



Pandemic process status questionnaire: Development and psychometric properties

Busra Candiri¹, Burcu Talu¹

¹Inonu University, Faculty of Health Sciences, Physiotherapy and Rehabilitation Department, Malatya, Türkiye

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Abstract

The pandemic process has caused significant changes in many areas of daily life. The aim is to develop a new questionnaire to evaluate the changes that occurred during the pandemic process and to examine the psychometric properties of this questionnaire. For face validity, 10 individuals were asked to interpret the questions. The Pandemic Process Status Questionnaire was tested with the help of a questionnaire created with the help of Google Forms. In order to evaluate the content validity, the content validity index and content validity ratio were used in line with the opinions of 7 experts. A pilot test was carried out. Exploratory factor analysis was performed for construct validity. The World Health Organization Quality of Life-brief version was used for convergence validity. A total of 25 items with an impact score of less than 1.5 in face validity were deleted. According to the content validity index, 15 items and 21 items according to the content validity rate were removed. In the pilot application, 5 items with an item-total correlation below 0.3 were deleted. The results of the exploratory factor analysis provided 6 dimensions: general status, physical status, psychological status, social and economic status, concerns about the pandemic, and eating habits. This structure explained 71.77% of the total variance. The questionnaire showed a weak correlation with the World Health Organization quality of life-Short Form ($r=0.26$). The Pandemic Process Status Questionnaire is a short and valid tool to summarize the situation encountered during the pandemic process.

Keywords: Questionnaire, Psychometrics, Pandemic, COVID-19, Validity

Introduction

The new SARS-CoV-2 Coronavirus disease was first seen in Wuhan in December 2019 and then spread rapidly all over the world. The COVID-19 pandemic was declared by the World Health Organization in March 2020 [1]. The pandemic has had significant impacts on society and health systems [2]. During the pandemic, house arrest has been implemented in many countries to prevent the spread of the virus. When these restrictions are considered in general terms, they have caused significant changes in many areas of people's daily lives such as health, economic status and eating habits, physical mobility

[3]. The pandemic has caused difficulties in accessing healthcare, especially for those without COVID-19 [4]. The pandemic causes individuals in society to be inactive for a long time, and it also creates socio-psychological problems. As a result, health-related quality of life is affected [2]. Various studies have been conducted to understand the changes that the pandemic has brought about in the lives of individuals. Bai et al. conducted a network analysis of individuals' mental health and quality of life during the pandemic. The World Health Organization Quality of Life-brief version (WHOQOL[®]-BREF) was used in the study [5]. In addition, the EQ-5D-5L questionnaire with sub-dimensions of mobility, self-care, usual activities, pain/discomfort, and anxiety/

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Corresponding Author: Busra Candiri, Inonu University, Faculty of Health Sciences, Physiotherapy and Rehabilitation Department, Amasya, Türkiye
Email: candiri_17@hotmail.com

depression was used to evaluate the effects of the pandemic on health-related quality of life [6]. The pandemic has brought significant changes in people's lifestyles, such as their eating habits. As a result of a study investigating eating and nutritional habits during the pandemic, it was determined that the number of daily meals, appetite, and weight of individuals increased [7]. In another study, an event effect scale was used to evaluate the effects of the pandemic on mental health and quality of life, including questions about mental health problems, social status, family support, and lifestyle changes [8]. Since the Neolithic Age and the Bronze Age, people have been struggling with pandemics and epidemics. Based on past pandemics, it is thought that similar outbreaks may occur in the future [9]. Considering the current as well as future effects of pandemics, scales that examine comprehensive and pandemic-specific difficulties are needed to examine changes in society [10].

The difficulties brought by the pandemic have caused many changes in people's lives. Considering past pandemics, it is also aimed to develop a new questionnaire to evaluate the changes caused by the pandemic and to evaluate the psychometric properties of the developed questionnaire

Material and Methods

A questionnaire has been developed to evaluate the changes brought about by the pandemic process in the lives of individuals living in Turkey since March 2020. The research was designed prospectively. The study was carried out between September 2020 and September 2022. The study protocol was approved by the local Clinical Research Ethics Committee (Approved number 2020/1095).

