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ORIGINAL ARTICLE

Evaluation of Turkish validity and reliability of the Cancer Stigma Scale

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Abstract

Objective: In this study, it was aimed to evaluate the Turkish validity and reliability of the Cancer Stigma Scale (CASS) in women who applied for cancer screening.

Methods: After the translation and cultural adaptation phase of CASS was completed, the Turkish version (T-CASS) was applied to 500 women who applied for cancer screening between December 2, 2019 and January 26, 2020, by face-to-face interview technique. The reliability of T-CASS was evaluated with internal consistency analysis and test-retest analysis. Cronbach Alpha internal consistency coefficient was calculated to evaluate internal consistency. The validity of the T-CASS was evaluated by content validity (according to the Davis technique) and construct validity. The accuracy of the six sub-dimensional structures was tested with first and second level Confirmatory Factor Analysis (CFA).

Results: Cronbach's alpha coefficient for the T-CASS was 0.659. Test-retest total scores of the T-CASS showed "moderate" correlation ($r=0.488$, $p<0.001$). The content validity results showed that all items were suitable for language validity according to the Davis Technique. According to the results of first and second order CFA, fit indices demonstrated a very good model fit.

Conclusion: It was concluded that T-CASS is a "valid" and "moderately reliable" scale that can be used to measure cancer stigma in groups of women with similar sociodemographic characteristics.

Keywords: Attitude, Early Detection of Cancer, Scale, Stigma, Validity and Reliability

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INTRODUCTION

Today, cancer ranks second among the causes of death in the World.[1] It is predicted that one out of every five men and one out of every six women will develop cancer during their lifetime, and one out of every eight men and one in every eleven women will die of cancer worldwide.[2] In addition to cancer lethality, it adversely affects physical and mental health with loss of organs and limbs; it causes great harm to the economy of individuals and society with labor losses and high treatment costs.[3,4]

Characteristics such as race, nationality, belief, physical disability, and mental illness of individuals or groups have been seen as a stigma in many societies throughout history, and those individuals or groups have been evaluated as incomplete and defective by the society.[5,6] Since cancer is a disease with high mortality and morbidity, being diagnosed with cancer in society is considered as a situation that evokes death. The society believes that even if people diagnosed with cancer recover from such a fatal disease, the state of deficiency and inadequacy will continue physically and socially.[7,8] Seeing cancer as a stigma with this aspect results in stigmatization of cancer patients. This stigmatization process leads to a decrease in self-esteem, anxiety disorder and depression, not participating in cancer screenings, and even rejection of cancer treatment in order to avoid visible changes such as hair loss.[5,9] However, early diagnosis and adequate treatment play a key role in reducing cancer-related disability and increasing survival.[10] However, cancer stigma reduces the chance of early diagnosis by decreasing participation in screening activities and negatively affects compliance with cancer treatment.[5,11]

In the literature research, it was determined that the studies on cancer stigma are limited, and the stigma measurement tools in this field are generally aimed at determining the stigma level of people with cancer. It has been observed that the tools that measure the attitudes of healthy people and therefore the society towards cancer are limited.[11,12,13] Determining the cancer stigma levels when people are still healthy and revealing the factors associated with stigma are of great importance in terms of removing the stigma barrier in front of cancer screenings, increasing compliance with cancer treatment, and increasing the quality of life by protecting the mental and physical health of people. Therefore, in this study, it was aimed to evaluate the Turkish validity and reliability of the Cancer Stigma Scale (CASS), developed in England, in women who applied to screening center.

METHODS

Participants and Procedure

This study is a part of one of the authors' thesis research. The thesis research consists of two parts. The first is a methodological study evaluating the validity and reliability of the Cancer Stigma Scale; The second is a descriptive study in which the cancer stigma levels of the participants and associated factors were evaluated. In this article, the section evaluating the Turkish validity and reliability of the cancer stigma scale is presented.

