28.37	2.09	6.14	23.20
Factor 4	1.97	5.79	34.16	1.89	5.57	28.77
Factor 5	1.48	4.36	38.52	1.65	4.87	33.63
Factor 6	1.30	3.82	42.34	1.65	4.86	38.49
Factor 7	1.27	3.73	46.07	1.56	4.58	43.07
Factor 8	1.16	3.42	49.49	1.51	4.43	47.50
Factor 9	1.08	3.18	52.67	1.45	4.26	51.76
Factor 10	1.01	2.97	55.64	1.32	3.87	55.64

Table 4. Factor load values relating with scale items

Item Expressions	Factor load
Factor 1	
M42 Vitamin B6-B12 Supplement	0.820
M43 Calcium, Magnesium, Zinc etc. Minerals	0.809
M40 Vitamin D Supplements	0.758
M44 Omega 3-6-9 supplement foods	0.739
M41 Vitamin C Supplement	0.723
M46 Probiotic-Prebiotic Supplement	0.574
M45 Propolis Supplement	0.531
Factor 2	
M36 Carbonated Drinks (Cola etc.)	0.760
M37 Commercial juices	0.722
M38 Energy drinks	0.611
M34 Other Herbal Teas	0.599
Factor 3	
M17 Rye Bread	0.789
M18 Whole Wheat Bread	0.704
M16 Brown bread	0.789

Table 4. Factor load values relating with scale items (continue)

Item Expressions	Factor load
Factor 4	
M8 Yoghurt	0.720
M7 Milk (Cow, goat, sheep etc.)	0.634
M10 Buttermilk, Kefir	0.595
M9 Cheese Types	0.470
M6 Egg	0.429
Factor 5	
M3 The fish	0.703
M1 Red meat (Bovine and ovine)	0.643
M4 Offal (Liver, kidney, etc.)	0.638
M2 White meat (Chicken, turkey, etc.)	0.421
Factor 6	
M31 Black tea	0.694
M30 Water	0.669
Factor 7	
M33 Green tea	0.748
M32 Turkish coffee	0.611
M35 Instant coffee (packaged coffees such as 3 in 1 etc.)	0.570

Table 4. Factor load values relating with scale items (continue).

Item Expressions	Factor load
Factor 8	
M22 Legumes (chickpeas, beans, lentils, etc.)	0.745
M21 Cereal Products (bulgur, rice, pasta etc.)	0.735
Factor 9	
M25 Salt	0.768
M24 Sugar	0.761
Factor 10	
M20 Fruits	0.698
M19 Vegetables	0.517
Items That Cannot Be Uploaded to Any Factor or Items loaded to More Than One Factor	
M5 Processed meat products	-
M11 Honey, molasses	-
M12 Olive oil	-
M13 Sunflower oil	-
M14 Butter	-
M15 Herbal margarine	-
M23 Spices	-
M26 White bread	-
M29 Biscuit, chocolate, etc. snacks	-
M39 Alcoholic beverages	-

In the light of data shown in Table 4, items which cannot be loaded to any factor and which constitute a factor on their own (Item 12 (Olive oil), Item 13 (Sunflower oil), Item 39 (Alcoholic beverages)) and items loaded to more than one factor (Item 5 (Processed meat products), Item 11 (Honey, molasses), Item 14 (Butter), Item 15 (Herbal margarine), Item 23 (Spices), Item 26 (White bread), Item 29 (Biscuit, chocolate, etc. snacks)) have been excluded from the scale and the scale was reduced to 34 items.

3.3.2. Confirmatory factor analysis (CFA)

Measurement model established in order to verify the structure consisting of 34 items and 10 sub-dimensions has been analyzed with primary level CFA. As a result of the analysis, it was seen that the model showed sufficient fit, and the chi-square decrease values (modification indices "M.I." values) were examined for possible changes in the model. By connecting the modification shown by highest "M.I." value when conceptually appropriate (e33 <-> e34), model has been carried out. By examining the fit index values of the model, it was seen that the measurement model was verified (Table 5, Figure 1).

