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Psychometric properties and cultural adaptation of Polish version of Gynecological Cancers Awareness Scale (GCAS)

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ABSTRACT

Objectives: Cancer of the female genital organs is one of the most common causes of death of women in Poland. The aim of the study was to translate and analyze the psychometric properties of the Polish version of the Gynecological Cancers Awareness Scale (GCAS).

Material and methods: Cross-sectional study and questionnaire technic were used to collect data. The study was conducted from June 10th to July10th 2021 among 443 adult women in Poland.

Results: The Cronbach Alpha measure was used to assess the internal consistency of the scale. Cronbach's Alpha values greater than 0.7 indicates that the scale has high reliability.

Conclusions: The analysis confirms that the Polish version of Gynecological Cancers Awareness Scale has a very high reliability to assess the women's cancers awareness and knowledge of cancers.

Key words: gynecological cancers; GCAS; women; cancer prevention

INTRODUCTION

Cancer has been one of the most common causes of death in Poland for many years, and the number of cases of malignant cancer has more than doubled in recent decades [1]. According to statistics, in 2018 there were quite a few numbers of new cases of malignant tumors of the female genital organs. the incidence rate was 14.5%, which is second only to breast cancer (22.5%). In addition, female genital malignancies caused 13.5% of cancer deaths in women (ovarian cancer — 6.1%, uterine shaft cancer — 3.9%, cervical cancer — 3.5%) [2].

The problem in the early detection of this group of cancers is the lack of characteristic clinical signs at their initial stage and the unsatisfactory participation of women in recommended preventive studies [1]. Prevention allows early detection of the disease, which increases the chances of their faster and more effective treatment. In order to improve the situation, measures should be taken to raise women's awareness of health-promoting behavior, including their participation in screening. Early diagnosis of gynecological cancers with effective and common screening programs is very important in reducing mortality and morbidity rates [3–9].

The analysis will allow for the preparation of a Polish version of a standardized tool for recognizing women's awareness of female genital cancers. Identifying knowledge deficits can be useful in practice in the implementation of educational programs aimed at women.

Objectives

The aim of the study was to translate and analyze the psychometric properties of the Polish version of the Gynecological Cancers Awareness Scale (GCAS).

MATERIAL AND METHODS

Design and Participants

The study was conducted using a diagnostic survey method and survey technique. The subject of this study consisted of women who applied to two gynecology outpatient clinics in south-eastern Poland. The sample size required for a reliable factor analysis during the adaptation of a scale to a different culture, is classified as follows: 100 “poor”, 200 “medium”, 300 “good”, 500 “very good”, and 1000 “perfect” [10, 11]. Based on this classification, it was aimed to reach 500 women, 443 of whom agreed to participate and were included in the study. Women meeting the inclusion criteria were selected from the relevant population by random sampling method. Inclusion criteria: sexually active women in aged over 18 years no communication problems and voluntary consent to participate in the study. The method of

sample selection and data collection as well as the sample size were agreed with the author of the original version.

Gynecological Cancers Awareness Scale (GCAS)

GCAS was developed by Alp Dal and Ertem in 2017 to assess women's awareness of gynecological cancers and it is addressed to women aged 18–65 [12]. Given the cultural differences, the Polish version of the scale is addressed to sexually active adult women.

This GCAS scale consists of 41 statements divided on four subscales:

1. Awareness of Early Diagnosis and Knowledge of Gynecologic Cancers — items 1, 2, 12, 13;
2. Awareness of Gynecologic Cancer Risks — items 3–11;
3. Awareness of Gynecologic Cancer Prevention — items 14–19;
4. Awareness of Regular Control and Severe Disease Perception on Gynecologic Cancers — items 20–41.

It is a five-point Likert-type scale (1 = strongly disagree, 2 = disagree, 3 = neither agree nor to disagree, 4 = agree, and 5 = strongly agree). GCAS is evaluated against the overall result. The minimum score is 41 and the maximum score is 205. The higher the score, the higher the awareness of women. On the end of questionnaire, respondents were asked about socio-demographic data including age, place of residence and the level of education.

Tool translation procedure

The GCAS was translated into Polish by two independent translators, they then compared the two versions and created a single version of the translation. The English version has been retranslated into English by another translator. The main purpose of this process was preparation of a Polish version of the scale ready for practical use [13–15].

Ethical consideration

Prior to the study, permission was obtained to conduct the study from the researchers who developed the scale. The research tool was used with the authors' consent and prepared according to the rules adopted for the language adaptation process. Ethical approval (Decision No: 7/06/2021) was received from the Bioethics Committee at the University of Rzeszow Poland. Informed consent was obtained from the women included in the study.

Pilot study

The pilot study was carried out with 35 women to ensure that the prepared version of the tool was understandable. The data obtained from this pilot study was not included in the

main sample. The pilot application determined that there were no misunderstood questions, and the Polish form of the scale was applied to the participants.