Permission from the Ankara Provincial Health Directorate and Hacettepe University Non-Interventional Clinical Researches Ethics Board's approval (Land No: 2019/24-20), were obtained as well as participants'

informed consents.

Data were collected at Ahmet Andiçen Cancer Early Diagnosis and Treatment Center between 2 December 2019 and 26 January 2020. The data collection form was applied by the researcher to the people who applied for cancer screening by face-to-face interview method after screening.

In the literature, when calculating the sample size in validity-reliability studies, it is stated that 200 participants are "moderate", 300 participants are "good", 500 participants are "very good" and 1000 participants are "excellent".[14,15] In this study, it was planned to conduct the research with 500 participants. Initially, the study was planned to evaluate the validity and reliability of the CASS in both genders who had not been diagnosed with cancer before. For this purpose, the data collection form was applied to 527 people without any gender restriction. Since 10 out of 527 people were diagnosed with cancer before, 5 people did not answer all of the scale questions, and 11 people did not answer all the demographic, knowledge and/or perception questions, they were excluded from the analysis. Only one of the applicants for cancer screening at the time of data collection was male, and since this did not provide sufficient representation for the male gender, the data of the male participant was also excluded from the analysis. Thus, the research analyzes were carried out on the data of 500 female participants.

Study Instrument

Data Collection Form included questions about the sociodemographic characteristics of the participants and the Turkish version of CASS (T-CASS).

CASS was developed by Laura AV Marlow and Jane Wardle in England in 2014 to measure the stigma of cancer in the non patient population. The scale consists of six dimensions: Awkwardness, Severity, Avoidance, Policy Opposition, Personal Responsibility and Financial Discrimination. The number of items in each dimension varies between three and five, and there are 25 items in total. The scale consists of statements scored through a 7-point Likert method: 1 = disagree strongly, 2 = disagree moderately, 3 = Disagree slightly, 4 = Agree slightly, 5 = Agree moderately, 6 = Agree strongly, and 7 = Not sure. Items 10, 11, 21, 22, and 23 of the scale are reverse scored. The Cronbach Alpha internal consistency coefficient of the scale is 0.76-0.91. The scale does not have a cutoff point, and high scores indicate a high stigma level.[11,12]

Language Validity

In this study, firstly, the language validity of CASS was evaluated. In the first step, CASS was independently translated into Turkish by five English teachers. These five translations were evaluated by the researchers and the most appropriate single translation was decided for each scale item. In the second step, the most appropriate translation was evaluated independently by a group of five experts (an associate professor working in a community mental health field, an epidemiologist, a professor of psychiatry, a professor working in medical oncology, and an associate professor working in medical oncology) in terms of the original concept, suitability for Turkish culture and intelligibility. In the third step, the researchers made adjustments to the translation according to the suggestions of the experts. In the fourth step, the translation was evaluated by a Turkish teacher in terms of

grammar and intelligibility and took its final form in Turkish. In the fifth step, the Turkish scale was translated back into English by a new English teacher. The English translation obtained in the sixth step was compared with the original scale by the researchers and it was seen that the scale items were compatible with each other. Thus, the language validity phase of the scale was completed.

Statistical Analysis

Data was evaluated the statistical package program IBM SPSS 23, and AMOS v.23 program. The descriptive statistics were expressed as frequency, mean, median, standard deviation, 1st–3rd quartile, minimum-maximum values. Analytical method (Kolmogorov-Smirnov) and visual methods (histogram and probability graphs) were used to evaluate the conformity of continuous variables to the normal distribution.

Internal consistency analysis and test-retest analysis were performed to evaluate the reliability of the T-CASS. The Cronbach Alpha internal consistency coefficient was calculated to evaluate the internal consistency. For the test-retest reliability analysis of the T-CASS, the scale was reapplied to 100 people with known pseudonyms from 500 participants with an interval of 15-30 days, which is stated as the ideal time interval in the literatüre.[15] The correlation between both measurements was evaluated with Spearman's rho correlation coefficient.

