



Short Breast Health Perception Questionnaire: Turkish validity and reliability study

Meme Sağlığı Algısı Kısa Anketi: Türkçe geçerlik ve güvenilirlik çalışması

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ABSTRACT

Aim: The aim of the present study was to examine the Turkish validity and reliability of the Short Breast Health Perception Questionnaire in women.

Method: A total of 400 women who were admitted to the Internal Medicine polyclinics of Fırat University Hospital were included in this methodological study. After the translation process of the questionnaire, content and construct validity were conducted. Explanatory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were conducted for construct validity, while item analyses and internal consistency analysis were conducted for reliability.

Results: It Total variance rate explained in the explanatory factor analysis found as a result of the evaluations and analyses was 66.35%. Factor loads of all items in the study ranged between 0.69 and 0.88. The questionnaire had a Cronbach's alpha value of 0.940. EFA and CFA showed that the Turkish version of the 11-item and one-factor Short Breast Health Perception Questionnaire was confirmed without any changes to the original scale form. CFA results showed good fit index values.

Conclusion: Short Breast Health Perception Questionnaire Turkish version is a valid and reliable measurement instrument for evaluating women's perception of breast health and for use in clinical practice.

Keywords: breast cancer; reliability; scale; validity; woman

Öz

Amaç: Bu araştırma, kadınlarda Meme Sağlığı Algısı Kısa Anketi'nin Türkçe geçerlik ve güvenilirliğini incelemek amacıyla yapıldı.

Yöntem: Bu metodolojik araştırma, Fırat Üniversitesi Hastanesi'nin Dahili polikliniklerine başvuran 400 kadın birey ile yapıldı. Ölçeğin çeviri süreci ardından kapsam ve yapı geçerliliği yapıldı. Yapı geçerliliği için Açıklayıcı Faktör Analizi (AFA) ve Doğrulayıcı Faktör Analizi (DFA), güvenilirlik için madde analizleri ve iç tutarlık analizi yapıldı.

Bulgular: Yapılan değerlendirme ve analizler sonucunda; açıklayıcı faktör analizinde açıklanan toplam varyans oranı %66.35 bulundu. Bütün maddelerin faktör yükleri 0.69-0.88 arasında değiştiği belirlendi. Ölçeğin Cronbach's alpha değerinin 0.940 olduğu belirlendi. Yapılan AFA ve DFA sonucunda 11 maddeli ve tek alt boyutlu Meme Sağlığı Algısı Kısa Anketi'nin Türkçe formunun orijinal ölçek formunda hiçbir değişiklik olmadan doğrulandığı görüldü. DFA sonucunda iyi uyum indeksi değerleri elde edildi.

Sonuçlar: Meme Sağlığı Algısı Kısa Anketi'nin Türkçe versiyonu, kadınların meme sağlık algısını değerlendirmek ve klinik uygulamalarda kullanılması için geçerli ve güvenilir bir ölçme aracıdır.

Anahtar kelimeler: geçerlik; güvenilirlik; kadın; meme kanseri; ölçek

Introduction

In women in the world and in Türkiye, the type of cancer with the highest incidence and highest mortality rate is breast cancer (Bray et al., 2018). With early diagnosis, survival and treatment increase by 90% in breast cancers (DeSantis et al., 2019; World Health Organization [WHO], 2023). The importance of early diagnosis is increased with the fact that 20% of breast cancer cases have risk factors, most of which are non-modifiable. Recently, the measures taken to prevent the disease and screening methods have become more prominent in the fight against cancer (Güzel & Bayraktar, 2019). Early diagnosis and treatment is possible by running screening programs in breast cancer (DeSantis et al., 2019; WHO, 2023). Breast cancer screening programs are reported to be effective in facilitating the early detection of malignancy, improving patients' quality of life, decreasing the society's burden of disease and reducing cancer-related mortality (Alipour, et al., 2022; Güzel & Bayraktar, 2019; Yılmaz &

Durmuş, 2016). With early diagnosis methods, in developed countries survival chance of patients who have breast cancer has been increasing in the last two decades (WHO, 2023). In addition to all these positive developments, most women can consider it to be a stressful experience when they are called for further examinations after the primary screening (Alipour et al., 2022) and overdiagnosis, false positives, and false negatives may affect patients' decision to participate in a screening program (Alipour et al., 2022; Marmot et al., 2013). In addition, during the detection, "diagnosis and treatment of cancer, psychological reactions such as anxiety and depression" are frequently seen (Alipour et al., 2022). These processes and events can cause different negative reactions and stress in most women. (Al-Azri et al., 2014; Alipour et al., 2022). They may also affect patients' perceptions of breast health (Alipour et al., 2022).