Data collection

The data was collected from June 10th to July 10th 2021 by midwives among women who applied to the gynecology polyclinics in Rzeszow for a routine check-up, and who agreed to participate in the study. The interviews were conducted on weekdays using an anonymous questionnaire and took approximately 10 minutes to complete. -

PSYCHOMETRIC ANALYSIS OF THE SCALE

Validity analysis

The adequacy and size of the sample were tested before factor analysis for the construct validity of the scale was done. Kaiser–Meyer–Olkin (KMO) test was used to determine the adequacy of the sample. Bartlett’s Test of Sphericity analysis was conducted to determine whether the scale is suitable for factor analysis. KMO values used to decide whether the data is suitable for factor analysis or not are interpreted as follows; 0.90–1.00 “perfect”, 0.80–0.89 “very good”, 0.70–0.79 “good”, 0.60–0.69 “medium”, and 0.50–0.59 “poor”. The desired KMO value to conduct factor analysis should be over 0.60 [16].

Principal Component Analysis was used to examine the factor structure of the GCAS, and the results were evaluated according to the opinion that the factor loads of the questions obtained as result of the analysis should be at least 0.30 [17]. Confirmatory Factor Analysis (CFA) was applied to support the accuracy of the results obtained by explanatory factor analysis (EFA). As a result of CFA, the lower limits of the data fit index of the model were accepted as ≤ 5 for X^2/sd , ≤ 0.08 for RMSEA, and a value higher than 0.90 for GFI, CFI, and IFI [18].

Reliability analysis

The reliability value of the GCAS was determined through the Cronbach Alpha (α) coefficient. The Cronbach α reliability coefficients range from 0 to 1. As the value approaches 1, the reliability of the internal consistency of the scale increases. According to this, a value below 0.50 is unacceptable, values between 0.50–0.60 are weak, values between 0.60–0.70 are questionable, values between 0.70–0.80 are acceptable, values between 0.80–0.90 are good, and values between 0.90–1.00 are perfect [19].

The item-total correlation coefficients were examined to determine the relationship between the scores obtained from the scale items and the total score of the GCAS. The

correlation values calculated between the items were above 0.20, which was accepted as a sufficient value for the reliability of the scale [20].

Data evaluation

The data was analyzed with SPSS for Windows 22 package program and LISREL 8.80 package program. Numbers, percentages, minimum and maximum values, mean, and standard deviations as well as statistical analyzes stated in the table below were used in the analysis of the data.

Table 1. Statistical tests used in data analysis

Test Used	Technique
Content Validity	Davis Technique
Explanatory Factor Analysis	KMO and Bartlett Coefficients, Principal Components Analysis
Explanatory Factor Analysis	χ^2 /SD value, GFI, AGFI, CFI, RMSEA, SRMR fit indices, and PATH diagram
Internal Consistency	Cronbach α coefficient, item total correlation, bottom top 27% slice comparison

RESULTS

There were 443 women in the study. A majority the respondents had secondary (48.3%) or higher (34.1%) education level. Residents of villages constituted 55.1% of the respondents, while 44.9% were from the city. The participants mean age was 33.64 ± 11.19 years, and their age differed from 18 to 65 years. The scale was examined in three different categories: content validity, construct validity, and internal validity, to determine whether the GCAS is valid and reliable in the Polish language.

Findings regarding content validity

The GCAS, whose validity and reliability were examined after the translation process was completed, was submitted to the opinion of 10 experts for evaluation regarding cultural equivalence to ensure content validity. The CVI scores of the items of the GCAS, whose content validity was evaluated using the Davis technique in the presence of expert opinions, are shown in Table 2.

Table 2. CVI Scores of GCAS Items

Items		4	3	2	1	CVI Score
1	Ovarian cancer is a female genital organ cancer	9	1	–	–	1.00
2	Uterine cancer is a female genital organ cancer	10	–	–	–	1.00
3	Not giving birth increases the risk of ovarian cancer	10	–	–	–	1.00
4	Menstruating at a young age (before the age of 9) and going through menopause at an older age (after the age of 52) increases the risk of ovarian and uterine cancers	7	3	–	–	1.00
5	The drugs used in the <i>in-vitro</i> fertilization treatment increase the risk of ovarian cancer	10	–	–	–	1.00
6	Receiving hormone therapy after menopause increases the risk of ovarian and uterine cancers	8	2	–	–	1.00
7	Being overweight increases the risk of ovarian and uterine cancers	10	–	–	–	1.00
8	Being over the age of 50 increases the risk of uterine cancer	10	–	–	–	1.00
9	Diabetes mellitus increases the risk of uterine cancer	10	–	–	–	1.00
10	Not giving birth increases the risk of uterine cancer.	10	–	–	–	1.00
11	Using contraceptive pills increase the risk of uterine and cervical cancers	10	–	–	–	1.00
12	Early diagnosis is important in the female genital organ cancer	10	–	–	–	1.00
13	Having HPV (the virus causing cervical cancer) test is important for early diagnoses of cervical cancer	10	–	–	–	1.00
14	For the early diagnosis of cervical cancer, I have a cervical swab test performed	10	–	–	–	1.00
15	For the early diagnosis of the female external genital organ, I make self-examination for the external genital organ	7	3	–	–	1.00
16	I do not smoke in order to reduce the risk of female genital organ cancer	10	–	–	–	1.00
17	In order to reduce the risk of female genital organ cancer, I do not use contraceptive pills for a long period	8	2	–	–	1.00
18	I keep away from stress in order to reduce the risk of female genital organ cancer	8	1	1	–	0.90
19	I regularly get examined by a gynecologist	10	–	–	–	1.00