The validity of the T-CASS was evaluated by testing its content validity and construct validity. The content validity of the scale was evaluated according to the "Davis technique" by the experts involved in the language validity phase. In the Davis technique, experts evaluate each item and give a four-point rating as "Appropriate", "The item needs some revision", "The item needs serious review" and "The item is not suitable". In this technique, the "content validity index" for the item is obtained by dividing the total number of experts who marked the "Appropriate" and "The item needs some revision" options by the total number of experts who evaluated the items. If this value is 0.80 and above, it means that the item is acceptable.[16,17]

During the evaluation of the Construct Validity of the T-CASS, Confirmatory Factor Analysis (CFA) was applied to the entire sample (n=500), since the structure of the CASS was known beforehand. In the literature, it is stated that there is no need to perform Explanatory Factor Analysis (EFA) while adapting the scale, since its latent structure was determined and verified during the development phase of the scale. It is stated that it is appropriate to evaluate the compatibility in the new culture with Confirmatory Factor Analysis (CFA) while adapting the model put forward during the development phase.[15,18]

RESULTS

Participant Characteristics

All of the 500 people (100.0%) participating in the research were women. The mean age of the participants in the study was 54.8 ±8.6, and the median age was 56. 22.0% of the participants were between the ages of 60-64, 31.0% had a university degree or higher.

Validity Analysis

In this study, in order to evaluate the validity of the T-CASS, firstly language validity, then content validity and construct validity were evaluated.

Language Validity

The stage of ensuring the Turkish language validity of the T-CASS is explained in the method section.

The Content Validity

As seen in Table 1. the x^2 value of the six-factor structure was 341.673, the degrees of freedom were 248, and p=<0.001. The six-factor structure showed "very good" fit when evaluated with x^2/sd, RMSEA, SRMR, AGFI, and "good" fit when evaluated with CFI, and GFI.

The content validity of the scale was evaluated according to the "Davis technique". According to the evaluations of the experts, the content validity index of 24 of the 25 items constituting the scale was 1.0 and one item was 0.8. If this value is 0.80 and above, it means that the item is acceptable.[16,17] This result showed that all items were suitable for language validity according to the Davis Technique.

The Construct Validity

Confirmatory Factor Analysis (CFA) was performed on all samples (n=500). Maximum likelihood method was applied in CFA. The path graph obtained as a result of the first level CFA is given in Figure 1 and the standard fit measures are given in Table 1.

Table 1. Goodness-of-fit values of the Turkish Cancer Stigma Scale (T-CASS) obtained as a result of the first level Confirmatory Factor Analysis (CFA)

Fit values	Weak fit (WF)	Good fit (GF)	Very Good Fit (VGF)	CASS fit values	T-CASS fit values	Compatibility Result of T-CASS
x^2		2df≤ x^2 ≤3df	0≤ x^2 ≤2df	379.63	341.673	VGF
x^2/df		≤5	≤3	1.465	1.378	VGF
RMSEA	≤0.10	≤0.08	≤0.05	0.052	0.028	VGF
SRMR		≤0.10	≤0.05		0.041	VGF
CFI	0.85≤CFI<0.90	0.90≤CFI<0.95	0.95≤CFI≤1	0.94	0.927	GF
GFI	0.85≤GFI<0.90	0.90≤GFI<0.95	0.95≤GFI≤1		0.949	GF
AGFI	0.80≤AGFI<0.85	0.85≤AGFI<0.90	0.90≤AGFI≤1		0.933	VGF

RMSEA: root mean square error of approximation footnotes; SRMR: standardized root mean square residual, CFI: comparative fix index; GFI: goodness of fit index; AGFI: adjusted goodness fit index