Health perception is defined as the evaluation of one's own health (Özdemir et al., 2021). No matter what actual health



status is, health perception can affect an individual's life satisfaction and quality of life (Heiestad et al., 2020; Lee & Oh, 2013). When patients' health perceptions are graded, not only their physical condition, but also other aspects such as general well-being are evaluated (Shields & Shooshtari, 2001). Therefore, researchers assess an individual's physical and emotional health as well as their perception of health in a variety of conditions. This assessment is carried out through questionnaires designed for this purpose (Shields & Shooshtari, 2001). Overall, feelings of general health are an important part of medical care. General feelings of health can be evaluated with disease-specific or general scales. The most well-known of these questionnaire is the General Health Questionnaire. The short form of this scale, consisting of 12 questions, is generally used and has been culturally adapted in many countries (Goldberg & Hillier, 1979). It is becoming increasingly important to conduct general or disease-specific research to detect and measure minor problems (Alipour et al., 2022). Many breast-related scales have been adapted and developed in Türkiye for this purpose (Ceylan & Rızalar, 2022; Gözüm et al., 2004; Secginli, 2012; Taylan et al., 2021). However, there is no survey targeting women's perceptions of breast health in Türkiye despite the importance of the issue in women's life. Therefore, this study was conducted to adapt the Short Breast Health Perception Questionnaire (Short-BHPQ) developed by Alipour et al. in 2022 into Turkish and to test its validity and reliability in the Turkish population.

Methods

Study design

This methodological research was conducted to adapt the Short-BHPQ into Turkish.

Population and sample of research

Research population included women admitted to the Internal Medicine Clinics of Firat University Hospital between October 2022 and December 2022. Sample included 400 women who met the research criteria between the aforementioned dates Inclusion criteria: "being female, being ≥ 18 years of age, no suspicious breast lesions in clinical breast examination, no suspicious breast lesions in breast ultrasound (when necessary), no suspicious lesion in mammogram in the past year in women >40 years of age. Exclusion criteria: breast cancer history, benign breast lesions other than fibrocystic changes or small (less than 1 cm) fibroadenomas, cosmetic breast surgery history, a recent change in breast examination or a recent imaging examination, psychological illness history, or use of psychotropic medication and who agreed to participate in the study". It has been stated that the sample size should be at least 5 times (if possible 10 times) the number of scale items in scale adaptation studies (Noh, 2019; Prinsen et al., 2018; Tabachnick et al., 2019). There are 11 items in the original Short Breast Health Perception Questionnaire. Therefore, the sample size was predicted as at least 55 or 110. For this reason, the study was terminated with 400 women.

Data collection instruments

Research data were collected face-to-face by using the Personal Information Form and the Short-BHPQ.

Personal information form

There are five questions in this form created by the researchers: age, marital status, educational status, place of residence, employment status and income status.

Short Breast Health Perception Questionnaire (Short-BHPQ)

It was developed in 2022 by Alipour et al. to evaluate perception of breast health in women. The 5 likert type scale consists of 11 items. The items are scored as "Always (1)", "Very Often (2)", "Sometimes (3)", "Rarely (4)" and "Never (5)". The scale consists of a single factor. Possible score of the scale is between 11 and 55. Higher scores mean better breast health perception. Original scale had a Cronbach's alpha (α) coefficient of 0.93 (Alipour et al., 2022).

Procedure

The authors of Short-BHPQ gave their written consent before initiating the study. Two independent linguists then translated the scale from English to Turkish (Seçer, 2020). Researchers examined the two translations to form a single Turkish version. This version was sent to seven faculty members consisting of 2 public health, 1 psychiatry and 4 internal medicine nursing specialists for content validity. Item content validity index (I-CVI) and scale content validity index (S-CVI) were used in the evaluation of expert views; Turkish version, which was obtained after the agreement between the expert views, was translated back into English by a third linguist. Agreement was achieved between the Turkish and English versions. After determining that the language and scope equivalence were sufficient, a pilot application was conducted on 50 women to test the comprehensibility of scale items by the participants (Seçer, 2020). Participants of the pilot study were not included in the sample. After it was confirmed that there was no problem in the scale with the pilot study, the actual application was started.

