



Validation and Reliability of the Turkish Premenstrual Coping Measure

Premenstrual Semptomlarla Baş Etme Ölçeği'nin Türkçe Geçerlik ve Güvenirlik Çalışması

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ABSTRACT

Objective: The aim of this study is to evaluate the Turkish validity and reliability of the premenstrual coping measure (PCM) among university students.

Methods: The universe of this methodological study consisted of 364 university students who were found to meet the inclusion criteria in a university in the spring semester of the 2016-2017 academic year. In the study, stratified sampling method was used and stratified weights were determined according to the education field (health, social and natural sciences). Data were collected by using the Inclusion Criteria Questionnaire, Premenstrual Symptoms Screening Tool, Personal Information Form, and PCM. In the study, scale validity was determined by language, content and construct validity methods; scale reliability was evaluated by Cronbach alpha reliability coefficient calculation and test-retest method.

Results: In the study, the content validity index of the PCM was determined as 0.997. As a result of confirmatory factor analysis, 5 items were removed from the scale. The fit index values obtained for the 27-item measurement model was found to be acceptable. Cronbach's alpha reliability coefficients of the scale sub-dimensions were found to be highly reliable. The correlation between the re-test and the first test was calculated for the sub-dimensions of the PCM, and it was found that the correlation coefficients and the scale did not show a time-dependent change.

Conclusion: In the study, it is concluded that PCM is a valid and reliable instrument that can be used to evaluate the premenstrual symptoms coping status of university students with premenstrual symptoms.

Keywords: Premenstrual coping measure, validity, reliability

ÖZ

Amaç: Çalışmada Premenstrual Semptomlarla Baş Etme Ölçeği'nin (PSBÖ) üniversite öğrencilerinde Türkçe geçerlik ve güvenilirliğinin değerlendirilmesi amaçlanmıştır.

Yöntemler: Metodolojik tipte olan bu çalışmanın örneklemini 2016-2017 eğitim-öğretim yılı bahar döneminde bir üniversitede öğrenim gören öğrencilerden araştırmaya dahil edilme kriterlerine uygun 364 öğrenci oluşturmuştur. Çalışmada tabakalı örnekleme yöntemi kullanılmış olup, öğrenim alanına (sağlık, sosyal ve fen bilimleri) göre tabaka ağırlıkları belirlenmiştir. Veriler Araştırmaya Dahil Edilme Kriterleri Soru Formu, aybaşı öncesi belirtileri tarama gereci, kişisel bilgi formu ve PSBÖ kullanılarak toplanmıştır. Çalışmada ölçek geçerliği dil, kapsam ve yapı geçerliği yöntemi ile; ölçek güvenilirliği ise Cronbach alfa güvenilirlik katsayılarının hesaplanması ve test-tekrar test yöntemi ile değerlendirilmiştir.

Bulgular: Çalışmada PSBÖ'nün kapsam geçerlik indeksi 0,997 olarak belirlenmiştir. Doğrulayıcı faktör analizi sonucunda ölçekten 5 madde çıkarılmıştır. Yirmi yedi madde ile oluşturulan ölçüm modeli için elde edilen uyum indeks değerlerinin kabul edilebilir düzeyde olduğu saptanmıştır. Ölçek alt boyutlarına ait Cronbach alfa güvenilirlik katsayılarının yüksek derecede güvenilir olduğu belirlenmiştir. PSBÖ'nün alt boyutları için tekrar test ile ilk test arasında korelasyon hesaplanmış olup, sınıf içi korelasyon katsayıları ile ölçeğin zamana bağlı bir değişim göstermediği tespit edilmiştir.

Sonuç: Çalışmada PSBÖ'nün üniversitede öğrenim gören ve premenstrual semptom yaşayan kız öğrencilerin premenstrual semptomlarla baş etme durumlarını değerlendirmede kullanılabilecek geçerli ve güvenilir bir ölçüm aracı olduğu sonucuna ulaşılmıştır.

Anahtar Sözcükler: Premenstrual semptomlarla baş etme ölçeği, geçerlik, güvenilirlik

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Introduction

Menstruation in women's life is a period that starts with puberty and repeats every month until menopause. Hormonal changes in the menstrual cycle can cause problems such as anxiety, irritability, depressive mood, sudden change in mood, sleep disturbance, fatigue, change in sexual desire, breast swelling and tenderness, weight gain, headache, appetite change, general body aches and edema (1-4). The American College of Obstetricians and Gynecologists defines the condition where these physical and emotional symptoms appear about five days before menstruation and end within a few days with the onset of menstruation, as premenstrual syndrome (PMS) (3).

