

## Adaptation of the Short Questionnaire to Assess Changes in Lifestyle-Related Behaviors During Covid-19 Pandemic in Turkish: A Validity Reliability Study

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### ABSTRACT:

**Purpose:** In this study, "A Short Questionnaire to Assess Changes in Lifestyle-Related Behavior Adaptation of During COVID-19 Pandemic" into Turkish was carried out to examine its reliability and validity in the Turkish sample.

**Material and Methods:** The study was conducted through an online questionnaire with a total of 160 people, 58.8% of whom were women, between the ages of 18-65 years (31.24±11.35 years). The relevant validity and reliability tests were conducted for the Turkish adaptation of the translated questionnaire.

**Results:** In the study, it was determined that the sample size (KMO=0.812) and the items were sufficient for factor analysis ( $\chi^2=819.879$ ;  $p<0.01$ ). The results of the explanatory factor analysis explained 68,239% of the total variability of the questionnaire and were accepted as 4 dimensions. According to the results of the confirmatory factor analysis, it was determined that the structural equation model of the scale was significant at  $p=0.000$ , and in addition, it was related to the 13 items that make up the scale and the four-factor questionnaire structure. When the goodness of fit index of the questionnaire was evaluated, it was found that it had acceptable fit with RMSEA 0.080; it has been found that it is in perfect agreement with  $\chi^2$  2.011. Factor loads of all items were determined to be between 0.647 and 0.828. The Cronbach's Alpha coefficient of the questionnaire was found to be 0.866.

**Conclusion:** As a result of the validity and reliability tests for the Turkish version of the questionnaire, it has been revealed that it is a valid and reliable measurement tool that can be used in health institutions.

**Keywords:** Lifestyle, diet, COVID-19, Pandemic

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### INTRODUCTION

Coronavirus Disease (COVID-19) has spread all over the world within 3 months after being detected in China (Wuhan) in December 2019. In Turkey, it caused a pandemic that was officially declared on March 11, 2020 (Leszczak et al., 2022). This epidemic has spread all over the world, causing radical lifestyle changes, and has been one of the common and life-changing events (González-Hijón et al., 2023). Quarantine practices, routine changes, uncertainties, and stress situations caused by the pandemic affect the physical and mental health of individuals, worsen sleep quality, increase the time

spent in front of the screen, decrease the amount of physical activity, and cause more energy intake (Canello et al., 2020; González-Hijón et al., 2023; Martínez-de-Quel et al., 2021). On the other hand, it was stated that it can motivate people to adopt a healthier lifestyle (such as nutrition, sleep, stress management, and physical activity) (Canello et al., 2020; Kaufman-Shriqui et al., 2022). In addition, hypophagia or hyperphagia and overeating can occur due to acute or chronic stress, both of which can cause significant body weight changes (Sidor & Rzymiski, 2020).

It is known that a healthy lifestyle strengthens the

immune system, reduces the risk of respiratory tract infections, and thus is effective in preventing many chronic conditions caused by the epidemic. In addition, it has been emphasized that regular physical activity increases the effectiveness of vaccines and may be beneficial for anxiety and depression. In addition, a healthy lifestyle is very important both in the pandemic process and in reducing the risk of all chronic diseases that may occur in the future (Cancello et al., 2020; Medrano et al., 2021). Therefore, during the pandemic, healthy lifestyle advice has been given, emphasizing the importance of adequate sleep and physical activity, healthy nutrition and stress management, as well as appropriate hygiene and social isolation measures (Hu et al. 2020; Van der Werf et al., 2021).

It is of great importance to examine the impact of COVID-19 on lifestyle behaviors and develop new strategies, as the effects of Pandemic still continue and the possibility of new variants is foreseen today (Kumari et al., 2020; Shimpo et al., 2021). At this point, Kumari et al developed a questionnaire that can assess all major aspects of lifestyle-related behaviors during the COVID-19 pandemic in 2020 (Kumari et al., 2020). Therefore, the aim of this study is to adapt the short questionnaire developed to evaluate changes in lifestyle-related behaviors during the COVID-19 pandemic into Turkish, to evaluate its validity and reliability, and to emphasize the importance of adopting a healthy lifestyle while the pandemic continues.

