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Turkish adaptation of the Mishel uncertainty in illness scale-community form

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Abstract

Purpose: The study aims to conduct the Turkish validity and reliability study of the Mishel uncertainty in illness scale-community form.

Design and Methods: This is a study with a methodological design. It was carried out in a family health center in a province in the Black Sea Region between May and October 2019. The sample of the study consisted of 479 individuals with chronic diseases. The data were analyzed with exploratory and confirmatory factor analysis.

Findings: The Cronbach's alpha was found to be 0.79. The fit indices of the 20-item scale with three-factor structure are at an acceptable level (root mean square error of approximation: 0.056; comparative fit index: 0.926; incremental fix index: 0.927; goodness of fit index: 0.918; Tucker–Lewis index: 0.915; adjusted goodness of fit index: 0.896; χ^2/SD: 2.481, $p < 0.001$).

Practice Implications: The level of uncertainty revealed by the scale gives information about the chronic disease management of individuals.

KEYWORDS
illness scale, Mishel uncertainty in illness scale, uncertainty assessment, uncertainty measure

1 | INTRODUCTION

Chronic diseases have an important place in achieving sustainable development goals in the 21st century. Success in sustainable development goals and the reduction of possible disease burden in the coming years will be determined by how societies will respond to the problems they encounter. At this point, actions aimed at reducing, preventing and controlling non-communicable diseases come to the fore.[1] It is known that together with the changing population characteristics, individuals have been living with one or more chronic diseases now. Therefore, it is important to determine how individuals manage their current illnesses throughout their life, what uncertainties they encounter and what their support needs are.[2]

Uncertainty in illness is one of the psychological stress factors for individuals. It has been shown in the literature that uncertainty in illness is inversely related to quality of life,[3] while there is a positive correlation between uncertainty in illness, anxiety and depression levels.[4] It is recommended that patients' coping strategies be

improved to reduce the negative effects of uncertainty.[3,4] It is generally accepted that uncertainty increases in complex diseases. However, individuals' cognitive perception of disease stimuli affects disease uncertainty rather than the severity of the disease or the uncertainty about the prognosis.[5] Individuals who experience uncertainty during the disease process are at high risk for difficulties such as incompatible coping strategies, anxiety, depression, and decreased quality of life.[5,6] The negative effects of multiple sclerosis, myocardial infarction, diabetes mellitus, fibromyalgia, rheumatoid arthritis and cancer, HIV, and other chronic conditions-related uncertainty have been reported.[7] Meeting patients' need for information and counseling is an important initiative for healthcare professionals to reduce disease uncertainty.[3,4,8,9]

The uncertainty in illness theory, which Mishel developed in 1988 and reconceptualized in 1990, describes the ways in which both the patient and his family perceive and manage uncertainty about a disease. The model perceives uncertainty as a stressor and provides a theoretical framework for the selection of interventions

that will improve the psychological and behavioral outcomes it causes. It suggests that managing uncertainty is important to adapt to the acute or chronic stages of a disease.[10]

Although the causes of disease uncertainty vary, it is reported that it is associated with age, level of knowledge, education, social support, healthcare professional support, cognitive capacity, and the anxiety level of the individual.[11,12] Disease uncertainty is affected by the fact that the information one has about any threat to health is too little, too much or inconsistent.[11] In addition, coping with uncertainty is directly related to spirituality, religious belief, perceived quality of life, self-esteem, family support, and hope for life.[3,13] As in all other religions, beliefs in the Turkish Muslim societies affect life and health behavior in many respects, including the way diseases are managed and the level of uncertainty.[14,15] Religions, beliefs and cultural characteristics of societies have an impact on health and disease perceptions.[16,17] For example, the perception that events are determined by a divine power and the results will not change has an effect on cancer patients' and their families' ability to make sense of and cope with the disease.[18]

The prognosis of chronic illnesses that cannot be cured completely and have a poor course involves feelings, such as loss of independence, difficulty of acceptance, hopelessness and depression, as well as uncertainty for the individual and his family.[19] Not being able to cope with the problems caused by the existing chronic disease leads to physiological, social and psychological problems. Having less knowledge than necessary in case of chronic disease may turn into posttraumatic stress symptoms.[19]