20	If I have pain in my abdomen, I go to a gynecologist	10	–	–	–	1.00
21	Abdominal distention may be a serious symptom	10	–	–	–	1.00
22	Abnormal vaginal bleeding may be a serious symptom	10	–	–	–	1.00
23	Bleeding after sexual intercourse may be a serious symptom	10	–	–	–	1.00
24	Too much menstrual bleeding may be a serious symptom	10	–	–	–	1.00
25	Weight loss may be a serious symptom	10	–	–	–	1.00
26	A palpable mass in the genital area may be a serious symptom	10	–	–	–	1.00
27	A wound in the genital area may be a serious symptom	10	–	–	–	1.00
28	Bleeding between menstruation periods may be a serious symptom	10	–	–	–	1.00
29	I go to a doctor if I have a sudden and irregular weight loss	10	–	–	–	1.00
30	If I have a long-term diarrhea without a reason, I go to a doctor	10	–	–	–	1.00
31	If there are people with ovarian cancer in my family, I go to a gynecologist	10	–	–	–	1.00
32	If I have bleeding between menstruation periods, I go to a gynecologist	10	–	–	–	1.00
33	If I have brown discharge, I go to a gynecologist	10	–	–	–	1.00
34	If I have back pain, I go to a doctor	10	–	–	–	1.00
35	If I have problem with urination, I go to a doctor	10	–	–	–	1.00
36	If I have pain during sexual intercourse, I go to a gynecologist	10	–	–	–	1.00
37	If I have continuous discharge, I go to a gynecologist	10	–	–	–	1.00
38	If I have a problematic itch in my genital area, I go to a gynecologist	10	–	–	–	1.00
39	If I have pain in my genital area, I go to a gynecologist	10	–	–	–	1.00
40	If I have burning in my genital area, I go to a gynecologist	10	–	–	–	1.00
41	If I have watery bloody discharge, I go to a gynecologist	10	–	–	–	1.00
CVI mean		0.99				

CVI scores of all items belonging to the GCAS vary from 0.90 to 1.0. Therefore, no item was excluded from the scale in terms of content/scope validity (Tab. 2).

Findings regarding construct validity

After content validity, factor analysis was performed to determine the construct validity of the GCAS to obtain clearer findings in the study. KMO and Bartlett’s tests were applied before factor analysis to evaluate the adequacy of the sample and the suitability of the data for factor analysis.

Table 3. KMO and Bartlett test values for scale items

KMO	0.896
Bartlett	$\chi^2 = 8322.644, p = \mathbf{0.000}$

As shown in Table 3, the KMO value was determined as 0.896, and this value shows suitability for principal components analysis. Similarly, the Bartlett test results ($\chi^2 = 83922.644, p = 0.000$) showed that the data correlate with each other and are suitable for factor analysis. In addition, the anti-image correlations of the scale items were also examined to evaluate whether the study data is suitable for factor analysis (Tab. 4). As seen in the table, all items meet the sampling adequacy criterion.

Table 4. Anti-image correlations

	S20	S21	S22	S23	S24	S25	S27	S28	S29	S30	S31	S32	S33	S34	S35	S36
S20	0.92 0 ^a															
S21	– 0.22 4	0.93 2 ^a														
S22	– 0.09 2	– 0.02 8	0.95 4 ^a													
S23	– 0.02 8	0.03 3	– 0.21 9	0.93 0 ^a												
S24	0.00 7	– 0.17 4	– 0.04 0	– 0.21 2	0.92 3 ^a											
S25	0.03 2	– 0.11 4	– 0.06 3	– 0.16 4	– 0.30 1	0.91 4 ^a										
S27	0.04 2	0.02 6	– 0.02 7	– 0.05 1	– 0.07 3	– 0.13 9	0.92 2 ^a									
S28	0.05 6	– 0.07	0.02 2	– 0.09	0.07 5	– 0.00	– 0.26	0.92 8 ^a								