Statistical analysis

SPSS 22.0 and LISREL 8.8 package program were used for data analysis. Sociodemographic characteristics were expressed with arithmetic mean, standard deviation, frequency and percentage. Validity was tested by using Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). In EFA, item score averages and standard deviations, KMO, Barlett's Sphericity Test, item total correlation value were used. Scree Plot Chart and Eigenvalue were used for the determination of scale factor structures. Fit indices and Path diagram were used in CFA (DeVellis & Thorpe, 2021; Pallant, 2020; Seçer, 2020). Reliability was determined with Cronbach's alpha value of the items and the total scale. Invariance of the scale against time was tested with test-retest method. A minimum KMO value of 0.60, a significant Barlett's Test of Sphericity p value, an Eigenvalue of at least 1, a Cronbach's alpha value of at least 0.7 were the criteria taken as basis. In the fit indices (χ^2/SD (Chi-square/degree-of-freedom) value, GFI (goodness of fit index), AGFI (adjusted goodness of fit), CFI (comparative fit index), RMSEA (root mean square error of approximation), SRMR (Standardized Root Mean Square Residual) fit indices), value suggested by Byrne (2013), Bae (2017), Woo (2017) were taken into account. In the retest application, the correlation value between the two application scores was examined (DeVellis & Thorpe, 2021; Seçer, 2020).

Ethical considerations

Ethics Committee approval of a İstanbul Sabahattin Zaim University Ethics Committee (30.09.2022 dated and 2022/08 numbered) and institutional permission from the hospital where the research would be carried out were obtained. Official permission was obtained from the scale owner via e-mail for

the adaptation of the questionnaire. The study adhered to the principles of the Helsinki Declaration of Human Rights. After explaining the purpose of the study, verbal consent was obtained from the individuals who participated in the study.

Results

Table 1. Descriptive characteristics of the womens (n=400)

Characteristics	n	%
Age (Mean±SD)	36.79±13.80 (min:19, max: 80)	
Marital status		
Married	228	57
Single	172	43
Place of residence		
City	238	59.5
Town	129	32.3
Village	33	8.3
Educational status		
Illiterate	22	5.5
Literate	42	10.5
Primary education	73	18.3
Secondary education	35	8.8
High school	74	18.5
University and higher	154	38.5
Working status		
Yes	134	33.5
No	266	66.5
Income status		
Income<expense	189	47.3
Income=expense	156	39
Income>expense	55	13.8

Participants were found to have a mean age of 36.79±13.80 (min:19 max:80) years. It was found that 57% of the participants were married, 59.5% lived in the city, 38.5% had a university or higher degree, 66.5% were unemployed, and 47.3% had less income than their expenses (Table 1).

Results regarding validity

Content validity

Draft of the Turkish version was examined by seven experts. Item content validity index was found to be between 0.90 and 1.00, and scale content validity index was 0.97.

Construct validity

Before testing construct validity, suitability of the sample size and the suitability of the data set for analysis was found with KMO and Barlett's Test of Sphericity. KMO value was 0.934 and Barlett's Test of Sphericity was found to be significant ($X^2=1844.328$; $p=0.000$)

Exploratory factor analysis

Factor structure of the questionnaire was examined with two of the most common factor analysis statistical techniques, Principal Component Analysis and Varimax rotation method. EFA showed that the scale had a single factor in accordance with its original structure, explaining 66.35% of the total variance (Table 2). While determining the factors, care was taken to ensure that the eigenvalue was above 1. All items had factor loads between 0.69 and 0.88 (Table 2). According to the results obtained, the scale consists of 11 items and a single factor.

Scree Plots show how many factors a scale has (Seçer, 2020). In our study, the scree plot of the questionnaire confirms the one-factor structure of the 11-item questionnaire. In the light of this information obtained, single factor 11 item-questionnaire was confirmed with confirmatory factor analysis (Table 3).