## **MATERIAL and METHODS**

Permission was obtained from the authors to use the original version of this questionnaire, and the standard translation-back translation method was used for the translation of the questionnaire (Hançer, 2003). After the language equivalence was achieved, the opinion of a group of 10 experts in the relevant field was sought to ensure the content validity of the scale. Lawshe Method was used to collect expert opinions (Yeşilyurt & Çapraz, 2018).

### **Purpose and Type of the Study**

In this research, the translation of "A Short Questionnaire to Assess Changes in Lifestyle-Related Behavior Adaptation of During COVID-19 Pandemic" into Turkish was conducted to assess its reliability and validity in the Turkish sample.

### **Sampling and Participant**

A pilot study was conducted with 30 people to evaluate whether the translated questionnaire was understandable. It was determined that there was

no problem in understanding the questionnaire and the data obtained from the pilot study were also included in this study. In validity and reliability studies, it is recommended that the sample size is at least 5 times or 10 times the number of variables used in the research (Bryman & Cramer, 2001). 160 people aged 18 and 65, living in Turkey, speaking Turkish, literate, and who voluntarily agreed to participate in the study were included in this study.

### **Data Collection Tools**

The data obtained were collected using an online questionnaire. The relevant survey was created via the Google online survey platform and distributed to the participants via WhatsApp™ or e-mail. Body mass index (BMI ) was calculated using self-reported body weights and heights of the participants.

### **A Short Questionnaire to Assess Changes in Lifestyle-Related Behavior Adaptation of During COVID- 19 Pandemic**

This questionnaire includes 20 Likert-type questions developed by Kumari et al. with the Indian population in 2020. Questionnaire; It was developed through a standard methodology that included expert assessment, pretesting and validation, and then construct validity and content validity were analyzed. A cross-sectional questionnaire was administered to 103 literate participants aged 18 years and older to validate the questionnaire, which used a 5-point Likert scale as an answer option. Exploratory factor analysis was performed to determine construct validity. Cronbach's alpha value was calculated to test the internal consistency of the entire questionnaire. The Cronbach's Alpha coefficient of the questionnaire is 0.72 (Kumari et al., 2020).

### **Statistical Analysis**

The data obtained in the research collected by the tests were transferred to the SPSS 25.0 (Statistical Package for Social Sciences, version 25) program, and then statistical analyzes of the data were made using this program. DFA (Confirmatory Factor Analysis) was conducted using the AMOS 21 program. Normality analyzes were evaluated with kurtosis and skewness values. Evaluation of the difference between the mean scores according to the demographic characteristics of the participants, independent sample t-test in two-category groups; F test when there are more than two categories; Bonferroni was used for multiple comparison test. The relationship between continuous variables was evaluated with Pearson correlation analysis. Values

with  $p < 0.05$  were considered statistically significant. The Kaiser-Meyer-Olkin (KMO) test was applied to assess the sample size's suitability for factorization, followed by the Bartlett Sphericity test. Exploratory factor analysis using Principal Component Analysis and Varimax rotation methods was then performed. To confirm the construct validity, confirmatory factor analysis was employed. Discrimination power of items was evaluated through Independent group t-tests and item-total correlations. Distinctiveness of items was determined by ranking the questionnaire scores and comparing the average scores of the lower 27% and upper 27% groups using t-tests. Reliability was assessed using Cronbach Alpha and the halving method. Additionally, mean explained variance (AVE) and composite reliability (CR) values were calculated for each factor separately.

### Ethical Approval

For this study, "Ethics Committee Approval" dated 01.12.2021 and numbered 186 was obtained from Haliç University Non-Invasive Clinical Research Ethics Committee. Data collection stages in line with the principles of the Declaration of Helsinki has been carried out.

### RESULTS

In this study, which included 160 adults between the ages of 18-65 years, 58.8% of the participants were female and 60.6% were single. The mean age of the participants was  $31.24 \pm 11.35$  years, and the mean BMI was  $25.05 \pm 4.58$  kg/m<sup>2</sup>. The descriptive information of the participants is given in Table 1. The Lawshe Method, which was used to collect expert opinions, was applied for each item to ensure the language equivalence and cultural equality of the short questionnaire used in the study. Accordingly, it means "1-Not applicable", "2-Item needs to be corrected", and "3-Appropriate". As a result of the opinions obtained, the content validity ratios (CVR) were calculated for the entire questionnaire. The criterion value for CVR was accepted as 0.6 for ten specialists. The content validity of the items was ensured, since the average of all the questionnaire items were 0.82 and 0.91, respectively, regarding their relevance and intelligibility to Turkish society. Item-total score correlation values were found to be between 0.376 and 0.659. As a result, the answers given are consistent and the study can be continued. In addition, the general internal consistency coefficient of the questionnaire was calculated as 0.904, and it was found to be reliable (Table 2). The Kaiser-Meyer-Olkin (KMO) value was determined to be 0.812. Thus, the sample size and