Instrument development

In order to create the items, first of all, a literature review was carried out with the help of the Endnote X9 software program. Web of Science and Pubmed databases were used. Keywords (quality of life or lifestyle behavior) and (COVID-19 or pandemic) were used in this search. As a result of this search, a total of 251 articles (Pubmed=144 and Web of Science=17) were found. After removing 70 duplicated articles, 181 articles remained. These articles were reviewed with the other author to create the items.

In addition, the draft version of the items was created considering the difficulties encountered during the pandemic process. First of all, all the questionnaire items were evaluated in terms of language by interviewing the linguist and the final version of the draft questionnaire was given.

Face Validity

Ten individuals over the age of 18 were asked to interpret the questions in the draft questionnaire. The items were evaluated qualitatively through face-to-face interviews with the participants. Those who scored less than 1.5 item effect score were excluded from the questionnaire [11].

Content validity

The items were evaluated in terms of content validity by 7 experts from different fields (1 psychological counselor, 1 engineer, 2 teachers, and 3 physiotherapists among whom two were experienced in developing questionnaires). For the content validity index (I-CVI) of the items, the experts analyzed the items according to their relevance on a 4-point Likert-type scale. I-CVI was obtained by dividing the number of experts who gave 3 or 4 points to each item by the total number of experts. As a result, items below I-CVI 0.78 were excluded from the questionnaire [12]. How necessary the items were for the scale was measured using a 3-point scale (1 = Not necessary; 2 = Useful but not necessary; 3 = Necessary). In addition, the content validity index (S-CVI/Ave) at the questionnaire level was calculated by taking the average of the I-CVI values of the items. S-CVI/Ave should be >0.90 [12]. As a result of the evaluation, the content validity ratio (CVR) was calculated. According to Lawshe, the suitable CVR value for 7 experts is 1.00.

Pilot Testing and Item Analysis

A pilot test was conducted before the explanatory factor analysis. The pilot application was carried out using a questionnaire created with the help of a Google form. This questionnaire includes the consent of the participants to the study. It also questions the participants' residence status in Turkey, name surname, and age information since March 10, 2020. Participants completed the questionnaires individually. If the item-total correlation was less than 0.3, the item was removed. In addition, if Cronbach alpha increased when any item was removed, the item was deleted [13].

Construct validity

Exploratory factor analysis was used to evaluate the construct validity. At this stage, it is stated that a sample of 100-200 may be sufficient [14,15]. Data were collected with a different sample from the pilot application. Survey questions were shared in class social media groups at the university and relatives or friends were encouraged to share the survey as well. Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity tests were used to evaluate the adequacy and suitability of the sample. Eigenvalue value was determined as ≥ 1 and screen plot graphic was used. The minimum factor load was determined as 0.4. Exploratory factor analysis and varimax rotation were used to determine the factors.

Convergence validity

At this stage, WHOQOL-BREF was used to assess convergent validity. Turkish validity and reliability of this questionnaire have been made [16]. This questionnaire consists of 25 questions covering physical health, psychological health, social relationships, and environment in addition to general health status. Each item is rated on a 5-point (1-5) scale. A higher score indicates better quality of life [17]. Correlations were considered

low (<0.40), moderate (0.40-0.59), substantial (0.60-0.79), and high (>0.80) [18].

Statistical analysis

Statistical analysis was done using Software SPSS 25.0 version. Data analysis was performed through exploratory factor analysis with the basic component method with Varimax rotation. The normal distribution of data was examined by Kolmogorov-Smirnov test. Correlation between PPSQ and WHOQOL - Bref was evaluated using the Pearson correlation coefficient for normal distribution data and the Spearman correlation coefficient for non-distributed data. The P value <0.05 was considered significant.

Results

The Pandemic Process Status Questionnaire (PPSQ) initially consisted of 93 items. The flowchart of the development process of the questionnaire is given in Figure 1.