		3		9		3	3									
S29	0.03 9	– 0.05 7	0.06 5	– 0.01 2	– 0.00 2	– 0.07 2	0.02 4	– 0.06 3	0.93 8 ^a							
S30	– 0.23 1	– 0.12 1	0.06 9	0.07 5	– 0.16 2	0.06 0	– 0.08 6	– 0.02 7	– 0.15 0	0.88 2 ^a						
S31	0.00 7	0.07 6	– 0.01 0	0.05 2	0.06 9	– 0.04 9	0.01 1	– 0.04 5	0.00 4	– 0.17 9	0.93 0 ^a					
S32	– 0.00 8	0.04 2	– 0.10 6	– 0.02 2	0.00 3	– 0.11 4	0.04 2	– 0.18 2	– 0.08 9	– 0.00 4	– 0.23 0	0.93 0 ^a				
S33	– 0.09 2	0.02 8	– 0.00 1	0.03 8	– 0.01 3	0.00 9	0.07 0	– 0.10 0	– 0.05 4	0.02 8	0.06 3	– 0.30 5	0.92 6 ^a			
S34	– 0.05 4	– 0.17 0	0.06 8	– 0.06 8	0.01 1	– 0.02 9	– 0.04 4	– 0.00 6	– 0.22 7	– 0.06 0	– 0.03 6	0.04 5	– 0.07 8	0.90 9 ^a		
S35	– 0.00 5	0.00 0	– 0.06 0	0.07 5	– 0.08 1	0.05 3	0.03 0	0.00 0	– 0.05 4	0.02 0	– 0.07 4	– 0.10 1	– 0.07 5	– 0.24 4	0.91 4 ^a	
S36	0.05 8	– 0.03	– 0.04	– 0.19	0.00 9	0.19 0	– 0.11	0.07 5	– 0.06	0.05 8	– 0.09	0.03 6	– 0.12	– 0.05	– 0.22	0.90 9 ^a

		7	6	7			8		4		2		5	0	5	
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Table 4. Anti-image correlations (continued)

	S37	S38	S26	S39	S40	S41	S4	S5	S6	S7	S3	S8	S9	S10	S11	S14	S17
S37	0.90 8 ^a																
S38	– 0.18 6	0.92 0 ^a															
S26	0.08 5	0.01 9	0.93 9 ^a														
S39	– 0.00 2	– 0.39 4	– 0.29 2	0.93 1 ^a													
S40	– 0.08 4	– 0.31 7	– 0.07 2	– 0.19 9	0.94 1 ^a												
S41	– 0.04 5	0.06 7	– 0.04 1	– 0.15 8	– 0.27 9	0.95 1 ^a											
S4	– 0.14 8	0.09 8	0.04 8	– 0.01 5	0.00 6	– 0.01 2	0.82 2 ^a										

S5	0.02 0	0.08 7	0.00 8	0.01 4	— 0.02 8	— 0.02 2	— 0.21 3	0.85 7 ^a									
S6	— 0.04 8	— 0.01 6	0.06 9	0.02 2	— 0.02 9	0.08 2	0.06 9	— 0.16 0	0.93 4 ^a								
S7	— 0.03 4	0.01 3	— 0.04 5	— 0.02 6	0.02 5	— 0.05 3	— 0.13 3	0.04 7	— 0.12 5	0.87 0 ^a							
S3	0.06 1	— 0.08 1	— 0.05 2	0.05 0	0.02 9	0.02 7	— 0.27 1	— 0.13 0	— 0.13 3	— 0.02 3	0.79 8 ^a						
S8	0.07 7	— 0.06 8	— 0.02 7	0.00 4	— 0.03 6	0.04 3	— 0.10 4	— 0.01 5	— 0.05 0	— 0.20 8	— 0.00 4	0.90 3 ^a					
S9	0.01 5	0.04 5	— 0.00 3	0.02 8	— 0.06 8	— 0.00 9	0.00 8	0.01 0	— 0.04 1	— 0.33 2	— 0.04 0	— 0.22 3	0.83 6 ^a				
S10	0.02 8	— 0.13 2	0.01 2	0.02 4	0.03 6	— 0.07 5	— 0.12 6	— 0.07 1	— 0.01 2	— 0.10 0	— 0.47 0	— 0.00 4	— 0.02 6	0.81 7 ^a			
S11	— 0.09 2	0.03 7	— 0.05 2	0.05 2	0.05 5	— 0.02 5	0.01 2	— 0.10 9	— 0.12 3	0.04 0	0.03 8	— 0.03 2	— 0.13 4	— 0.15 4	0.81 4 ^a		