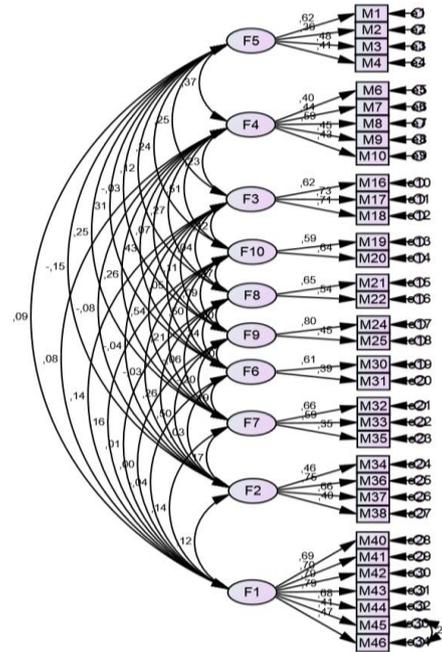


Figure 1. Measurement model of “Nutrition Consumption Frequencies Scale of Change prior to and during/after relating with individuals”.

Table 5. Fit index values and good fit values of the measurement model

	Fit Index		
	Values of the Model	Good fit	Acceptable fit
χ^2/sd	3.981	≤ 3	4-5
GFI	0.933	≥ 0.90	(0.89-0.85)
AGFI	0.918	≥ 0.90	(0.89-0.85)
NFI	0.927	≥ 0.95	(0.94-0.90)
NNFI (TLI)	0.941	≥ 0.95	(0.94-0.90)
CFI	0.963	≥ 0.95	≥ 0.90
RMSEA	0.043	≤ 0.05	(0.06-0.08)
SRMR	0.046	≤ 0.05	(0.06-0.08)

Alpar (2011) stated that items with a factor load of less than 0.300 must be excluded from the scale. When Figure 1 is examined, it is seen that it is shown which items the model consists of and factor loadings the items have. The factor load of each item was examined in detail and it was found that there was no value below 0.300. Accordingly it is seen that M1 expression with a value of 0.62 is the strongest indicator of F5 sub-dimension, M8 expression with a value of 0.59 is the strongest indicator of F4 sub-dimension, M17 expression with a value of 0.73 is the strongest indicator of F3 sub-dimension, M20 expression with a value of 0.64 is the strongest indicator of F10 sub-dimension, M21 expression with a value of 0.65 is the strongest indicator of F8 sub-dimension, M24 expression with a value of 0.80 is the strongest indicator of F9 sub-dimension, M30 expression with a value of 0.61 is the strongest indicator of F6 sub-dimension, M32 expression

with a value of 0.66 is the strongest indicator of 7 sub-dimension, M36 expression with a value of 0.75 is the strongest indicator of F2 sub-dimension, M42 expression with a value of 0.79 is the strongest indicator of F1 sub-dimension.

Table 5 contains the fit index values of the measurement model. According to the table, it is determined that values of Chi-square goodness of fit test (χ^2 / sd), NFI (Normed Fit Index), NNFI (Non-Normed Fit Index) showed an acceptable fit, whereas values of RMSEA (Root Mean Square of Approximate Errors), SRMR (Standardized Root of Mean Errors), GFI (Goodness of Fit Statistics), AGFI (Adjusted Goodness of Fit Statistics) and CFI (Comparative Fit Index) showed a good fit (Bagozzi and Yi, 1988; Bollen and Lennox, 1991; Jöreskog and Sorbom, 1993; Kline, 1998; Şimşek, 2007; Meydan and Şeşen, 2015).

3.4. Reliability Analysis

3.4.1. Test-retest reliability

The scale, which was applied to 3107 participants, was re-applied to 150 people randomly selected among these participants at a different time using their e-mail addresses. In order to evaluate the invariance of the scale with respect to time, the relationship between the scores obtained from the first and second applications was examined using the Pearson Correlation Coefficient. The findings obtained are shown in Table 6.

Table 6. Pearson correlation coefficients and significance between test-retest scores of the scale and sub-dimensions

	r	P
Total score	0.925	0.000*
Factor 1	0.923	0.000*
Factor 2	0.921	0.000*
Factor 3	0.971	0.000*
Factor 4	0.934	0.000*
Factor 5	0.857	0.000*
Factor 6	0.894	0.000*
Factor 7	0.943	0.000*
Factor 8	0.893	0.000*
Factor 9	0.832	0.000*
Factor 10	0.852	0.000*

*P < 0.001, r= Pearson correlation coefficient, P= significance level.