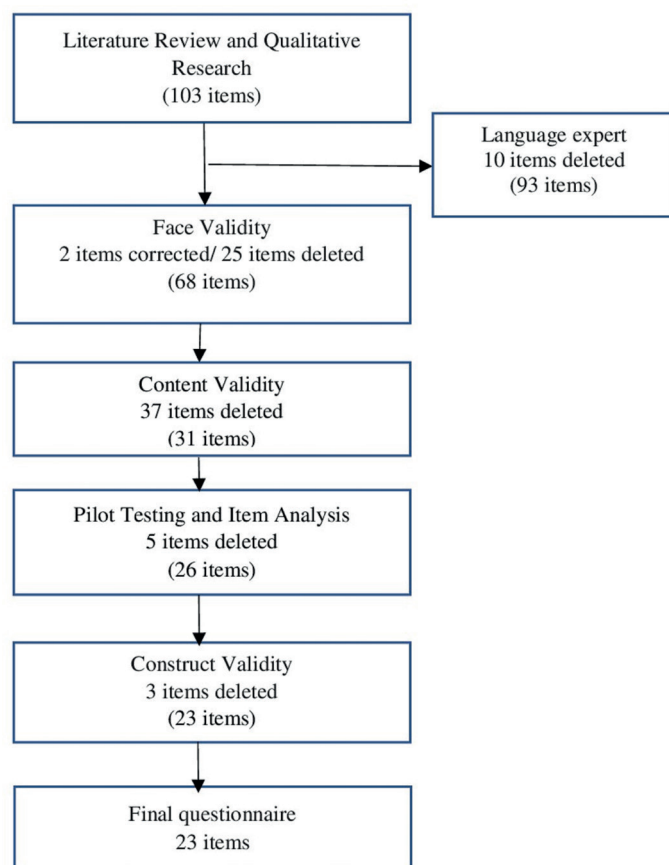


Figure 1. Flowchart for questionnaire development and validation

Face Validity

The mean age of the participants was 26.4 ± 4.03 . From a qualitative point of view, small suggestions were made for 2 items. Then, in quantitative face validity, a total of 25 items with an impact score below 1.5 were removed from the questionnaire.

Content validity

At this stage, first of all, 15 items below 0.78 according to CVI were deleted. S-CVI was found to be 0.90. Afterward, the items were examined according to the suggestions of the experts and the CVR, and 22 more items were deleted and as a result, 31 items remained.

Pilot Testing and Item Analysis

At this stage, a questionnaire was applied to 50 people. The mean age of the participants was 31.44 ± 11.90 . Cronbach's alpha was found to be 0.91. Since deleting any item would not cause an increase in Cronbach's alpha, the item was not deleted. In addition, 5 items with an item-total correlation below 0.3 were deleted. After the pilot testing, 26 items remained.

Construct validity

A total of 252 people filled out the questionnaire consisting of 26 questions. Since two of the participants did not reside in Turkey as of March 10, 2020, they were not included in the analysis. In total, analyzes were carried out for 250 participants. The mean age of the participants was 25.07 ± 8.63 . Since the value was 0.85 according to the KMO test result and Bartlett's test of sphericity test ($\chi^2 = 3672,962$ df= 253, $p=0.00$) was statistically significant, the sample was found to be appropriate. Principal component factor analysis was performed with Kaiser Normalization with varimax rotation. As a result of factor analysis, 6 factors were obtained for the questionnaire (Table 1). The scatter plot is in Figure 2. A 6-factor solution was shown, which explained 71.17% of the variance. One item was omitted because it was not assigned to any factor (fear of being unemployed during the pandemic worries me). Two items were removed because they were loaded on 2 factors and the difference between them was small (My sleeping habits changed during the pandemic process and I think I'm starting to get obsessed with cleaning during the pandemic process.). A total of 3 items were removed from the questionnaire at this stage, and a total of 23 items were obtained.

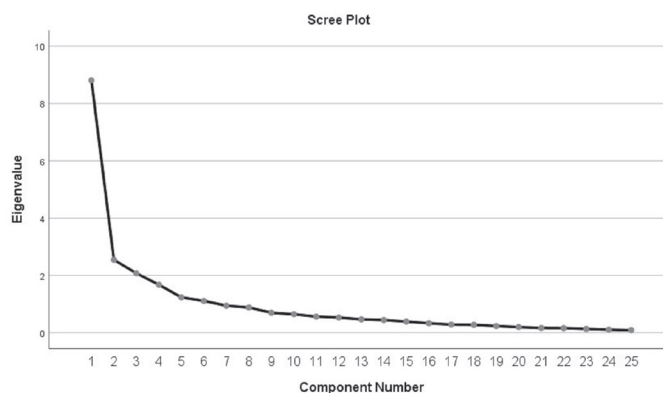


Figure 2. Scree plot for the exploratory factor analysis

Table 1. Results obtained from the factor analysis of the pandemic process status questionnaire