S14	0.04 5	— 0.01 4	— 0.00 2	0.04 7	— 0.00 7	— 0.01 6	— 0.02 3	0.01 0	— 0.05 1	0.09 4	0.04 6	— 0.09 7	— 0.13 9	— 0.00 5	— 0.01 8	0.89 1 ^a	
S17	0.07 9	— 0.03 8	0.02 6	0.00 7	0.05 3	— 0.01 9	— 0.02 4	— 0.03 7	— 0.01 4	— 0.07 8	— 0.01 3	— 0.06 6	0.13 3	0.06 8	— 0.35 8	— 0.00 7	0.76 8 ^a

Table 4. Anti-image correlations (continued)

	S15	S16	S18	S19	S1	S2	S12	S13
S15	0.895 ^a							
S16	-0.142	0.855 ^a						
S18	-0.056	-0.151	0.876 ^a					
S19	-0.132	-0.051	-0.145	0.904 ^a				
S1	0.086	-0.049	0.051	0.026	0.737 ^a			
S2	-0.064	0.013	-0.095	0.043	-0.777	0.730 ^a		
S12	0.065	-0.109	-0.033	-0.127	0.019	-0.127	0.748 ^a	
S13	-0.138	-0.035	0.035	0.039	-0.251	0.077	-0.601	0.795 ^a

^aMeasures of Sampling Adequacy (MSA)

The items, factor loading and explained variance of the GCAS are shown in Table 5.

Table 5. Factor analysis findings for the GCAS

Item no	Items	Factor/subdimension			
		1	2	3	4
S20	If I have pain in my abdomen, I go to a gynecologist	0.520	0.158	0.185	-0.054
S21	Abdominal distention may be a serious symptom	0.444	0.180	0.303	-0.115
S22	Abnormal vaginal bleeding may be a serious symptom	0.601	-0.081	0.406	0.132
S23	Bleeding after sexual intercourse may be a serious symptom	0.571	0.021	0.397	0.076
S24	Too much menstrual bleeding may be a serious symptom	0.507	0.075	0.336	-0.039
S25	Weight loss may be a serious symptom	0.547	0.094	0.349	0.113
S26	A palpable mass in the genital area may be a serious symptom	0.659	0.004	0.315	0.183
S27	A wound in the genital area may be a serious symptom	0.509	0.147	0.240	0.184
S28	Bleeding between menstruation periods may be a serious symptom	0.438	0.133	0.278	0.173
S29	I go to a doctor if I have a sudden and irregular weight loss	0.535	0.296	0.077	-0.084
S30	If I have a long-term diarrhea without a reason, I go to a doctor	0.489	0.263	0.042	-0.164
S31	If there are people with ovarian cancer in my family, I go to a gynecologist	0.543	0.029	0.137	0.056

S32	If I have bleeding between menstruation periods, I go to a gynecologist	0.656	-0.007	0.146	0.077
S33	If I have brown discharge, I go to a gynecologist.	0.666	0.036	0.043	0.027
S34	If I have back pain, I go to a doctor	0.524	0.175	-0.010	-0.090
S35	If I have problem with urination, I go to a doctor	0.652	-0.047	0.003	0.000
S36	If I have pain during sexual intercourse, I go to a gynecologist	0.623	-0.014	0.003	0.046
S37	If I have continuous discharge, I apply to a gynecologist	0.587	0.143	-0.090	-0.017
S38	If I have a problematic itch in my genital area, I go to a gynecologist	0.788	-0.001	0.046	0.114
S39	If I have pain in my genital area, I go to a gynecologist	0.820	-0.051	0.077	0.096
S40	If I have burning in my genital area, I go to a gynecologist	0.774	-0.017	0.017	0.153
S41	If I have watery bloody discharge, I go to a gynecologist	0.692	0.022	0.047	0.182
S3	Not giving birth increases the risk of ovarian cancer	0.008	0.761	0.006	0.145
S4	Menstruating at an early age (before the age of 9) and going through menopause at a later age (after the age of 52) increases the risk of ovarian and uterine cancers	0.028	0.721	-0.081	0.124
S5	The drugs used in the <i>in-vitro</i> fertilization treatment increase the risk of ovarian cancer	0.029	0.628	0.055	-0.096
S6	Receiving hormone therapy after menopause increases the risk of ovarian and uterine cancers	0.211	0.539	0.223	-0.014
S7	Being overweight increases the risk of ovarian and uterine cancers	0.065	0.541	0.281	0.239
S8	Being over the age of 50 increases the risk of uterine cancer	0.134	0.447	0.212	0.262
S9	Diabetes mellitus increases the risk of uterine cancer	0.056	0.485	0.288	0.107
S10	Not giving birth increases the risk of	0.032	0.735	0.082	0.033