items were "adequate" for factor analysis. Explanatory factor analysis was performed, the sizing step was repeated, and items that were not significant when combined were removed from the analysis. As a result, the related questionnaire was accepted as 4-dimensional, and the factor pattern was found acceptable. The questionnaire, adapted according to the exploratory factor analysis results, explains 68.239% of the total variability. In addition, the first factor explains 27.838% of the total variability, the second factor explains 15.036% of the total variability, the third factor explains 13.421% and the fourth factor explains 11.944% (Table 3).

The structural equation model of the scale was significant, and it was related to the four-factor structure of the 13 items and the questionnaire. The model has been improved. According to the results of the first level multi-factor analysis, it was found that it showed acceptable agreement with RMSEA 0.080 and excellent agreement with  $\chi^2$  (Cmin/df) 2.011. Thus, the existence of construct validity of the scale was determined (Table 4).

It is seen that the factor load value of all items is above 0.30. It was determined that all items had values between 0.647 and 0.828 according to their factor loads (Table 5, Figure 1).

The minimum value for the adequacy of item-total test correlation was determined as 0.30, and there is no item below this value. The item-total test correlation values of these items vary between 0.381 and 0.744, and the items are also related to each other. The mean discrimination scores of the lower 27% and upper 27% groups were compared with the independent group, and it was seen that there was a difference between the group mean scores (Table 6). Reliability analysis is performed to determine the consistency of the statements in the scales with each other and the scale of all statements on the same subject (Ercan & İsmet, 2004). When the results were examined, it was determined that this questionnaire was a very reliable questionnaire with a Cronbach Alpha value of 0.866. In addition, the reliability of the subscale was found to be in the range of 0.640-0.877 (Table 7).

According to the Two-Half Confidence, the questionnaire was found to be reliable. The results are shared in Table 8.

The reliability of the model was also analyzed according to the mean explained variance (MEV) and composite reliability (CR) values for each factor. In the four-factor structure measuring lifestyle change, MEV and CR values were at the desired level. Thus, it can be decided whether this factor should be removed from the model by looking at the fit and

discriminant validity analyzes. The validity of the measurement model was tested in terms of compatibility and discriminant validity. Concordance validity shows the correlation between the variables constituting the structure and this correlation is expected to be high. In addition, for concordance validity, the MEV value of each structure should be greater than 0.5, and the CR value calculated for

each structure should be greater than the MEV value. It was seen that the relevant limit values were provided for the measurement tool. Therefore, it was determined that concordance and discriminant validity were achieved (Table 9).

**Table 1:** Descriptive Information of Participants (n=160)

		$\bar{X}\pm SD$	
<b>Age (years)</b>		31.24±11.35	
<b>Weight (kg)</b>		73.00±16.64	
<b>Height (m)</b>		170.24±10.22	
<b>BMI (kg/m<sup>2</sup>)</b>		25.05±4.58	
		<b>n</b>	<b>%</b>
<b>Gender</b>	Female	94	58.8
	Male	66	41.2
<b>Marital status</b>	Married	62	38.8
	Single	98	61.2
<b>Educational status</b>	Primary school	6	3.75
	Middle school	6	3.75
	High school	20	12.5
	College	12	7.5
	University	90	56.25
	Postgraduate	26	16.25
<b>COVID-19 status</b>	Yes	65	40.6
	No	95	59.4