The gradual increase in chronic diseases brought the control and effective management of diseases into the agenda. For effective disease management, the unknown and uncertain areas in the disease process need to be evaluated and eliminated.[2,20] Therefore, valid and reliable measurement tools are needed to evaluate disease uncertainty. The number of studies focusing on this topic is limited in Turkey,[21] and it has been observed that the scales which have been used to evaluate disease uncertainty investigate the concept of uncertainty as a general concept, not specific to the disease.[22,23] This study aimed to carry out the Turkish adaptation of the Mishel uncertainty in illness scale-community form (MUIS-C), which was developed by Mishel[10] and whose validity and reliability studies were conducted in international literature,[7,24,25] and to test the validity and reliability of the measurement tool for the Turkish society.

2 | METHOD

2.1 | Research question

The following research question was addressed in the study: "Is the Mishel uncertainty in illness scale-community form a valid and reliable measurement tool for the Turkish society?" To answer this study question, the Turkish psychometric properties of the MUIS-C were evaluated through a methodological study which was conducted in a family health center in a province in the Black Sea Region between May and October 2019.

2.2 | Research sample

The research population constituted individuals who visited the family health center in the specified city center, who were diagnosed with any chronic disease at least 6 months ago, and who were 18 years of age or older. It is recommended in the literature that the sample size should be 5 or 10 times the number of scale items to perform factor analysis in validity and reliability studies.[26] For this reason, as required by the design of methodological studies, the sample size of the research was planned to be at least 230 individuals, which is ten times the total number of items in the scale to be adapted. All the patients who visited the family health center during the time of the study and who were diagnosed with a chronic disease at least 6 months ago were included in the study on a voluntary basis, without any sample selection. Four hundred and seventy-nine volunteers who met the inclusion criteria of the study formed the sample of the study.

2.3 | Data collection tools

Personal information form: The form was created by the researchers reviewing the relevant literature. This form includes questions on the characteristics of the individuals with a chronic disease, such as age, gender, education, marital status, family type, people with whom they live, name of the chronic disease, duration of diagnosis, drug use, being able to do personal daily care, and the effect of the disease on family and work life. Furthermore, individuals evaluate the effect of the current chronic disease on their lives on a visual scale between zero (very bad) and 10 (very good) by marking the option that suits them.

MUIS-C: The scale reveals the uncertainty experienced by individuals with chronic diseases when they are not hospitalized. Mishel recommends the use of the 23-item version of the scale, which was initially developed as 28 items in 1986.[10] In this study, the 23-item version of the scale was used, and the items 4, 19, and 20 were removed from the scale as their factor loadings were below 0.30. Thus, the final version of the scale consisted of 20 items. The scale is evaluated based on the total score and the score for each of the three dimensions, namely, perception of the current situation, perception of understanding, and ambiguity. Items 1, 2, 3, 4, 6, 8, 10, 11, 12, 13, and 17 represent the perception of the current situation dimension; items 5, 7, 19, and 20 represent the perception of understanding dimension; and items 9, 14, 15, 16, and 18 represent the ambiguity dimension. Each item in the scale is evaluated on a five-point Likert scale: "I absolutely disagree" (1), "I disagree" (2), "I am indecisive" (3), "I agree" (4), and "I strongly agree" (5). Items 6, 8, 22, and 23 are reverse scored. The total score that can be obtained from the scale varies between 20 and 100, and the average is 60. Higher scores indicate higher levels of disease uncertainty. The Cronbach's alpha of the original scale ranges from 0.74 to 0.92.[10]