	uterine cancer				
S11	Using contraceptive pills increases the risk of uterine and cervical cancers	0.039	0.449	0.372	-0.023
S14	For the early diagnosis of cervical cancer, I have a cervical swab test done	0.124	0.089	0.521	0.306
S15	For the early diagnosis of the female external genital organ, I make self-examination for the external genital organ	0.162	0.180	0.482	0.159
S16	I do not smoke in order to reduce the risk of female genital organ cancer	0.022	0.036	0.664	0.221
S17	In order to reduce the risk of female genital organ cancer, I do not use contraceptive pills for a long period	0.019	0.226	0.628	-0.072
S18	I keep away from stress in order to reduce the risk of female genital organ cancer	0.157	0.145	0.567	-0.004
S19	I regularly get examined by a gynecologist	0.310	0.070	0.417	0.111
S1	Ovarian cancer is a female genital organ cancer	0.136	0.168	0.020	0.803
S2	Uterine cancer is a female genital organ cancer	0.117	0.165	0.030	0.762
S12	Early diagnosis is important in the female genital organ cancer	-0.016	-0.001	0.227	0.769
S13	Having HPV (the virus causing cervical cancer) test is important to early diagnose cervical cancer	0.066	0.065	0.197	0.791
Variance explained (%)		20.411	9.185	8.101	7.550
Total variance explained (%)		45.247			

Routine Control and Serious Disease Perception in Gynecological Cancers Subdimension

1. Gynecological Cancer Risks Awareness Subdimension;
2. Protection from Gynecological Cancers Awareness Subdimension.

Early Diagnosis and Information Awareness in Gynecological Cancers Subdimension

Table 5 shows that the GCAS consists of four subdimensions, which is similar to the original structure. The factor loads of all the items of the scale are above 0.40 and the variance explained is 20.411% for Routine Control and Serious Disease Perception in Gynecological Cancers Subdimension, 9.185% for Gynecological Cancer Risks Awareness Subdimension,

8.101% for Protection from Gynecological Cancers Awareness Subdimension, 7.550% for Early Diagnosis and Information Awareness in Gynecological Cancers Subdimension, and 45.247% for the Total Gynecological Cancers Awareness Scale. Therefore, no item was removed from the scale at this stage and the four subdimensions were accepted. Structural equation modeling was established with confirmatory factor analysis after explanatory factor analysis to obtain more precise findings.

FINDINGS REGARDING CONFIRMATORY FACTOR ANALYSIS

The fit index values found for the GCAS, and normal and acceptable values are shown in Table 6.

Table 6. Fit index values found for the Gynecological Cancers Awareness Scale, and normal and acceptable values

Index	Normal value	Acceptable value	Found value
χ^2/SD	< 2	< 5	3.78
GFI	> 0.95	> 0.90	0.94
AGFI	> 0.95	> 0.90	0.93
CFI	> 0.95	> 0.90	0.94
RMSEA	< 0.05	< 0.08	0.056
SRMR	< 0.05	< 0.08	0.071

As seen in Table 6, many indexes were used to examine the fit of the model of the Gynecological Cancers Awareness Scale. Of these, the χ^2/SD value was found as 3.78, GFI as 0.94, AGFI as 0.93, CFI as 0.94, RMSEA as 0.056, and SRMR as 0.071. As a result of the relevant fit index values, it was decided that the model is acceptable in this state.

Findings Regarding Internal Validity

Table 7 presents item means, item total correlations, and Cronbach α coefficients if item is deleted from the GCAS.

Table 7. Item total correlations and Cronbach α coefficients of the Gynecological Cancers Awareness Scale

no	Item	n	Mean	SD	Item total correlation	Cronbach α if an item is deleted
S20	If I have pain in my	44	30.37	10.1	0.488	0.911

	abdomen, I go to a gynecologist	3		52		
S21	Abdominal distention may be a serious symptom	44 3	30.44	10.0 31	0.478	0.911
S22	Abnormal vaginal bleeding may be a serious symptom	44 3	40.16	0.87 8	0.579	0.910
S23	Bleeding after sexual intercourse may be a serious symptom	44 3	30.93	0.85 9	0.578	0.910
S24	Too much menstrual bleeding may be a serious symptom	44 3	30.81	0.94 6	0.499	0.911
S25	Weight loss may be a serious symptom	44 3	30.94	0.90 1	0.576	0.910
S26	A palpable mass in the genital area may be a serious symptom	44 3	40.15	0.80 5	0.624	0.909
S27	A wound in the genital area may be a serious symptom	44 3	30.88	0.87 1	0.542	0.910
S28	Bleeding between menstruation periods may be a serious symptom	44 3	40.13	0.71 5	0.506	0.911
S29	I go to a doctor if I have a sudden and irregular weight loss	44 3	30.34	10.0 37	0.499	0.911
S30	If I have a long-term diarrhea without a reason, I go to a doctor	44 3	30.13	10.1 84	0.415	0.912
S31	If there are people with ovarian cancer in my family, I go to a gynecologist	44 3	40.06	0.82 8	0.457	0.911
S32	If I have bleeding between menstruation periods, I go to a gynecologist	44 3	40.07	0.81 8	0.528	0.910
S33	If I have brown discharge, like broth, I go to a gynecologist	44 3	30.93	0.91 3	0.502	0.911
S34	If I have back pain, I go to a	44	30.16	10.0	0.408	0.912