Confirmatory factor analysis

The validity of EFA structure found as a result of EFA should be shown by using CFA with a different data set according to the literature. For this reason, two different methods can be stated in the creation of the data set used in factor analysis (Schumacker & Lomax, 2010). As the first method, after enough samples have been collected in a single study to conduct both EFA and CFA, some of these (for exp. 50%) can be randomly selected for EFA and the rest for CFA. Another method is collecting two different data sets and analysing one for EFA (Orçan, 2018). In this study, by using the first method, the method of randomly splitting the data set into two, both EFA and CFA were performed on different data sets. Thus, DFA was carried out with 200 women. In line with the CFA, it was decided to make modifications between Item 11-Item 10, Item 11-Item 8, Item10-Item 8, Item 10-Item 9 and Item4-Item3.

Table 2. Item-total score correlation coefficients, factor loads, alpha coefficients and SHORT BHPQ explained variance results

Scale items	Corrected Item-total Correlations	Cronbach's Alpha if Item Deleted	Mean±SD	Factor Load F1
1. I feel I have a dangerous disease in my breast	.749	.944	3.97±1.02	.796
2. I feel I will get a dangerous disease in my breast in the future	.706	.946	3.85±1.09	.760
3. I feel that I am causing trouble for my family due to my breast conditions	.816	.942	4.30±1.09	.856
4. I feel I have a disorder in my breast that will cause troubles for my family in the future	.800	.942	4.12±1.09	.843
5. I feel I have a problem in my breasts and this thought makes me anxious	.804	.942	3.92±1.09	.846
6. I feel I have a problem in my breasts and this thought has disturbed my daily life	.833	.941	4.13±1.09	.869
7. I feel I have a problem in my breasts and this thought disrupts my sexual activities	.787	.943	4.35±1.08	.832
8. I need to obsessively examine my breasts to stay calm	.855	.940	4.15±1.15	.887
9. I need to go for breast checkups sooner than my doctor has recommended for my peace of mind	.741	.945	3.88±1.25	.786
10. I constantly search for and inquire about new methods for detection of breast disorders	.727	.945	3.93±1.15	.769
11. I am constantly on the search for new information about breast diseases	.648	.948	3.86±1.04	.697
Eigen value				7.29
Total Explained Variance %				66.35

Table 3. Confirmatory factor analysis results

Fit criteria	Found	Appropriate	Acceptable	Result
χ^2/df	2	≤ 2	< 5	Appropriate fit
RMSEA	0.071	< 0.05	< 0.08	Acceptable fit
CFI	0.99	> 0.95	> 0.90	Appropriate fit
NFI	0.98	> 0.95	> 0.80	Appropriate fit
IFI	0.99	> 0.95	> 0.90	Appropriate fit
RMR	0.040	< 0.05	< 0.08	Appropriate fit
SRMR	0.029	< 0.05	< 0.08	Appropriate fit
GFI	0.93	> 0.95	> 0.90	Acceptable fit
AGFI	0.89	> 0.95	> 0.85	Acceptable fit
PGFI	0.55	> 0.89	> 0.50	Acceptable fit
PNFI	0.70	> 0.89	> 0.50	Acceptable fit
TLI	0.99	> 0.95	> 0.90	Appropriate fit

RMSEA: Root Mean Square Error of Approximation; CFI: Comparative Fit Index; NFI: Normed Fit Index; IFI: Incremental Fit Index; RMR: Root Mean Square Residual; SRMR: Standardized Root Mean Square Residual; GFI: Goodness of Fit Index; AGFI: Adjusted Goodness of Fit Index; PGFI: Parsimony Goodness of Fit Index; PNFI: Parsimony Normed Fit Index, TLI: Tucker Lewis Index.

Table 3 shows information on the fit indices found as a result of CFA. These analyses were conducted with 11 items. Fit indices obtained as a result of the analyses were found to be sufficient (Table 3). Figure 1 shows the PATH diagram as a result of confirmatory factor analysis.