TABLE 1 Descriptive characteristics of the participants with a chronic disease

Characteristics	$\bar{x} \pm SD$	
Age	52.05 ± 13.57 (min = 18, max = 86)	
Effect of the disease on life	5.4 ± 1.94 (min = 1, max = 10)	
	n	%
Gender		
Female	229	60.3
Male	151	39.7
Marital status		
Married	309	81.3
Single	71	18.7
Education level		
Illiterate	129	33.9
Secondary school	112	29.5
Middle school	39	10.3
High school and above	100	26.3
Family type		
Nuclear	279	73.4
Extended	101	26.6
Working status		
Working	111	29.2
Not working	269	70.8
Current chronic disease[a]		
Hypertension	161	31.5
Diabetes	151	29.5
Rheumatic disease	56	11.0
Asthma	51	10.2
Chronic lung disease	32	6.1
Chronic renal failure	16	3.1
Cancer	15	2.9
Other (epilepsy, psoriasis, etc.)	29	5.7
Drug use		
Yes	343	90.3
No	37	9.7
Being able to do personal care		
Yes	352	92.6
No	28	7.4
Care requirement		
Yes	93	24.5
No	287	75.5
Someone providing care at home		

(Continues)

TABLE 1 (Continued)

Characteristics	$\bar{x} \pm SD$	
Yes	292	76.8
No	88	23.2
Receiving training on the disease		
Yes	122	38.0
No	199	62.0

[a]Multiple responses were received from the participants.

2.4 | Data collection

After obtaining permission from the researcher who developed the scale for adaptation into Turkish and use, the scale was translated into Turkish by two independent language experts who can speak English and Turkish fluently. After a common text was created from both translations, the opinions of seven experts in the fields of educational sciences, public health and nursing were received about the adequacy of the translation from English to Turkish. Then, by comparing and evaluating the expert opinions, the pilot Turkish version of the scale was obtained. Finally, the pilot Turkish version was back-translated to English by an independent linguist who knows Turkish and English very well. The form to be administered was created by combining the pilot form with the personal information form. This form was administered to 479 individuals with chronic diseases by the researchers using the face-to-face questionnaire method. All of the participants in the sample completed the form. It took around 10 min to collect data.

2.5 | Validity analysis

The data were analyzed using the SPSS 22 and the Amos 22 program. Exploratory Factor Analysis (EFA) and confirmatory factor analysis (CFA) were performed to test the construct validity of the scales. Principal components analysis was used for the EFA and the data were analyzed using the varimax rotation method. To determine the appropriateness of the EFA, the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was used. By using Bartlett sphericity test, the meaningfulness of intervariable correlation coefficients was determined. For CFA, goodness of fit index (GFI), adjusted GFI (AGFI), comparative fit index (CFI), root mean square error of approximation (RMSEA), root mean square residual (RMR), standardized RMR (SRMR), normed fit index (NFI), and χ^2 and χ^2/SD GFIs were used.

2.6 | Reliability analysis

Cronbach's alpha was used to test the internal consistency of the scale and each factor obtained as a result of the factor analysis. The item-total item correlations and mean inter-item correlations were
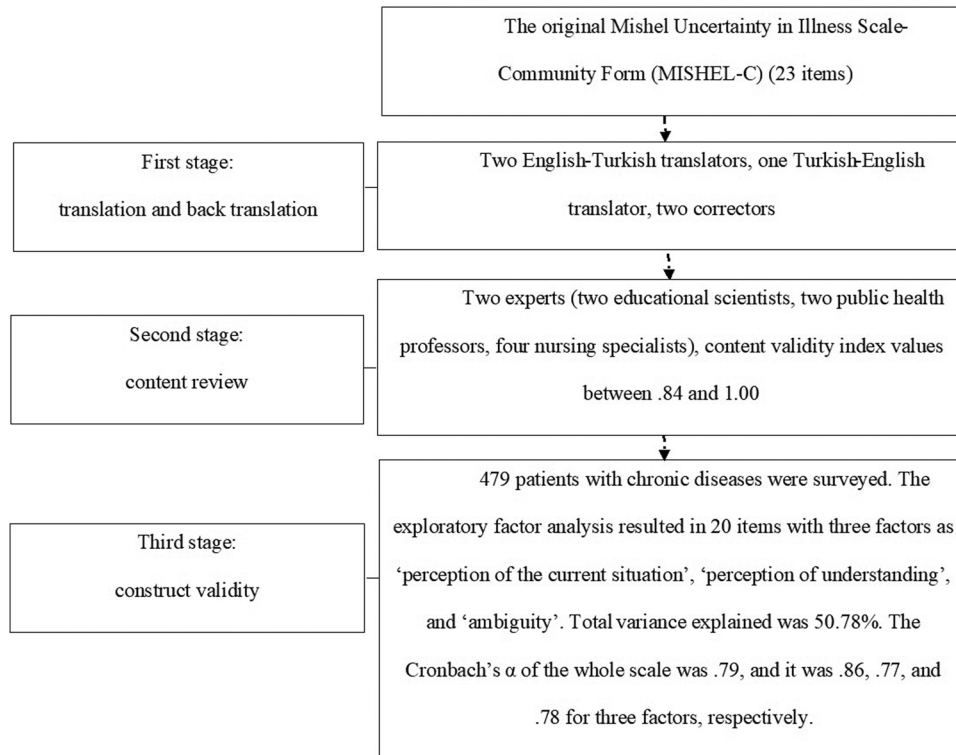
FIGURE 1 Flow chart of the study