BMI: Body Mass Index

**Table 2:** Reliability Analysis Results of the Study

	<b>Average if item is deleted</b>	<b>Variance if item is deleted</b>	<b>Item-total score correlation</b>	<b>Cronbach Alpha if item is deleted</b>
M1	48,8812	115,741	0.376	0.904
M2	49,2500	112,755	0.603	0.898
M3	49,0875	113,200	0.593	0.898
M4	49,1875	115,172	0.499	0.901
M5	49,1312	111,851	0.634	0.897
M6	49,1188	109,967	0.590	0.898
M7	48.8938	111,328	0.553	0.899
M8	49,1250	110,022	0.659	0.896
M9	49.2375	112,811	0.584	0.898
M10	49.2875	112,055	0.579	0.898
M11	49,2750	112,792	0.559	0.899
M12	49,1750	112,862	0.595	0.898
M13	49.3313	113,103	0.569	0.899
M14	49.2562	112,003	0.591	0.898
M15	49,0000	114,767	0.457	0.902
M16	49,2125	113,628	0.539	0.900
M17	49,5938	114,293	0.446	0.902
M18	49.2562	115,311	0.390	0.904
M19	48,8562	114,086	0.443	0.902
M20	49,4500	111,381	0.548	0.899
<b>Overall Cronbach Alpha Value of the Questionnaire=0.904</b>				

**Table 3:** Final Explanatory Factor Analysis of the Questionnaire

	Factors			
	Eating habits Bottom Size	Daily activity Bottom Size	Healthy Nutrition Information Bottom Size	Sleep patterns Bottom Size
M3	0.799			
M6	0.774			
M8	0.758			
M7	0.720			
M10	0.717			
M2	0.715			
M16		0.750		
M15		0.696		
M17		0.554		
M14			0.834	
M13			0.789	
M19				0.835
M18				0.824
Eigenvalue	4,994	1,502	1,182	1,049
Rate of Variance Explained	24,905	15,940	14,481	11,802
<b>KMO =0.812 X2(78) =819.879; Bartlett Test of Sphericity (p) = 0.000</b>				
<b>Total Explained Variance =67,129</b>				

**Table 4:** Confirmatory Factor Analysis Results of the Questionnaire

Index	Perfect Fit Criterion	Acceptable Compliance Criteria	Post Modification
X <sup>2</sup> /SD	0 ≤ χ <sup>2</sup> / df ≤ 3	3 ≤ χ <sup>2</sup> / df ≤ 5	2,011
RMSEA	0.00 ≤ RMSEA ≤ 0.05	0.05 ≤ RMSEA ≤ 0,08	0.080
SRMR	0.00 ≤ SRMR ≤ 0.05	0.05 ≤ SRMR ≤ 0,08	0.052
CFI	0.95 ≤ CFI	0.85 ≤ CFI	0.931
GFI	0.90 ≤ GFI	0.85 ≤ GFI	0.902
AGFI	0.90 ≤ AGFI	0.85 ≤ AGFI	0.841
IFI	0.90 ≤ IFI ≤ 1.00	0.80 ≤ IFI	0.933
TLI	0.90 ≤ TLI	0.80 ≤ TLI	0.904
NI	0.90 ≤ NFI	0.80 ≤ NFI	0.875

Chi-square/ Degrees of Freedom ( X<sup>2</sup>/SD)  
 Root Mean Square Error of Approximation (RMSEA)  
 Comparative Fit Index (CFI)  
 NNFI (TLI): Unnormed Compliance Index  
 Goodness of Fit Index (GFI): Goodness of Fit Index  
 Adjusted Goodness of Fit Index (AGFI)

**Table 5:** Confirmatory Factor Analysis Factor Loads (First Level)

	Standardized factor load	Unstandardized factor load	SE	CR	p
M2	0.672	1,000			<0.001
M3	0.647	0.942	0.107	8,767	<0.001
M6	0.748	1,400	0.174	8,027	<0.001
M7	0.686	1,231	0.165	7,441	<0.001
M8	0.828	1,402	0.162	8,663	<0.001
M10	0.745	1,216	0.152	8,023	<0.001
M13	0.761	1,000			<0.001
M14	0.807	1,121	0.178	6,311	<0.001
M15	0.626	1,000			<0.001
M16	0.717	1,105	0.182	6,056	<0.001
M17	0.640	1,092	0.207	5,285	<0.001
M18	0.730	1,000			<0.001
M19	0.668	0.929	0.213	4,364	<0.001