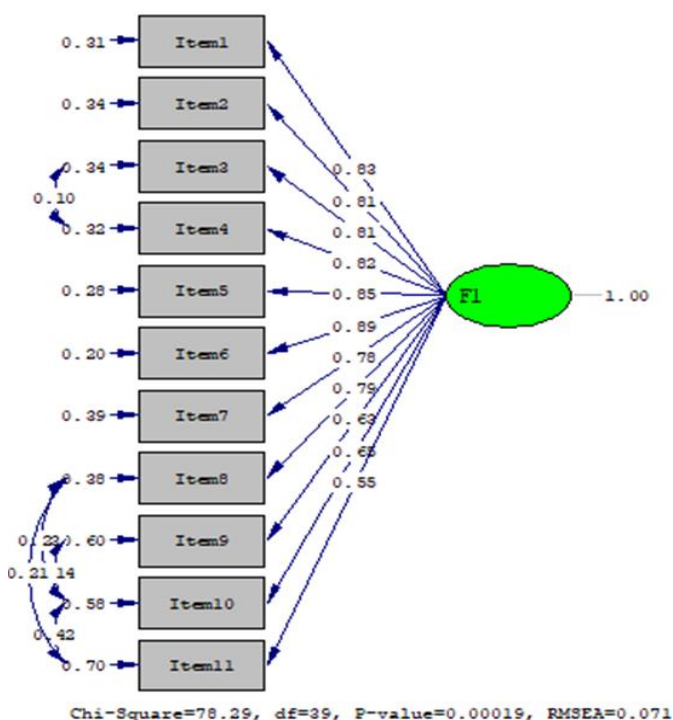


Figure 1. PATH diagram regarding the factor structure of the scale

Results on reliability

In the finalized questionnaire, reliability of the questionnaire was calculated with Cronbach's alpha coefficient, which was found to be 0.940 (Table 4). Total item-total correlation coefficient was found to be between 0.648 and 0.855 (Table 2).

Table 4. Correlation between factors, mean scores and reliability results

Factors		Mean $\pm$ SD	t/p	Test-retest (r*)	α	Min-Max	Mean $\pm$ SD
F1	Pre-test	36.42 $\pm$ 12.51	t=0.439	0.940*	0.948	19-55	44.49 $\pm$ 9.93
	Post-test	36.12 $\pm$ 12.32	p=0.663				

α : Cronbach's alpha Coefficient; t= Paired sample t test; r=Pearson Correlation Coefficient; p<0.05.

First application and the second application measurement results were not statistically significantly different ($p > 0.05$). Test-retest reliability coefficients of the scale items were found to be statistically significant ($p < 0.05$). Thus, test-retest reliability of the Short BHPQ was found to be high (Table 4).

Discussion

The present study was conducted for the translation of Short-BHPQ into Turkish. Turkish version of the Short-BHPQ was found to be a tool that met the validity and reliability standards.

I-CVI and S-CVI values above 0.90 in this study indicate that the scale measures the topic sufficiently and there is a consensus among the experts (7 experts). The fact that I-CVI and S-CVI values are above 0.80 shows agreement between expert views (Polit et al., 2007; Seğer, 2020). KMO value was found to be 0.934, and the χ^2 value was found as 1844.328, $p=0.000$ as a result of Barlett's Test of Sphericity analysis. In validity and reliability studies, KMO analysis and Barlett's Test of Sphericity test are important tests for evaluating the suitability and adequacy of data for factor analysis. KMO value should be ≥ 0.60 and Barlett's Test of Sphericity result should be statistically significant to be able to conduct factor analysis (Boateng et al., 2018). In line with the result found, it was concluded that the database and the number of individuals included in the study were sufficient for factor analysis. In intercultural scale adaptation studies, exploratory factor analysis should be conducted for the adapted scale (Polit & Beck, 2020). EFA and CFA were conducted to evaluate the construct validity of Short Breast Health Perception Questionnaire. It was found in the Turkish version of Short-BHPQ that the questionnaire had a single factor that explained 66.35% of the total variance.

Higher rates of variance show higher factor structure of a scale. Variance rates ranging between 40 to 60% are considered sufficient in the literature (Grove et al., 2012). In addition, it is recommended to exclude items with a factor load of < 0.30 from the scale (Finch, 2019; Seğer, 2020). Short-BHPQ factor loads were found to range between 0.69 and 0.88. Therefore, no scale item was excluded from the analysis. The factor analysis of Short-BHPQ showed that the factor structure was valid. Factor loads were not shown in the study of Alipour et al. (2022). Therefore, a comparison with the original scale could not be made in the present study. Scree Plots show how many factors a scale has (Seğer, 2020). In this study, the scree plot of the questionnaire confirms the one-factor structure of the 11-item scale. The results showed that the Short-BHPQ consisted of a single 11-item factor as in the original scale. The possible score of the scale is between 11 and 55. There is no cut-off point for breast health perception. A higher score shows a better perception, while a lower score shows a worse perception (Alipour et al., 2022). As stated in literature, the structure shown by EFA regarding the validity and reliability of the scale should be examined with CFA (Xia & Yang, 2019).