When Table 6 is examined, it is seen that there were highly significant positive linear relationships between the scale and sub-dimension scores (P < 0.001). The high correlation between the first and second application scores indicates that the scale is reliable.

Internal consistency

Cronbach Alpha internal consistency coefficients of the scale and its sub-dimensions formed according to the CFA result have been examined and the findings are shown in Table 7.

Table 7. Results relating with internal consistency coefficient

	Item No	Cronbach Alpha (α)	Reliability level
Total scale items	34	0.722	Quite reliable
Sub-dimensions			
Factor 1	7	0.841	Reliable at
Factor 2	4	0.644	Quite reliable
Factor 3	3	0.716	Quite reliable
Factor 4	5	0.542	Reliable
Factor 5	4	0.521	Reliable
Factor 6	2	0.598	Reliable
Factor 7	3	0.529	Reliable
Factor 8	2	0.521	Reliable
Factor 9	2	0.597	Reliable
Factor 10	2	0.544	Reliable

0.00< α <0.40= ccale is not reliable, 0.40< α <0.60= reliable, 0.60< α <0.80= quite reliable, 0.80< α <1.00= reliable at high degree.

Kalaycı (2014) stated that a scale with a Cronbach Alpha (α) reliability coefficient between 0.60 and 0.80 (0.60 $\leq\alpha\leq$ 0.80) is quite reliable. When Table 7 is examined, it is seen that as a result of the reliability analysis applied, "Nutrition Consumption Frequencies Scale of Change", which consists of 34 items, is quite reliable ($\alpha=0.722$). It has been determined that Factor 1 ($\alpha=0.841$) sub-dimension is reliable at a high degree; Factor 2 ($\alpha=0.644$) and Factor 3 ($\alpha=0.716$) sub-dimensions were quite reliable; Factor 4 ($\alpha=0.542$), Factor 5 ($\alpha=0.521$), Factor 6 ($\alpha=0.598$), Factor 7 ($\alpha=0.529$), Factor 8 ($\alpha=0.521$), Factor 9 ($\alpha=0.597$) and Factor 10 ($\alpha=0.544$) sub-dimensions were reliable.

4. Conclusion

Humans are not informed about various health problems or risks such as pandemics, earthquake and options such as pregnancy which they can be confronted with during their life time. All these events that can be experienced affect both the health and psychology of individuals, causing a change in their attitudes and perceptions towards nutrition. Purpose of this study is to develop a scale that can be applied before and during or after different events that may cause changes in the frequency of nutrition consumption of individuals and to gain them to literature. In this context, an application has been carried out regarding the COVID-19 pandemic period which we are experiencing at the time being. First of all, a nutrition list consisting of 47 items has been prepared in the light of the literature. Later, the opinions of 11 experts were taken and the list was reduced to 44 items. After the EFA analyzes were made, the list was updated as having 10 sub-dimensions and 34 items. After CFA analysis, no changes were made to the list. A positive highly significant linear relationship was found between

the scale and sub-dimension scores ($P < 0.001$), and the general Cronbach Alpha (α) reliability coefficient of the scale was found to be "quite reliable" ($\alpha=0.722$). In the light of all these analyzes, it was concluded that the "Nutrition Consumption Frequencies Change Scale" is a valid and reliable measurement tool for determining the change in the frequency of nutrition consumption of individuals depending on cancer, pandemic, pregnancy and other similar events.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

Conflict of Interest

The author declared that there is no conflict of interest.

Ethical Approval/Informed Consent

This research has been realized as per "Helsinki Declaration Principles". Written permission has been obtained from Recep Tayyip Erdogan University Ethical Committee with the decision letter dated 21.05.2020 and numbered 2020/34. Because the use of human phenomenon in the research requires the protection of individual rights, the condition of "Informed Consent" has been met as an ethical principle. Besides, the principle of "Respect for Human Dignity" has also been considered in the study, and by explaining to the individuals participating in the study that the information relating with them would not be disclosed to others, the "Privacy Principle" was adhered to.

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