SE: Standar Error, CR: Z test değeri

**Table 6:** Item Analysis Results Regarding the Questionnaire Items

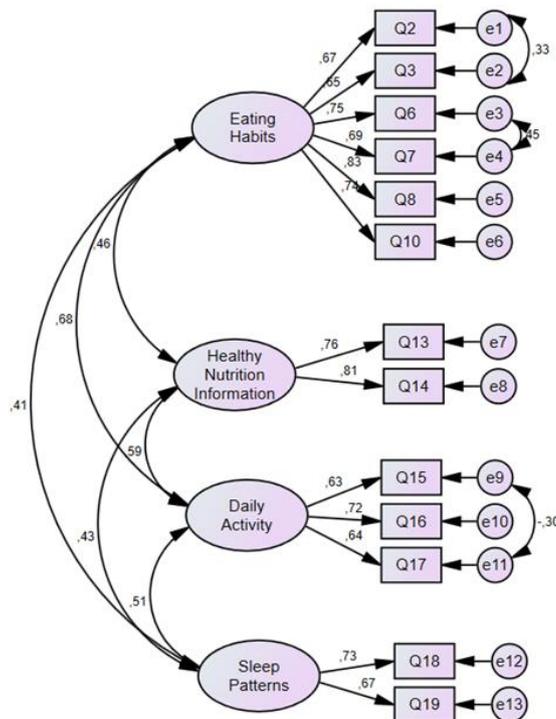
	r	t (< 27% and > 27%)	p value (< 27% and > 27%)
<b>F1: Feeding Habit</b>			
M2	0.632	10,492	0,000*
M3	0.648	8,456	0,000*
M6	0.740	16,876	0,000*
M7	0.674	14,889	0,000*
M8	0.744	13,977	0,000*
M10	0.667	14,075	0,000*
<b>F2: Healthy Nutrition Information</b>			
M13	0.614	16,473	0,000*
M14	0.614	18,951	0,000*
<b>F3: Daily Activity</b>			
M15	0.403	11,465	0,000*
M16	0.580	13,050	0,000*
M17	0.381	15,174	0,000*
<b>F4: Sleep Pattern</b>			
M18	0.487	21,826	0,000*
M19	0.487	19,035	0,000*

n = 160, \*\* n1 = n2 = 43;

r = Item Total Score Correlation \* Significant values for p < 0.05

**Table 7:** Reliability Analysis Results of the Questionnaire

Questionnaire and its Sub-Dimensions	Cronbach Alpha
Survey General	0.866
Eating habits	0.877
Healthy Eating Interest	0.760
Daily activity	0.640
Sleep patterns	0.655



**Figure 1:** First Level Multi-Factor Model Confirmatory Factor Analysis of the Questionnaire (Standardized)

**Table 8:** Two-Half Confidence

Cronbach's Alpha	Part one: M2, M6, M8, M13, M15, M17, M19	0.757
	Second Section M3, M7, M10, M14, M16, M18	0.710
Correlation between two halves		0.884
Spearman -Brown coefficient equal		0.938
Spearman -Brown coefficient not equal		0.939
Guttman Split-Half coefficient		0.931

**Table 9:** MEV and CR Value of the Questionnaire

	1	2	3	4	AVE	AVE square root	CR
1. NutritionHabit	1				0.52	0.72	0.87
2. Healthy Nutrition Information	0.453 **	1			0.62	0.79	0.76
3. Daily activity	0.582 **	0.538 **	1		0.5	0.71	0.72
4. Sleep patterns	0.528 **	0.380 **	0.547 **	1	0.5	0.71	0.70

**Evaluation of the Short Questionnaire Developed to Evaluate Changes in Lifestyle and Behaviors During the COVID-19 Pandemic**

- Items 1, 3, 4, 5, 6 and 11 are scored as follows:  
2 = Slightly decreased, 1 = Slightly decreased, 0 = Slightly similar, -1 = Slightly increased, -2 = Substantially increased.
- Items 7, 8, 9, 10 and 13 are scored as follows:  
2 = Slightly increased, 1 = Slightly increased, 0 = Slightly similar, -1 = Slightly decreased, -2 = Slightly decreased.
- 2. \*\*, 12. \*\*\* are scored as follows:  
0 = Completely similar -1 = Slightly increased/decreased -2 = Significantly increased/decreased  
\*\* Item 2 is scored assuming the person ate normal meal and snack portions prior to the COVID pandemic.  
\*\*\* Item 12 is scored assuming that the person got enough sleep of 6-8 hours before the pandemic.
- As the total score obtained by the individuals from the questionnaire increases, the positive effect of COVID-19 on the lifestyle-related behaviors of the individual increases.
- The negative impact of COVID-19 on an individual's lifestyle-related behaviors increases as the total score obtained by individuals from the questionnaire decreases.
- If the total score obtained by the individuals from the questionnaire is 0, COVID-19 did not have an effect on the individual's lifestyle-related behaviors.