included in the analysis. Spearmen correlation analysis was used for item total score analysis.

3 | RESULTS

3.1 | Descriptives

Total, 60.3% of the participants are women, the average age is 52.05 ± 13.57 (min = 18, max = 86), 81.3% are married, 33.9% have not attended school, and 29.5% are primary school graduates. About 73.4% have nuclear family structure, and 70.8% do not work. Currently, the most common chronic diseases are hypertension (31.5%) and diabetes (29.5%). Here, 90.3% of the participants use drugs, 92.6% can do their personal daily care, 24.5% need care due to their disease, and 76.8% have someone who takes care of the home. The participants stated that the disease affects family (47.6%) and work life (38.7%). They evaluated the effect of the disease on life between 0 and 10, and the average was 5.4 ± 1.94 (Table 1).

3.2 | Descriptive statistics for the MUIS-C

The mean score of the MUIS-C was found to be 63.99 ± 11.52 (min = 31, max = 99).

3.3 | The results of the validity and reliability analyses

The validity and reliability stages of the study are given in Figure 1.

3.4 | Language validity

The Davis technique was used for the language content validity of the scale.[27] Language content validity index values of items ranged between 0.84 and 1.00. According to Davis, content validity index values should be greater than 0.80.[27] Therefore, it can be said that the language content validity indexes of the MUIS-C scale are sufficient. After the scale was finalized, it was piloted with 20 individuals who were not included in the study, and it was seen that the items were clear and understandable for the participants.

3.5 | Validity analysis

The EFA results revealed that the KMO coefficient was 0.922 and the Barlett test result was $\chi^2 = 3427.176$, $p < 0.001$. The factor loadings of the items in the scale ranged from 0.348 to 0.653. The total variance explained was 50.776 (Table 2).

3.6 | Reliability analysis

For MUIS-C, the total Cronbach's alpha was 0.79, and that of the scale dimensions was determined as follows: perception of the current situation $\alpha = 0.86$, perception of understanding $\alpha = 0.77$, and ambiguity $\alpha = 0.79$. The item- total score correlation coefficients of the scale ranged from 0.46 to 0.66 (Table 2).

The CFA results were significant at $p < 0.001$, and the structural equation modeling of the scale was found significant for 20 items and three dimensions. The model was improved. During the improvement,

the variables that reduce compliance were determined and new co-variances were created for the residual values with high covariance (e3–e11; e9–e12; e14–e15). In the renewed fit index calculations, it was seen that values accepted for fit indices were obtained (Table 3). According to the results of the first level multifactor analysis, when the fit indices of the MUIS-C were analyzed, the following values which are at an acceptable level were obtained: RMSEA: 0.056; CFI: 0.926; IFI: 0.927; GFI: 0.918; TLI: 0.915; AGFI: 0.896; χ^2/SD: 2.481 ($p < 0.001$) (Table 2).