In the present study, CFA supported the single-factor scale structure shown by EFA. Fit indices were taken into account to evaluate whether the model was consistent with the data. The χ^2/df , CFI, NFI, IFI, RMR, SRMR and TLI values showed an appropriate fit. RMSEA, GFI, AGFI, PGFI and PNFI values showed acceptable fit.

In the literature, $\chi^2/df \leq 2$; CFI, NFI, IFI and TLI indices above 0.95, and RMR and SRMR values below 0.05 are indicators of appropriate fit. RMSEA value below 0.80, GFI value above 0.90, AGFI value above 0.85, PGFI and PNFI values above 0.50 are accepted as indicators of acceptable fit (Alavi et al., 2020; Kline, 2016; Seğer, 2020; Xia & Yang, 2019). A comparison could not be made since the study conducted by Alipour et al. (2022) did not show CFA results. As a result of construct validity, it can be seen that the model fit is acceptable as in the original scale form, and it shows appropriate fit in some values. These results show indicate high validity for the Turkish version of the questionnaire. Internal consistency and homogeneity of Short-BHPQ was shown with Cronbach's alpha reliability coefficient. Cronbach alpha value of all items shows the total reliability of that scale and the general view is that this value should be ≥ 0.70 . In a scale, values of the reliability coefficient between 0.60 and 0.69 are acceptable, values between 0.70 and 0.89 are considered good, and values between 0.90 and 1.00 are considered appropriate.

High Cronbach's alpha coefficients show that items are consistent with each other (Kılıç, 2016). In the validity and reliability study of the original questionnaire, Cronbach's alpha coefficient is 0.93 (Alipour et al., 2022). Cronbach's alpha reliability coefficient was found to be 0.94 in the present study as an indicator of the internal consistency and homogeneity of the Short-BHPQ. Thus, the scale has appropriate internal consistency and is similar to the original structure of the scale. Item analysis indicates the relationship between the scores obtained from each item of the scale and the total score (Johnson & Christensen, 2019). It was stated that items with an item-total correlation of ≥ 0.30 distinguish between individuals well (Çokluk et al., 2012). It should also be as close as possible to 1 and positive (Johnson & Christensen, 2019). It was found that Short-BHPQ had an item total correlation coefficient between 0.648 and 0.855. Each item showed a correlation of >0.30 with the total scale and a positive correlation was found. Therefore, item-total score correlations have sufficient level of reliability. Alipour et al. (2022) found similar results in their study. Test-retest method measure the consistency of scales, and the measurement results between two applications should not be statistically significant (Noble et al., 2019). In test-retest analysis of the Short-BHPQ, no statistically significant difference was found between the two applications ($p > 0.05$). Test-retest reliability coefficients of the scale items were found to be statistically significant in the evaluation of the relationship between the first and second application measurement results of each item ($p < 0.05$). The same results in both evaluations are an indicator of clear and consistent statements. This shows a high internal consistency for the questionnaire and reliable results in multiple applications.

Conclusion

The results of the present study and the original Short-BHPQ were found to be consistent. Single-factor structure of the questionnaire was confirmed with EFA and CFA results. It

was found that "Cronbach's alpha internal consistency coefficient", "item-total correlation" and "test-retest analysis" of the scale had high correlations. In line with these results, the Turkish version of the Short-BHPQ is a valid and reliable measurement tool to evaluate women's breast health perception and to be used in clinical practice.

Ethics Committee Approval

Ethics committee approval was obtained from İstanbul Sabahattin Zaim University Local Ethics Committee (Board Decision No: 2022/08/) on September 30, 2022.

Informed Consent

Written consent was obtained from the participants.

Peer-Review

Externally peer-reviewed.

Author Contributions

S.B.: Literature search, Design, Critical Review, Drafting of Manuscript, Interpretation, Editing, Writing Manuscript, Supervision.

G.B.T.: Literature search, Data Collection, Data Analysis and Interpretation, Writing Manuscript, Editing, Supervision.