**DISCUSSION**

The restrictions imposed due to the pandemic have seriously disrupted people's daily routines. In the early stages of the world, quarantine led to fundamental changes in normal food-related behavior and diet (Kumari et al., 2020). In addition, all areas (gyms, parks, playgrounds, etc.) where individuals can socialize and maintain a healthy lifestyle have been closed to prevent the spread of COVID-19. Many types of physical activity have become limited. In addition, deviating from a healthy lifestyle worsens the course of chronic diseases (Ammar et al., 2020). As several variants of the COVID-19 outbreak still exist, and new ones are expected, it is increasingly important to discover how significant the impact of this epidemic and related restrictions on people's eating habits and lifestyle-related behaviors, including their physical health. There is no valid and reliable comprehensive measurement tool developed or adapted in Turkey to evaluate behavioral changes in lifestyle due to the COVID-19 pandemic. In this study, Turkish validity and reliability analyses of "A Short Questionnaire To Assess Changes In Lifestyle-Related Behavior During COVID-19 Pandemic" were conducted to determine these changes. In the study, the validity and reliability analyzes of the questionnaire were made. It was determined that the sample size was sufficient for factor analysis and that there was sufficient correlation between the items. The sizing step was repeated, and then it was determined that the factor design was acceptable in the 4-dimensional questionnaire. According to the confirmatory factor analysis, it was determined that the result of the structural equation model of the scale was significant and it was related to the 13-item and 4-

factor structure of the questionnaire, and the model was improved. When the goodness of fit indexes of the related scale are examined; acceptable fit and perfect fit. According to all these results, the existence of construct validity of the relevant scale was determined. The questionnaire was found to be quite reliable with a Cronbach Alpha of 0.866. In addition, it was seen that the reliability of the sub-dimension was in the range of 0.640-0.877 and the questionnaire was reliable. Finally, the reliability of the measurement model was tested by looking at the mean explained variance (MEV) and composite reliability (CR) values of each factor separately. It has been determined that concurrency and discriminant validity are provided. In summary, our results support good internal consistency, content validity, face validity, and construct validity of this questionnaire. The questionnaire also has a structure that is short, clear, easy to understand, self-administered and takes no more than 3-5 minutes to administer. Although there is no measurement tool in Turkey to evaluate lifestyle behavior changes during the COVID-19 pandemic process, there are studies conducted in Poland, Italy and Saudi Arabia (Hammouri et al., 2022; Sidor & Rzymiski, 2020). In a study conducted in Jordan, the Cronbach alpha values of this questionnaire were shown to be over 0.7 (Hammouri et al., 2022). However, the self-developed questionnaire used on the Polish population assesses people's dietary choices and habits only during the COVID-19 outbreak (Sidor & Rzymiski, 2020).

## CONCLUSION

As a result, it has been shown that the related questionnaire is a valid and reliable measurement tool in the Turkish sample. This measurement tool consists of 13 items covering information needed to assess nutrition, physical activity, and sleep. Maintaining a healthy lifestyle is vital in reducing the risk of chronic diseases that may arise both during the pandemic and in the future. A scientifically validated assessment of individuals' lifestyle changes during the COVID-19 period can be examined with this questionnaire. It is hoped that this will provide valuable information for public health policies and interventions aimed at maintaining good mental health and a healthy lifestyle during and after the COVID-19 pandemic. In addition, this survey study can be effective in determining how lifestyle behaviors of individuals and communities may be affected during and after any quarantine or epidemic. It can be effective in understanding the duties of relevant health professionals, including

nutritionists and dietitians, in pandemic situations such as COVID-19 that are currently ongoing in the world and may be possible in the future.

## LIMITATIONS

According to the results of the study, this questionnaire is a reliable measurement tool. However, the study has some limitations. First, a self-reported questionnaire was used for the study. In future research, clearer statements can be obtained with the face-to-face interview technique. Secondly, geographical constraints necessitate the planning of the study by focusing on national-based or different cohort groups and increasing the number of samples in the future.

## Conflict of Interest

All authors declared no conflict in the study.

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