	doctor	3		60		
S35	If I have problem with urination, I go to a doctor	44 3	30.88	0.81 8	0.439	0.911
S36	If I have pain during sexual intercourse, I go to a gynecologist	44 3	30.86	0.80 3	0.440	0.911
S37	If I have continuous discharge, I go to a gynecologist	44 3	30.82	0.87 2	0.418	0.912
S38	If I have a problematic itch in my genital area, I go to a gynecologist	44 3	40.03	0.75 5	0.591	0.910
S39	If I have pain in my genital area, I go to a gynecologist	44 3	40.03	0.73 0	0.601	0.910
S40	If I have burning in my genital area, I apply to a gynecologist	44 3	40.01	0.75 7	0.570	0.910
S41	If I have watery bloody discharge, I go to a gynecologist	44 3	40.14	0.72 8	0.549	0.910
S3	Not giving birth increases the risk of ovarian cancer	44 3	30.16	10.0 42	0.313	0.913
S4	Menstruating at an early age (before the age of 9) and going through menopause at a later age (after the age of 52) increases the risk of ovarian and uterine cancers	44 3	30.35	0.90 6	0.276	0.913
S5	The drugs used in the <i>in-vitro</i> fertilization treatment increase the risk of ovarian cancer	44 3	30.14	0.82 7	0.242	0.913
S6	Receiving hormone therapy after menopause increases the risk of ovarian and uterine cancers	44 3	30.23	0.73 8	0.438	0.911
S7	Being overweight increases	44	30.44	0.97	0.410	0.912

	the risk of ovarian and uterine cancers	3		4		
S8	Being over the age of 50 increases the risk of uterine cancer	44 3	30.66	0.85 6	0.404	0.912
S9	Diabetes mellitus increases the risk of uterine cancer	44 3	30.26	0.86 2	0.352	0.912
S10	Not giving birth increases the risk of uterine cancer	44 3	30.13	0.95 7	0.323	0.913
S11	Using contraceptive pills increases the risk of uterine and cervical cancers	44 3	30.47	0.99 6	0.338	0.913
S14	For the early diagnosis of cervical cancer, I have a cervical swab test done	44 3	40.15	0.90 7	0.402	0.912
S15	For the early diagnosis of the female external genital organ, I make self-examination for the external genital organ	44 3	30.90	0.96 7	0.421	0.912
S16	I do not smoke in order to reduce the risk of female genital organ cancer	44 3	30.98	10.0 70	0.353	0.913
S17	In order to reduce the risk of female genital organ cancer, I do not use contraceptive pills for a long period	44 3	30.57	10.0 83	0.333	0.913
S18	I keep away from stress in order to reduce the risk of female genital organ cancer	44 3	30.32	10.0 82	0.401	0.912
S19	I regularly get examined by a gynecologist	44 3	30.96	10.1 13	0.444	0.911
S1	Ovarian cancer is a female genital organ cancer	44 3	40.47	0.85 4	0.369	0.912
S2	Uterine cancer is a female genital organ cancer	44 3	40.47	0.84 3	0.348	0.912
S12	Early diagnosis is important in the female genital organ	44 3	40.51	0.91 3	0.269	0.913

	cancer					
S13	Having HPV (the virus causing cervical cancer) test is important to early diagnose cervical cancer	44 3	40.35	0.93 3	0.349	0.912
Routine Control and Serious Disease Perception in Gynecological Cancers Cronbach α					0.920	
Gynecological Cancer Risks Awareness Cronbach α					0.814	
Protection from Gynecological Cancers Awareness Cronbach α					0.719	
Early Diagnosis and Information Awareness in Gynecological Cancers Cronbach α					0.849	
Total Gynecological Cancers Awareness Cronbach α					0.913	

As seen in Table 7, the Cronbach α coefficient is 0.943 for Total Gynecological Cancers Awareness Scale, 0.920 for Routine Control and Serious Disease Perception in Gynecological Cancers Subdimension, 0.814 for Gynecological Cancer Risks Awareness Subdimension, 0.719 for Protection from Gynecological Cancers Awareness Subdimension, and 0.849 for Early Diagnosis and Information Awareness in Gynecological Cancers Subdimension. Item-total correlations for all items of the scale are positive and the deletion of any item did not cause a significant increase in the Cronbach α coefficient of the scale. Therefore, no item was removed from the scale at this stage, either.