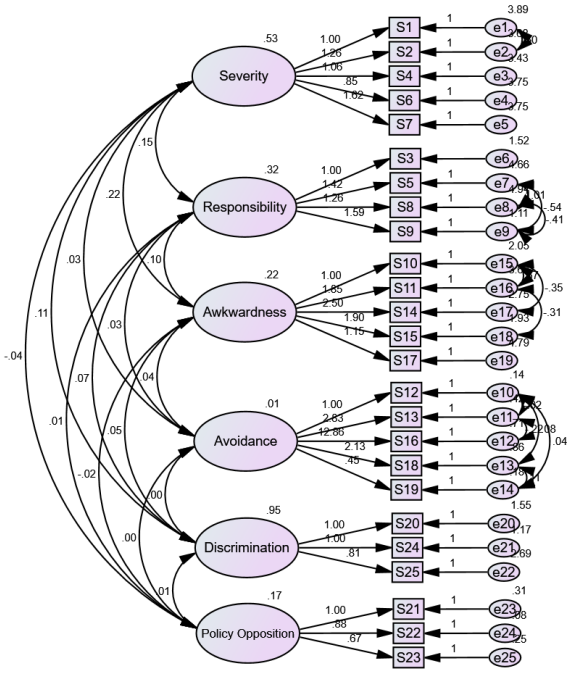

Figure 1. First Level Confirmatory Factor Analysis (CFA) Path Plot of the Turkish Cancer Stigma Scale (T-CASS)

In the literature, it is stated that when applying CFA to multifactorial scales, second-level multifactorial models should also be tested.[15] For this reason, the accuracy of the six sub-dimensional structures was tested with first and second level CFA and it was shown that the observed variables were gathered under more than one independent factor, and these factors were combined under a larger and inclusive factor. The path graph obtained as a result of the second level CFA for this six-factor model is given in Figure 2 and the standard fit measures are given in Table 2. In order to increase the model fit in both CFA analyzes, modifications were made between the items 1st and 2nd, 5th and 8th, 5th and 9th, 8th and 9th, 10th and 11th, 10th and 14th, 11th and 15th, 12th and 13th, 12th and 18th, 12th and 19th, 13th and 16th, 18th and 19th items. It was observed that the goodness of fit values increased after the modification.

As seen in Table 2. the x^2 value of the six-factor structure was 360.983, the degrees of freedom were 258, and p=<0.001. The six-factor structure showed "very good" fit when evaluated with x^2/sd, RMSEA, SRMR, AGFI fit indices, and "good" fit when evaluated with CFI and GFI fit indices.

Table 2. Goodness-of-fit values of the Turkish Cancer Stigma Scale (T-CASS) obtained as a result of the second level Confirmatory Factor Analysis (CFA)

Fit values	Weak fit (WF)	Good fit (GF)	Very Good Fit (VGF)	T-CASS fit values	Compatibility Result of T-CASS
x^2		2df≤ x^2 ≤3df	0≤ x^2≤2df	360.983	VGF
x^2/df		≤5	≤3	1.399	VGF
RMSEA	≤0.10	≤0.08	≤0.05	0.028	VGF
SRMR		≤0.10	≤0.05	0.043	VGF
CFI	0.85≤CFI<0.90	0.90≤CFI<0.95	0.95≤CFI≤1	0.919	GF
GFI	0.85≤GFI<0.90	0.90≤GFI<0.95	0.95≤GFI≤1	0.945	GF
AGFI	0.80≤AGFI<0.85	0.85≤AGFI<0.90	0.90≤AGFI≤1	0.931	VGF

RMSEA: root mean square error of approximation footnotes; SRMR: standardized root mean square residual, CFI: comparative fix index; GFI: goodness of fit index; AGFI: adjusted goodness fit index