The first level multi-factor CFA results of the MUIS-C are shown in Figure 2. Based on the results, three items were

TABLE 2 Validity and reliability results for the Mishel uncertainty in illness scale-community form

Item	Scale items	Factor loading	$\bar{x} \pm SD$	Item-total correlation	Cronbach's alpha if item deleted	Exp. variance (%)
Factor 1: Perception of the current situation ($\alpha = 0.861$)						
1	I do not know what is wrong with me.	0.444	2.78 ± 1.08	0.516	0.854	21.742
2	I have many questions without answers.	0.629	3.24 ± 1.15	0.597	0.848	
3	I am unsure if my illness is getting better or worse.	0.679	3.20 ± 1.05	0.622	0.846	
4	Explanations about my condition are not clear.	0.460	2.99 ± 1.08	0.548	0.851	
6	The symptoms of my illness continue to change unpredictably.	0.579	2.94 ± 1.08	0.593	0.848	
8	The doctors say things to me that could have many meanings.	0.582	3.22 ± 1.03	0.457	0.858	
10	It is difficult to know if the treatments or medications I am getting are helping.	0.629	3.15 ± 1.12	0.644	0.844	
11	Because of the unpredictability of my illness, I cannot plan for the future.	0.619	2.97 ± 1.21	0.659	0.843	
12	The course my illness continues to change. I have good and bad days.	0.697	2.45 ± 1.01	0.497	0.855	
13	There are different opinions about what is wrong with me.	0.559	3.12 ± 107	0.473	0.857	
17	Because of the treatment, what I can do and cannot do keeps changing.	0.541	3.17 ± 1.03	0.502	0.855	
Factor 2: Perception of understanding ($\alpha = 0.775$)						
5	The purpose of each treatment is clear to me.	0.694	3.09 ± 1.00	.531	0.745	36.268
7	I understand everything explained to me.	0.713	3.08 ± 1.09	0.541	0.739	
19	The severity of my illness has been determined.	0.777	3.13 ± 1.06	0.609	0.705	
20	The doctors and nurses use everyday language, so I can understand what they are saying.	0.772	3.22 ± 1.25	0.641	0.687	
Factor 3: Ambiguity ($\alpha = 0.787$)						
9	My treatment is too complex to understand.	0.536	2.70 ± 1.05	0.561	0.747	
14	What will happen to me is unclear.	0.550	2.84 ± 1.10	0.525	0.761	
15	The results of my tests are inconsistent.	0.742	2.64 ± 1.01	0.640	0.720	
16	The efficiency of the treatment is unclear.	0.655	2.69 ± .98	0.631	0.724	
18	I did not get a certain diagnosis.	0.762	2.12 ± .90	0.466	0.775	
Total Cronbach's alpha, $\alpha = 0.794$						
Total explained variance (%)						50.776

	RMSEA	NFI	CFI	IFI	GFI	TLI	AGFI	CMIN	CMIN/DF
Premodification	0.061	0.867	0.910	0.911	0.907	0.898	0.883	462.951	2.772
Postmodification	0.056	0.883	0.926	0.927	0.918	0.915	0.896	406.822	2.481

TABLE 3 Multifactor confirmatory factor fit index results for the Mishel uncertainty in illness scale-community form before and after modification