Table 8. Bottom top 27% slice comparison results

	n	Mean	SD	Significance
Bottom 27%	120	133.73	12.16	$t = -31.130$
Top 27%	120	176.05	8.59	$p = \mathbf{0.000}$

As seen in Table 8, the comparison results of the bottom and top 27% slice of the GCAS are statistically significant ($p < 0.05$). This result shows the discriminatory power of the scale.

The distribution of the min, max, and mean scores taken from the GCAS and its subdimensions is presented in Table 9.

Table 9. Distribution of scores obtained from Gynecological Cancers Awareness Scale and subdimensions

Subscales	n	Min.	Max.	Mea n	SD
Routine Control and Serious Disease Perception in Gynecological Cancers	44 3	24.00	110.0 0	84.27	12.02
Gynecological Cancer Risks Awareness	44 3	16.00	45.00	29.84	5.19
Protection from Gynecological Cancers Awareness	44 3	6.00	30.00	22.88	4.02
Early Diagnosis and Information Awareness in Gynecological Cancers	44 3	4.00	20.00	17.80	2.94
Total Gynecological Cancers Awareness	44 3	72.00	203.0 0	154.7 9	17.85

As seen in Table 9, the participants' mean scores were as follows: 84.27 ± 12.02 for Routine Control and Serious Disease Perception in Gynecological Cancers, 29.84 ± 5.19 for Gynecological Cancer Risks Awareness, 22.88 ± 4.02 for Protection from Gynecological Cancers Awareness, 17.80 ± 2.94 for Early Diagnosis and Information Awareness in Gynecological Cancers, and 154.79 ± 17.85 for the Total Gynecological Cancer Risks Awareness Scale.

DISCUSSION

It is very important to have knowledge about gynecological cancers. With increasing awareness of gynecological cancer, incidences can be reduced by enabling their prevention and early diagnosis [21]. For this purpose, valid and reliable measurement tools are needed to determine gynecological cancer awareness. This section discusses the findings obtained from the research conducted to ensure the validity and reliability of the GCAS under the following headings:

Validity is the degree to which a measurement tool can measure the property that it aims to measure accurately without reflecting the effect of any other feature on the measurement. [22, 23]. To test the validity of the GCAS, it was first adapted to Polish. Language validity, content validity, and a pilot application were carried out in this regard. In the adaptation phase of the GCAS to the Polish culture, it was first translated from its original language Turkish into English and then from English into Polish. Then, the scale items, which

were translated into Polish, were examined by expert linguists, and the original scale was compared to the Polish translation. The Polish form of the scale was presented to 10 academicians who are experts in their fields to evaluate the content validity.

After language validity, content validity, and pilot application, the study proceeded with the construct validity. Construct validity is performed to evaluate how accurately an abstract concept or behavior can be measured by the tool [23, 24]. Factor analysis method, one of the most frequently used methods, was used to ensure construct validity. Prior to factor analysis, KMO analysis was performed to test the sample size sufficiency and appropriateness. The KMO value of the GCAS was determined as 0.896 (Tab. 3). The KMO value of the Turkish version of the Scale was found as 0.943 [12]. The sample size analysis value $\chi^2 = 8322.644$, $p = 0.000$ tested in the study showed that the sample size was quite sufficient and suitable for factor analysis (Tab. 3).

Varimax rotation was used in the EFA stage of factor analysis. The variance explained for the scale was found as 45.24% (Tab. 5). As a result, it was determined that the variance explained according to the EFA findings was at a satisfactory level. The original GCAS consists of 41 items. In the literature, the lower value for the factor loading of the items in the measurement tool was specified as 0.30–0.40. As a result of EFA in this study, it was determined that the Gynecological Cancers Awareness Scale was gathered under four factors as in the original. As a result, the Polish version of the Gynecological Cancers Awareness Scale consisting of 41 items was obtained (Tab. 5).

According to the CFA results, the χ^2/SD value was found as 3.78, GFI as 0.94, AGFI as 0.93, CFI as 0.94, RMSEA as 0.056, and SRMR as 0.071 (Tab. 6). According to the relevant fit index values, it was decided that the model was acceptable in this state.

Reliability shows the invariance of the measurement tool, consistency, the ability to reach similar results in measurements made at different times and is used to determine the true value levels. If the reliability of a measurement tool is found to be low, its scientific value is also considered low [25]. Cronbach's alpha internal consistency coefficient and item total correlation were used to determine the reliability of the Polish version of the GCAS.

In this study, the Cronbach's alpha internal consistency coefficient of the GCAS was found to be 0.913 (Tab. 7). The Cronbach's alpha internal consistency coefficient of the original scale was 0.944 [12].

CONCLUSIONS

Since the Gynecological Cancer Awareness Scale, which was developed by Alp Dal and Ertem (2017) to measure the Gynecological Cancer Awareness of women and which we have made valid and reliable in Polish, is harmonious with the original scale, it was determined that it is a valid and reliable tool for evaluating the gynecological cancer awareness of Polish women.

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