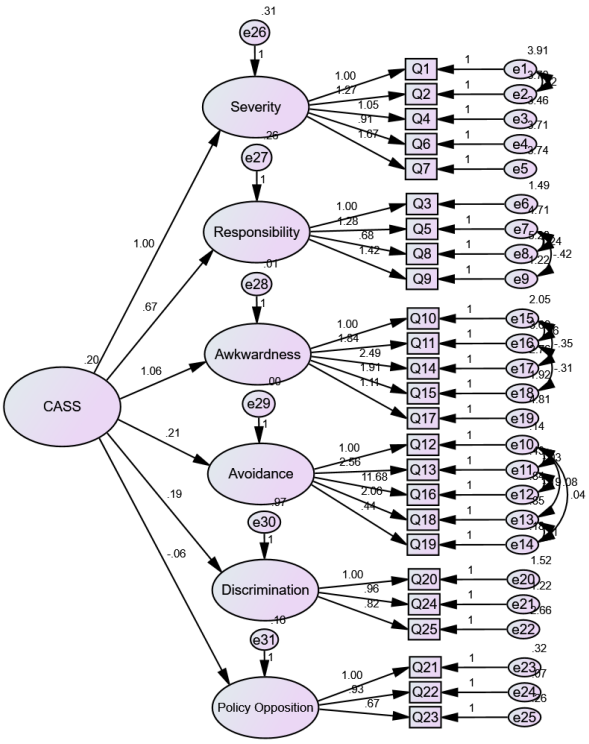

Figure 2. Second Level Confirmatory Factor Analysis (CFA) Path Plot of the Turkish Cancer Stigma Scale (T-CASS)

Reliability Analysis

In this study, internal consistency analysis and test-retest analysis were performed to evaluate the reliability of the T-CASS.

Internal Consistency Analysis

As seen in Table 3, item-total correlation values were examined to examine the item discrimination of the T-CASS and it was found that item-total correlations ranged between 0.142 and 0.543. In the scale development and adaptation process, item-total correlation values are required to be at least 0.20 in terms of distinguishing the measured feature. It is recommended that items below this value be removed from the scale. It is stated that items with item-total correlation values between 0.20-0.30 need to be corrected, items between 0.30-0.40 have good discrimination, and items that are above 0.40 have very good discrimination.[19, 20]

Table 3. Item Analysis Results Based on Correlation of the Turkish Cancer Stigma Scale (T-CASS) (n=500)

Scale items	Scale point averages when the item is deleted	Scale variance when the item is deleted	Corrected item-total score correlation
Severity			
Item 1	10.38	26.581	0.297
Item 2	10.22	25.884	0.325
Item 4	10.39	27.492	0.282
Item 6	10.49	29.052	0.194
Item 7	9.77	25.587	0.292
Personal responsibility			
Item 3	7.85	16.658	0.262
Item 5	5.76	11.464	0.296
Item 8	6.63	11.484	0.282
Item 9	7.81	17.711	0.152
Awkwardness			
Item 10	10.63	20.446	0.352
Item 11	11.19	23.736	0.286
Item 14	8.79	21.903	0.194
Item 15	11.37	25.251	0.236
Item 17	10.21	20.701	0.314
Avoidance			
Item 12	5.24	5.560	0.320
Item 13	5.15	5.336	0.142
Item 16	4.49	2.415	0.283
Item 18	5.01	4.222	0.301
Item 19	5.24	5.638	0.242
Policy opposition			
Item 21	2.16	0.752	0.438
Item 22	2.23	1.035	0.543
Item 23	2.17	1.000	0.371
Financial discrimination			
Item 20	3.47	6.955	0.420
Item 24	3.58	7.446	0.427
Item 25	3.18	6.518	0.336

Accordingly, it was observed that the item total correlation values of two items (Item 21, Item