Abbreviations: CFI, comparative fit index; AGFI, adjusted goodness of fit index; CMIN/DF, minimum discrepancy per degree of freedom; GFI, goodness of fit index; IFI, incremental fix index; NFI, normed fit index; RMSEA, root mean square error of approximation; TLI, Tucker–Lewis index.
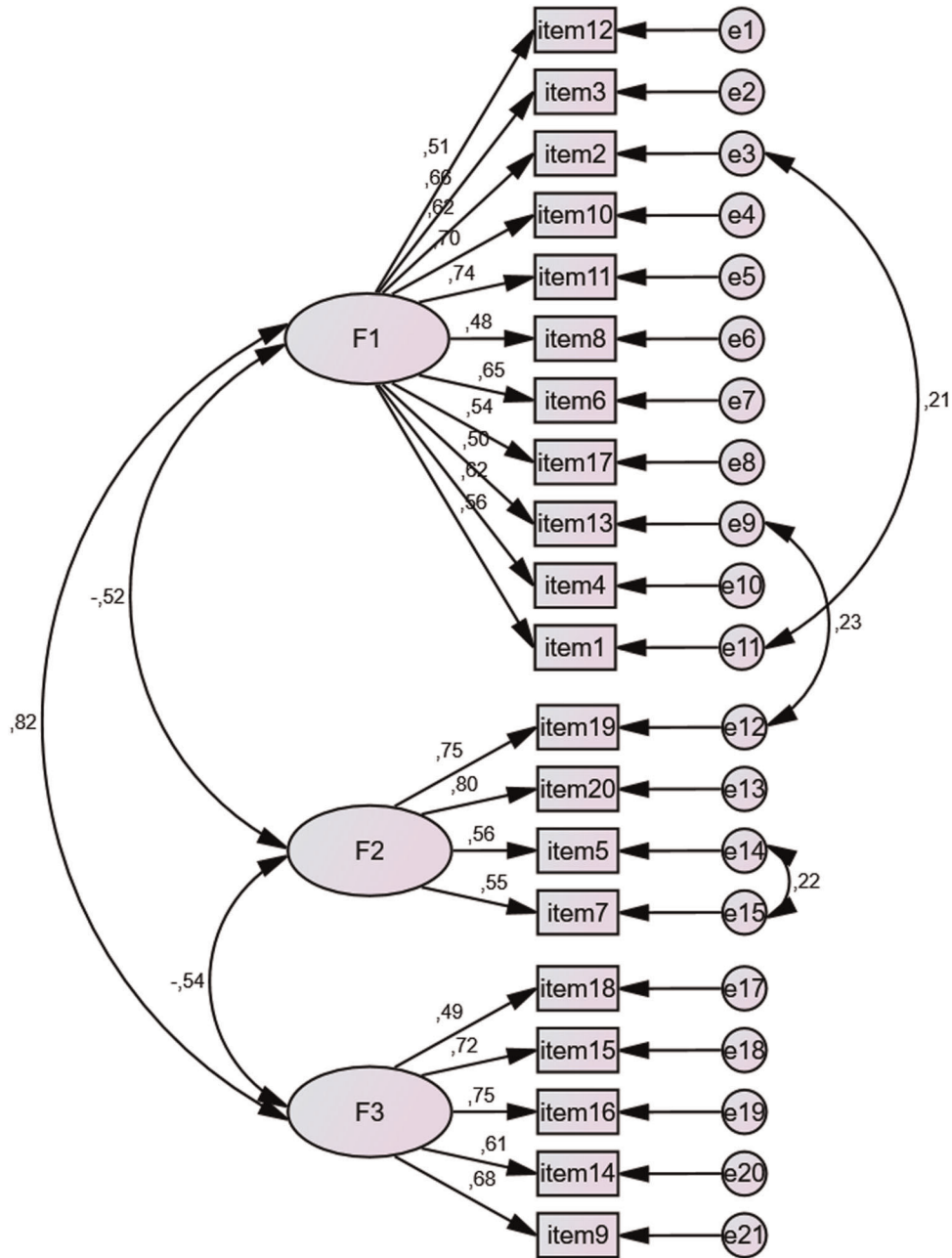
FIGURE 2 Analysis of the factor structure of the MUIS-C with the PATH diagram. MUIS-C, Mishel uncertainty in illness scale-community form [Color figure can be viewed at wileyonlinelibrary.com]

removed from the model and the model was accepted with a three-factor structure consisting of 20 items. The lowest factor loading of the scale was found as 0.44 and the highest value was 0.78.

4 | DISCUSSION

As a result of the opinions of seven experts on the items of the MUIS-C, the content validity index was found to be high. As a result of the EFA, the total variance KMO coefficient of the scale was found to be 0.922 and Bartlett's sphericity test results were significant, indicating that the sample size was perfectly suitable for factor analysis and the data came from a multivariate normal distribution.[28] As a result of the analysis, the total variance explained was found to be 50.776. In the literature, explanatory variance rate between 40% and 60% has been considered sufficient.[29]