Code	Item	Factor Load					
		1	2	3	4	5	6
1	I get angry more quickly compared to before the pandemic period	0.865					
2	The pandemic process increases my anxiety level	0.833					
3	The pandemic process causes a pessimistic view of the future	0.829					
4	I feel more stressed during the pandemic process	0.741					
5	Having people around me with COVID-19 causes me anxiety		0.869				
6	I worry about the thought of being a COVID-19 carrier		0.869				
7	I'm afraid that someone from my family or close circle will catch COVID-19		0.847				
8	I'm afraid of having COVID-19		0.760				
9	My general health is adversely affected by the pandemic process			0.821			
10	The restricted life in the pandemic process negatively affects my general health			0.765			
11	Due to my various disease during the pandemic process, I have difficulties in getting health care			0.719			
12	The diseases I've had during the pandemic worry me more than usual			0.553			
13	I miss meeting my relatives and friends				0.789		
14	The pandemic process allows me to spend more time with my family				0.778		
15	I spend more time on social media than before the pandemic				0.761		
16	My social interaction decreased during the pandemic process				0.569		
17	I'm having a hard time going to work during the pandemic process				0.431		
18	The sedentary lifestyle (inactive) during the pandemic process is causing my physical health to deteriorate					0.805	
19	The sedentary and restricted life in the pandemic process reduces my physical performance					0.763	
20	Compared to the pre-pandemic period, I get tired more quickly					0.754	
21	The pandemic process makes healthy living more important for me					0.417	
22	My appetite increased during the pandemic process						0.858
23	I think I gained weight during the pandemic process						0.786
Eigenvalue		8.098	2.511	2.063	1.568	1.169	1.099
Variance explained (%)		35.208	10.917	8.967	6.817	5.082	4.780
Cumulative percentage%		35.208	46.124	55.092	61.909	66.991	71.772

Table 2. Correlation coefficient between PPSQ factors and WHOQOL^{BREF} subscales

WHOQOL- BREF	PPSQ						
	Education Status	General Status	Physical Status	Psychological Status	Social and Economic Status	Concerns about the Pandemic	Eating Habits
General health		0.23**	0.08	0.19*	-0.01	0.02	0.10
Physical health		0.40**	0.24**	0.24**	0.06	0.21**	0.12
Psychological health		0.22**	0.16*	0.22**	0.03	0.03	0.19*
Social relationships		0.19*	0.09	0.15*	0.01	0.11	-0.00
Environment		0.28**	0.10	0.16*	0.05	0.06	0.08

PPSQ= Pandemic Process Status Questionnaire; WHOQOL^{BREF}= World Health Organization Quality of Life-brief version*Significant at the $p < 0.05$ **Significant at the $p < 0.01$

Convergence validity

At this stage, 166 people completed the PPSQ and the WHOQOL - BREF. The mean age of the participants was 31.76 ± 9.86 years. The correlation between the subsections of the two questionnaires was evaluated with the Spearman test, and the correlation between the total scores of the scale was evaluated with the Pearson test. The correlations of the subsections are given in Table 2. There was a weak positive correlation between the total scores ($r=0.26$; $p=0.00$).

Scoring

The PPSQ consists of 6 sections and 23 questions. General status (4 items), eating habits (2 items), social status (5 items), and 3 questions related to physical status were scored based on a 5-point Likert scale (1=strongly agree, 5=strongly disagree). Physical status (1 item), psychological status (4 items) and concerns about the pandemic (4 items) were calculated on a 5-point Likert scale (1 = Always, 5 = Never). The lowest score on the questionnaire is 23 and the highest score is 115. Lower scores for all subsections indicate worse status. The formula was used to convert the scores into standardized scores between 0-100. According to this formula, the raw score of each section was obtained by summing the scores.

$$\text{Standardized score} = \frac{\text{Actual raw score} - \text{Lowest possible raw score}}{\text{Possible raw score range}}$$

Discussion

In this study, the PPSQ, consisting of 23 items, was developed in order to examine the changes in the COVID-19 pandemic process. It makes the interpretation of the difficulties encountered easily specific to the pandemic. In addition, the psychometric properties of the questionnaire were also tested. The questionnaire included questions about general status (4 items), psychological status (4 items), social status (5 items), concerns about the pandemic (4 items), eating habits (2 items), and physical status (4 items). The results showed that the questionnaire could evaluate the changes that occurred during the pandemic process.