22) in the Policy opposition sub-dimension and two items (Item 20, Item 24) in the Financial Discrimination sub-dimension were above 0.40. The discrimination of these items was found to be very good. It was observed that the item total correlation values of one item in the Severity sub-dimension (Item 2), two items in the Awkwardness sub-dimension (Item 10, Item 17), two items in the Avoidance sub-dimension (Item 12, Item 18), one item in the Policy opposition sub-dimension (Item 23) and one item in the Financial Discrimination sub-dimension (Item 25) were between 0.30-0.40. It was found that the discrimination of these items was good. Three items in the Severity sub-dimension (Item 1, Item 4, Item 7), three items in the Personal Responsibility sub-dimension (Item 3, Item 5, Item 8), two items in the Awkwardness sub-dimension (Item 11, Item 15) and two items (Item 16, Item 19) in the Avoidance sub-dimension were seen that the item-total correlation values were between 0.20-0.30. It has been found that these items need to be corrected. The total item correlation values of an item in the Severity sub-dimension (Item 6), an item in the Personal Responsibility sub-dimension (Item 9), an item in the Awkwardness sub-dimension (Item 14), and an item in the Avoidance sub-dimension (Item 13) were below 0.20. Accordingly, it was found that these items were not distinctive. In scale development studies, items with low discrimination are corrected, while items with no discrimination are removed from the scale.[15,19] However, since our study is an adaptation study, removing items from the scale will mean that the new scale is different from the original scale. In addition, practical significance is suggested instead of statistical significance in the literatüre.[19] Therefore, it was decided not to remove these items from the scale.

In order to evaluate the internal consistency, the Cronbach Alpha internal consistency coefficient was calculated for the T-CASS and for each sub-dimension, and it is shown in Table 4. As can be seen, the Cronbach Alpha internal consistency coefficient for the T-CASS was 0.659. The calculated Chronbach Alpha value for the Awkwardness sub-dimension was 0.498, the Severity sub-dimension was 0.507, the Avoidance sub-dimension was 0.408, the Policy opposition sub-dimension was 0.625, the Personal Responsibility sub-dimension was 0.429, and the Financial Discrimination sub-dimension was 0.580. If the value range of the Cronbach's Alpha coefficient is $0.00 \leq \alpha < 0.40$, the scale is not reliable. If it's $0.40 \leq \alpha < 0.60$, the scale reliability is low; if it's $0.60 \leq \alpha < 0.80$, the scale is moderate reliable, and if it's $0.80 \leq \alpha < 1.00$, the scale is a highly reliable scale.[14,21]

Table 4. The Cronbach Alpha Values of Turkish Cancer Stigma Scale (T-CASS) and Each Sub-Dimension

T-CASS and Sub-Dimensions	Item counts	Cronbach Alpha Value
T-CASS	25	0.659
Awkwardness	5	0.498
Severity	5	0.507
Avoidance	5	0.408
Policy opposition	3	0.625
Personal responsibility	4	0.429
Financial discrimination	3	0.580

Accordingly, while the T-CASS (Cronbach Alpha =0.659) and the Policy opposition sub-dimension (Cronbach Alpha =0.625) were "moderate" reliable, the other sub-dimensions were "low" reliable.

Test-Retest Analysis

For the test-retest reliability analysis of the T-CASS, the scale was reapplied to 100 people among 500 participants with an interval of 15-30 days, which is stated as the ideal time interval in the literatüre.[15]

The correlation between the scores obtained as a result of the first application and the second application was evaluated. Correlation was evaluated with Spearman's rho correlation coefficient because the scores did not fit the normal distribution, it is shown in Table 5. According to this; the correlation coefficient between the total scores obtained as a result of the first and second application of the T-CASS was 0.488. Correlation coefficients of the T-CASS were calculated as 0.471 for the Awkwardness sub-dimension, 0.398 for the Severity sub-dimension, 0.262 for the Avoidance sub-dimension, 0.133 for the Policy opposition sub-dimension, 0.258 for the Personal Responsibility sub-dimension, and 0.281 for the Financial Discrimination sub-dimension.