The item analysis findings show that the items in the scale can reveal the uncertainty level of the individuals with chronic diseases efficiently. According to the literature, an item in a scale is expected to have a factor loading value of 0.30 or 0.40.[29] Based on the item analysis, three items (items 4, 19, and 20) with a factor loading below 0.30 were removed from the scale, and the total score correlation coefficients of the remaining items varied between 0.46 and 0.66. The correlation coefficients were greater than 0.20 for all the items of the scale. In an adaptation study, the high correlation between the scale and its factors indicates that the internal consistency of the scale is high. In their MUIS-C study, Sharkey et al.[7] adapted the scale for adolescents and young adults with chronic diseases. Their scale consisted of 22 items and two sub-dimensions as ambiguity/future uncertainty ($\alpha = 0.93$) and unpredictability ($\alpha = 0.89$), and the total variance explained was 45.350%. In another adaptation study of the MUIS-C on the male sample with prostate cancer,[30] one item with low total score correlation was removed from the scale and the Cronbach's alpha coefficient was found to be 0.91. In the Italian adaptation study of the MUIS scale by Giammanco et al.,[24] the factor loadings of the items ranged between 0.41 and 0.80.

As far as model fit is concerned, χ^2/SD value below 3 refers to perfect fit, an RMSEA value of 0.08 and below indicates good fit, and NFI and CFI values of 0.90 and above and 0.95 and above point to good fit and perfect fit, respectively. An IFI value of 0.90 and above and a GFI value of 0.90 and above refer to good fit, and an AGFI value of 0.85 and above indicates an acceptable fit.[26,31] More than one fit index is obtained as a result of the CFA, which tests construct validity, and the accuracy of the model is evaluated when all the indices are together, not with a single fit index.[32] When the fit statistics in this study is analyzed, it is seen that RMSEA, CFI, IFI, GFI, TLI, and AGFI values and CMIN and CMIN/DF values indicate acceptable fit. When the model fit values and factor loadings of the scale items are evaluated together, it can be said that the three-factor and 20-item structure of the MUIS-C form is validated and the model has satisfactory fit values.[24] The scale with three-factor structure was found to have acceptable fit indexes with RMSEA = 0.046, CFI = 0.984, and TLI = 0.984. In the adaptation study of the scale with

two-factor structure, the fit indexes were reported as follows: CMIN = 520.053, $p < 0.001$, CFI = 0.840, TLI = 0.822, RMSEA = 0.079, and SRMR = 0.074.[7]

One of the methods used to evaluate internal consistency is the Cronbach's alpha reliability coefficient. If it is between 0.60 and 0.79, the measurement tool is considered to be relatively reliable, and if it is between 0.80 and 1, the tool is considered to be highly reliable.[33] In this study, the Cronbach's alpha was found to be 0.77 for the perception of understanding dimension and 0.79 for the ambiguity dimension. The Cronbach's alpha reliability values of the original scale range between 0.74 and 0.92. The total and sub-dimension Cronbach's alpha values of the scale in this study are compatible with the original scale and are reliable.[33] In the Italian adaptation study, the MUIS scale has three sub-dimensions and the Cronbach's alpha of the sub-dimensions are 0.796 for the ambiguity dimension, 0.778 for the inconsistency dimension, and 0.705 for the complexity dimension.[24]

4.1 | Limitations of the study

The validity study of the scale was conducted to evaluate uncertainty about chronic diseases in the Turkish population. One limitation of this validation study is that the test–retest reliability cannot be verified due to the study design.

5 | CONCLUSION

In this study, the Turkish adaptation of the MUIS-C developed by Mishel in 1986 was tested on a sample of individuals with chronic diseases, and in this way, it was aimed to make a contribution to the literature. The results revealed that the scale is valid and reliable in revealing the uncertainty levels of the Turkish community about chronic diseases. It is recommended to test the validity and reliability of the scale on larger samples and in different cultures.

5.1 | Implications for nursing practice

The scale reveals the uncertainty individuals with chronic diseases experience during the periods of non-hospitalization. The level of uncertainty revealed by the scale also gives information about the chronic disease management of individuals. Uncertainty is an important problem that negatively affects mental health. Therefore, especially psychiatric nurses, public health nurses, home care nurses and oncology nurses can use the MUIS-C and determine patients' condition while providing care to individuals with chronic diseases. In this way, they can organize care in line with the requirements of patients.

CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

DATA AVAILABILITY STATEMENT

Data available on request from the authors.

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