The pandemic has had negative effects on many areas of life. In a study conducted in China, the first 2 items of WHOQOL-BREF were used to evaluate the impact of the epidemic on quality of life [19]. On the other hand, Chopra et al developed a survey of the impact of COVID-19 on lifestyle-related behaviors to assess the effects on eating behavior, sleep, and activity [10]. The need for different scales has also been noted to examine changes in mental health, such as fear of COVID-19 [20].

One of the factors belonging to the PPSQ is related to the psychological state. The largest factor load in this sub-dimension was related to irritability, level of anxiety, and pessimism about the future. During the COVID-19 pandemic, one in three people worldwide has been reported to have an anxiety disorder [21]. In addition, longitudinal studies after COVID-19 infection have reported deterioration in mental health and life satisfaction [22].

Looking at past pandemics, it has been reported that mental health problems such as anxiety and depression have also been reported in epidemics such as Severe Acute Respiratory Syndrome, Ebola, Middle East Respiratory Syndrome, and Zika [23].

Concerns about the pandemic were also one of the sub-dimensions. The largest factor load in this sub-dimension was related to concerns about the patients in the immediate environment, fear of contracting the disease and being a carrier of the disease. It has been stated that the biggest fears in the pandemic process are getting infected and transmitting the virus to friends or family [24]. The general health sub-dimension included the impact on the general health of the pandemic and the difficulties in accessing health services during the pandemic. One of the challenges of the pandemic was access to healthcare. Situations not related to COVID-19 have delayed access to and care for healthcare in Italy [25]. In the sub-dimension of social status, the largest factor load was related to longing for relatives and friends. The pandemic has caused great social isolation and people are driven into loneliness [26]. In addition, the item about spending more time with family members during the pandemic was also important in this sub-dimension. As a common result of disasters, there may be conflicts within the family along with psychological disorders. During the pandemic process, family members had to spend more time as a result of social isolation and restrictions. Most of the individuals included in a qualitative study reported strained family relationships [27]. Again, the item related to the increase in the use of social media in this sub-dimension also showed a high factor load. Due to the physical distance rules during the pandemic process, societies have excessively increased the use of social media for work, education, or social [28]. The item with the largest factor load in the physical health sub-dimension was related to the effect of sedentary life in the pandemic process. It is stated that sitting time and inactivity increase during the pandemic process and this situation negatively affects the quality of life [2]. In the PPSQ, there were items related to increased appetite and weight gain in the sub-dimension of eating habits. It is reported that there are many changes in lifestyle behavior during the pandemic process. One of them is eating behaviors. As a result, weight gain occurs [29].

As a result of the content validity, the S-CVI was found to be 0.90. This indicates strong validity for the questionnaire [13]. As a result of the exploratory factor analysis, the 6-factor structure explained 71.77% of the total variance. [WHOQOL]- BREF was used for convergence validity. This questionnaire has been used for validity in many quality-of-life scales [18,30]. PPSQ showed similar characteristics in most sub-dimensions, although not the same number of dimensions as WHOQOL - BREF. However, the correlation between the questionnaires was low. In another study, a low correlation was shown between WHOQOL - BREF and Health Protective Behavior Scale ($r=0.34$) [18]. This was similar to our study.

The strongest aspect of the study was that it used different samples

at each validation stage. Also, this study has some limitations. First of all, it was aimed to reach individuals in different age groups. However, due to the fact that our study was conducted online, the adaptation and interest of the older age group were less. In addition, our lack of reliability analysis was an important limitation.

Conclusion

PPSQ is a valid tool to evaluate the situation encountered during the pandemic process in detail and in a short time. This questionnaire can help healthcare professionals assess the changes brought about by the pandemic. It can also be used for evaluation in various scientific research.

Patient informed consent :

Signed informed consent was gathered from the participants for this study.

Conflict of interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

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Ethical approval

The study protocol was approved by the local Clinical Research Ethics Committee (Approved number 2020/1095).

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