Table 5. Correlation Analysis between the Scores of the Turkish Cancer Stigma Scale (T-CASS) and its Sub-Dimensions in the First and the Second Application

T-CASS and its Sub-Dimensions	r[1]	p
T-CASS	0.488	<0.001
Awkwardness	0.471	<0.001
Severity	0.398	<0.001
Avoidance	0.262	0.009
Policy opposition	0.133	0.188
Personal responsibility	0.258	0.010
Financial discrimination	0.281	0.005

According to Cohen, the correlation coefficient indicates "0.10-0.29=weak, 0.30-0.49=moderate and 0.50-1.0=strong" correlation.[22] Accordingly, the T-CASS, Awkwardness and Severity sub-dimensions showed "moderate" correlation, while sub-dimensions of Avoidance, Policy opposition, Personal Responsibility and Financial Discrimination showed "weak" correlation. The p value was statistically significant in all sub-dimensions and the T-CASS, except for the Policy opposition sub-dimension.

DISCUSSION

In this study the Turkish validity and reliability of the CASS was evaluated in women who applied to screening center. Internal consistency analysis and test-retest analysis were performed to evaluate the reliability of the T-CASS. In order to evaluate its internal consistency, the Cronbach Alpha internal consistency coefficient was calculated for the T-CASS and for each of the six sub-dimensions. The Cronbach Alpha internal consistency coefficient for the T-CASS was 0.659, The Cronbach Alpha values of the sub-dimensions ranged from 0.408 to 0.625.

The sub-dimension Chronbach Alpha values of the Original CASS developed in England range from 0.73 to 0.87.[11] The Chronbach Alpha value of the Chinese version of CASS (C-CASS) is 0.88, and its sub-dimension values range from 0.70 to 0.89.[12] Chronbach Alpha values of the Japanese version of CASS (J-CASS) vary between 0.81-0.91.[23] The Cronbach Alpha value of the Turkish version of CASS (CASS-T), which was conducted in 2016, is 0.82, and its sub-dimensions range from 0.51 to 0.80.[24]

When the validity and reliability of the CASS is evaluated in different countries, it is seen that the Chronbach Alpha values are different from the original scale, while it rises in the Japanese society, it decreases in the Turkish society. It was thought that this situation was

caused by the different cultures in which the scale was developed and adapted. Many characteristics of societies such as their past lives, value judgments, social ties, health service delivery, health insurance and service utilization levels are different from each other, and this difference is reflected in their perceptions about cancer. All these lead to a change in the measurement skill, namely the reliability, of the measurement tool developed in one culture in the other culture.

Another factor affecting the level of reliability is thought to be the way the scale is applied. The scale was applied online in the English, Chinese and Japanese versions, and the participants were given a response time of up to two weeks.[11, 12, 23] In the Turkish version (CASS-T), the scale was distributed and collected after a while.[24] In our study (T-CASS), the scale was applied with face-to-face interview technique, and individuals were not given a time to think and evaluate. Having to answer the questions in a short time in front of the researcher may have prevented the participants from revealing their true feelings. It is thought that this method difference makes it difficult to comprehend the scale items and reduces the reliability value calculated in our study.

Education level and cognitive characteristics of the population to which the scale was applied also play a major role in the difference in reliability values. The English version of the scale was developed in university graduates, while in the Chinese version, almost all of the population consists of university graduates.[11, 12] The Turkish version was developed for university students.[24] In our study, only one-third of the population was university graduate. It is thought that as the education level decreases, the intelligibility of the scale items and the reflectivity of the perception about cancer decrease. In addition, it is thought that the decrease in the education level also reduces the intelligibility of the Seven-Point Likert scale. In the literature, it is stated that the scales consisting of seven and eight answer options developed abroad often do not match with Turkish culture, and five answer options are more appropriate for Turkish culture.[15] It is emphasized that it is important to determine the number of options according to the participant profile.[25] In conclusion, it is thought that all the reasons mentioned above caused the Cronbach Alpha value of our study to be lower than the CASS-T and other versions.