Z.Ö.: Literature Search, Study Conception/Design, Analysis, Drafting of Manuscript, Interpretation, Writing Manuscript, Editing.

Conflict of Interest

There is no conflict of interest.

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References

- Al-Azri, M., Al-Awisi, H., Al-Rasbi, S., El-Shafie, K., Al-Hinai, M., Al-Habsi, H., & Al-Moundhri, M. (2014). Psychosocial impact of breast cancer diagnosis among Omani women. *Oman Medical Journal*, 29(6), 437. <https://doi.org/10.5001/omj.2014.115>
- Alavi, M., Visentin, D. C., Thapa, D. K., Hunt, G. E., Watson, R., & Cleary, M. (2020). Chi-square for model fit in confirmatory factor analysis. *Journal of Advanced Nursing*, 76(9), 2209–2211. <https://doi.org/10.1111/jan.14399>
- Alipour, S., Rashidi, H., Maajani, K., Orouji, M., & Eskandari, Y. (2022). Development, validation, and implementation of a Short Breast Health Perception Questionnaire. *BMC Public Health*, 22(1), 1-8. <https://doi.org/10.1186/s12889-022-13501-5>
- Bae, B.R. (2017). *Structural equation modeling with Amos 24*. Chenngram Books.
- Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quinonez, H. R., & Young, S. L. (2018). Best practices for developing and validating scales for health, social, and behavioral research: A primer. *Frontiers in Public Health*, 6, 149. <https://doi.org/10.3389/fpubh.2018.00149>
- Bray, F., Ferlay, J., Soerjomataram, I., Siegel, R. L., Torre, L. A., & Jemal, A. (2018). Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: A Cancer Journal for Clinicians*, 68(6), 394–424. <https://doi.org/10.3322/caac.21492>
- Byrne, B. M. (2013). *Structural equation modeling with Mplus: Basic concepts, applications, and programming*. Routledge.
- Ceylan, E., & Rızalar, S. (2022). Turkish validity and reliability of body image after breast cancer questionnaire. *Journal of Education and*