In the test-retest reliability analysis of the T-CASS, the correlation between the first application total score of the T-CASS and the second application total score was evaluated. Accordingly, a moderate correlation was found in the T-CASS and in the sub-dimensions of Awkwardness, Severity, weak correlation was found in the sub-dimensions of Avoidance, Policy opposition, Personal Responsibility and Financial Discrimination. The p value of the T-CASS and all sub-dimensions except for the Policy opposition sub-dimension were statistically significant. A strong correlation was obtained in the sub-dimensions as a result of the test-retest result in the other versions.[11, 12, 24]

The fact that the scale has a seven-point Likert structure may have contributed to the lower correlation coefficients obtained from the test-retest result in our study compared to the other versions. In Likert-type questions, more than one option is presented between two extremes to determine the level of participation. As the number of options increases, the measured

range narrows. Namely; The slightest changes in the measured trait in the participants result in a decrease in the test-retest correlation values. In the test-retest application, the first T-CASS application was made when it came to screening, and the second application was made when it came to getting results. This may be related to the increase in awareness about cancer as a result of the cancer education given to individuals during the screening and the educational brochures given at the end of the screening. In other studies, there is no known cancer awareness training between the pretest and the posttest. It has been proven that awareness about cancer makes a difference in stigma scores.[24] In our study, it was thought that the difference in test-retest scores was caused by the awareness activities carried out after the screening.

In the evaluation of the validity of the T-CASS, the construct validity was evaluated after ensuring the language and content validity. At this stage, since the structure of the scale was known beforehand, Exploratory Factor Analysis (EFA) was not performed, but Confirmatory Factor Analysis (CFA) was performed. As a result of the first level CFA, the six-factor structure showed "very good fit" when evaluated with x^2/sd, RMSEA, AGFI fit indices, and "good fit" when evaluated with CFI, GFI, fit indices. The fit index values obtained in the study are similar to both the original CASS and the Chinese version adapted by Ye et al.[11, 12] It has been shown that the high reliability of the scale sub-dimensions in the original CASS and the Chinese version. Due to the low reliability of some sub-dimensions in our study, second-level CFA was performed to evaluate the situation of existing sub-dimensions under a single overarching dimension (Figure 2). Second-level CFA was not performed in the original study and the other versions.[11, 12, 24] As a result of the second level CFA, the six-factor structure showed excellent fit when evaluated with x^2/sd, RMSEA, AGFI fit indices, and acceptable fit when evaluated with CFI, GFI, fit indices.

Strengths

Previous development (CASS mean age: 29.1) and adaptations of the CASS (CASS-T mean age: 21.35, C-CASS mean age: 32.4) have been conducted in a healthy young population at low risk of cancer. [11, 12, 24] However, the stigma of cancer should be investigated in the target population of cancer, since it reduces participation in screening and adherence to treatment. Our study has made an important contribution to science because it was conducted in the cancer screening target population (Our study mean age: 54.8).

While previous studies applied online surveys to university graduates, excluding people with low education level and low socioeconomic status who cannot access a computer or smart phone, our study reflects the society more by ensuring the participation of every education level and every socioeconomic level. [11, 12, 23, 24]

Our study contributed to science by showing that the reliability of the scales decreased when applied in different ways to participants in different cultures and different educational levels.

Limitations

The fact that the participants were only female is a limitation of our study.

Selecting the participants from those who applied to the screening center may mean that people with high stigma scores were excluded from the study, since the stigma has

been proven to reduce participation in the screenings.

The score obtained in the second application of the scale for test-retest analysis may have been affected by the cancer education activities carried out in the cancer screening center.

CONCLUSION

It was concluded that T-CASS is a "valid" and "moderately reliable" scale that can be used to measure cancer stigma in groups of women with similar sociodemographic characteristics. It is recommended to develop a measurement tool suitable for Turkish Culture that can be used to measure the cancer stigma level of both genders in healthy individuals.

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