- Research in Nursing 19(2), 182-190. <https://doi.org/10.5152/jern.2021.56578>
- Çokluk, Ö., Şekercioğlu, G., & Büyüköztürk, Ş. (2012). *Sosyal bilimler için çok değişkenli istatistik: SPSS ve LISREL uygulamaları* (Vol. 2). Pegem Akademi. [in Turkish]
- DeSantis, C. E., Ma, J., Gaudet, M. M., Newman, L. A., Miller, K. D., Goding Sauer, A., Jemal, A., & Siegel, R. L. (2019). Breast cancer statistics, 2019. *CA: A Cancer Journal for Clinicians*, 69(6), 438–451. <https://doi.org/10.3322/caac.21583>
- DeVellis, R. F., & Thorpe, C. T. (2021). *Scale development: Theory and applications*. Sage Publications.
- Finch, W. H. (2019). *Exploratory factor analysis* (Vol. 182). Sage Publications.
- Goldberg, D. P., & Hillier, V. F. (1979). A scaled version of the General Health Questionnaire. *Psychological Medicine*, 9(1), 139-145. <https://doi.org/10.1017/s0033291700021644>
- Gözüm, S., Karayurt, Ö., & Aydın, İ. (2004). The results of Turkish adaptations of Champion's Health Belief Model Scale at Breast Cancer Screening. *Journal of Research and Development in Nursing*, 6(1), 71-85.
- Grove, S. K., Burns, N., & Gray, J. (2012). *The practice of nursing research: Appraisal, synthesis, and generation of evidence*. Elsevier Health Sciences.
- Güzel, N., & Bayraktar, N. (2019). Determination of women's awareness and practices on early diagnosis of breast cancer. *Journal of Hacettepe University Faculty of Nursing*, 6(2), 101-110.
- Heiestad, H., Gjestvang, C., & Haakstad, L. A. (2020). Investigating self-perceived health and quality of life: A longitudinal prospective study among beginner recreational exercisers in a fitness club setting. *BMJ Open*, 10(6), e036250. <https://doi.org/10.1136/bmjopen-2019-036250>
- Johnson, R. B., & Christensen, L. (2019). *Educational research: Quantitative, qualitative, and mixed approaches*. Sage Publications.
- Kılıç, S. (2016). Cronbach's alpha reliability coefficient. *Journal of Mood Disorders*, 6(1), 47-48. <https://doi.org/10.5455/jmood.20160307122823>
- Kline, R. B. (2016). *Principles and practice of structural equation modeling*. Guilford Publications.
- Lee, B.-A., & Oh, D.-J. (2013). The effects of health perception on living health belief, living satisfaction and wellbeing-oriented activities according to swimming participation with middle-aged women. *Journal of Exercise Rehabilitation*, 9(3), 381. <https://doi.org/10.12965/jer.130047>
- Marmot, M. G., Altman, D., Cameron, D., Dewar, J., Thompson, S., & Wilcox, M. (2013). The benefits and harms of breast cancer screening: An independent review. *British Journal of Cancer*, 108(11), 2205-2240. <https://doi.org/10.1038/bjc.2013.177>
- Noble, S., Scheinost, D., & Constable, R. T. (2019). A decade of test-retest reliability of functional connectivity: A systematic review and meta-analysis. *Neuroimage*, 203, 116157. <https://doi.org/10.1016/j.neuroimage.2019.116157>
- Noh, G. (2019). *The proper methods of statistical analysis for dissertation: SPSS & AMOS 21*. Hanbit Academy.
- Orçan, F. (2018). Exploratory and confirmatory factor analysis: Which one to use first? *Journal of Measurement and Evaluation in Education and Psychology*, 9(4), 414-421. <https://doi.org/10.21031/epod.394323>
- Özdemir, S. Ç., Sağlam, H. Y., Yiğit, D., & Arık, R. (2021). Relationship between profession choices and health perception of nursing students. *Health and Society*, 31(3), 128-136.
- Pallant, J. (2020). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS*. Routledge.
- Polit, D., & Beck, C. (2020). *Essentials of nursing research: Appraising evidence for nursing practice*. Lippincott Williams & Wilkins.
- Polit, D. F., Beck, C. T., & Owen, S. V. (2007). Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. *Research in Nursing & Health*, 30(4), 459. <https://doi.org/10.1002/nur.20199>
- Prinsen, C. A., Mokkink, L. B., Bouter, L. M., Alonso, J., Patrick, D. L., De Vet, H. C., & Terwee, C. B. (2018). COSMIN guideline for systematic reviews of patient-reported outcome measures. *Quality of Life Research*, 27(5), 1147-1157. <https://doi.org/10.1007/s11136-018-1798-3>
- Schumacker, R. E., & Lomax, R. G. (2010). *A beginner's guide to structural equation modeling* (3 ed.). Taylor and Francis Group.
- Secginli, S. (2012). Mammography self-efficacy scale and breast cancer fear scale: Psychometric testing of the Turkish versions. *Cancer Nursing*, 35(5), 365-373. <https://doi.org/10.1097/NCC.0b013e3182331a9a>
- Seçer, İ. (2020). *Psikolojik test geliştirme ve uyarılama süreci: SPSS ve LISREL uygulamaları*. Anı Yayıncılık. [in Turkish]
- Shields, M., & Shooshtari, S. (2001). Determinants of self-perceived health. *Health Reports*, 13(1), 35–52.
- Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2019). *Using multivariate statistics* (7 ed. Vol. 7). MA: Pearson.
- Taylan, S., Özkan, İ., & Adıbelli, D. (2021). Breast Cancer Perception Scale: Psychometric development study. *European Journal of Breast Health*, 17(2), 95. <https://doi.org/10.4274/ejbh.galenos.2020.6088>
- World Health Organization [WHO]. (2023). *Breast cancer*. <https://www.who.int/news-room/fact-sheets/detail/breast-cancer>
- Woo, J. P. (2017). *The concept and understanding of structural equation model*. Hannarae.
- Xia, Y., & Yang, Y. (2019). RMSEA, CFI, and TLI in structural equation modeling with ordered categorical data: The story they tell depends on the estimation methods. *Behavior Research Methods*, 51(1), 409–428. <https://doi.org/10.3758/s13428-018-1055-2>
- Yılmaz, M., & Durmuş, T. (2016). Health beliefs and breast cancer screening behavior among a group of female health professionals in Turkey. *The Journal of Breast Health*, 12(1), 18. <https://doi.org/10.5152/tjbh.2015.2715>