Of women at reproductive age in the world, 90-95% experience premenstrual changes (2). In a systematic analysis study, it was determined that the prevalence of PMS in the world was 47.8% and that the prevalence of PMS was lowest in France (12%) and highest in Iran (98%) (5). Studies show that PMS prevalence is quite common in our country (6-9). It is noteworthy that the prevalence of PMS varies between 66% (10) and 91.8% (11), especially in young women.

Premenstrual symptoms can cause a change in body perception, decrease in self-confidence, deterioration in family and social relationships, sleep problems, substance abuse, increased tendency to commit crime, increased tendency to accidents, loss of labor and economic losses (12,13). In addition to all these problems, PMS negatively affects the future general health, reproductive health and quality of life of young women aged 15-24. In particular, it prevents students from attending classes and reduces their academic success (14,15).

The etiology of PMS is thought to be multifactorial. Studies show that estrogen, progesterone, serotonin, gamma-aminobutyric acid levels, genetic properties, nutrition, body mass index, and exercise are associated with PMS (16-19).

Thyroid diseases, irritable bowel syndrome, symptoms related to climacteric syndrome, anxiety, fatigue, depression can often be confused with premenstrual symptoms (3,19). Half of those who experience PMS experience one or more of these health problems. In this regard, it is important to evaluate women thought to experience PMS in terms of these diseases (17). PMS cannot be diagnosed by laboratory tests, but it can be distinguished from other diseases by blood and urine analyzes (4,19). At the same time, posttraumatic stress disorder and sexual abuse were found to be associated with PMS (20). In this regard, the menstrual, reproductive and medical history of the woman should be evaluated in detail (17,21).

The time and type of premenstrual symptoms are important for the diagnosis of PMS (4). The severity of symptoms seen in the luteal phase increases before menstruation and decreases at the end of menstruation (17). In addition, the diagnosis of PMS should be confirmed by healthcare professionals using PMS scales and by reviewing the two-month daily records (3,17,21,22).

When the literature is examined, the importance of individualized treatment approach by a multidisciplinary team

is remarkable in reducing premenstrual symptoms (14,15). It is also recommended to adopt a holistic and gradual approach to dealing with premenstrual symptoms (15,21,23). In this context, it is recommended to provide life modification by teaching self-care practices such as raising awareness through training and counseling, providing self-monitoring (keeping PMS diary), lifestyle changes (regular exercise, adequate and quality sleep, quitting smoking, communicating, choosing the appropriate clothing), diet regulation, methods of dealing with stress (relaxation exercise such as breathing exercise, meditation and yoga, bathing, hobbying, massage, biofeedback, autohypnosis), dietary modification, methods of coping with stress (breathing exercises, a relaxation exercise such as meditation and yoga, taking a bath, dealing with a hobby, massage, biofeedback and other methods such as autohypnosis). In the second step approach, non-pharmacological methods including traditional and complementary medicine practices (calcium + vitamin D, magnesium supplement) and cognitive behavioral therapy are recommended. Pharmacological strategies such as hormonal (estrogen, danazol, gonadotropin releasing hormone analogues), non-hormonal (selective serotonin reuptake inhibitors) and symptomatic therapies (non-steroidal anti-inflammatory drug and diuretic) are recommended in cases where the problem persists (3,21-26).

Health professionals have roles and responsibilities in determining women's PMS status and coping levels with premenstrual symptoms and in gaining coping behaviors (3,21). When the literature is analyzed, it is determined that there is no standard Turkish measurement tool to evaluate how women can cope with premenstrual symptoms. In this study, it was aimed to evaluate the validity and reliability of the Premenstrual Coping Measure (PCM) developed by Read et al. (2) for Australian women.

Methods

In this study, the first stage of the doctorate thesis titled "Evaluation of the Effectiveness of Coping with Premenstrual Symptoms Education Program based on Information-Motivation-Behavioural Skills (IMB) Model in University Students", which examined the Turkish validity and reliability of PCM, was presented.

The Universe and the Sampling of the Research

The universe of the study was composed of all students studying at Ankara Yıldırım Beyazıt University in the spring term of 2016-2017 academic year (n=5757). In scale validity and reliability studies, it is recommended that the sample volume be 5-10 times the total number of scale items (27). In this context, the sample of the study was intended to be composed of at least 224 students who were studying at the university in the spring semester of 2016-2017 academic year (Scale number of items =32, 7 times of number of items =224). The stratified sampling method was used in the study, considering that students' behavior to cope with premenstrual symptoms might differ depending on the area they were getting education. Layer weights were determined according to the state of education in health, social and science.

It was aimed to reach at least 61 students in the field of Health Sciences, at least 142 students in the field of Social Sciences and at least 21 students in the field of Natural Sciences. At the same time, it was aimed to reach at least 45 students from each class including preparatory class, first, second, third and fourth year classes (n=224). In the study, more students were reached with the prediction of data losses. When 344 students were reached, the number of students to enter the teaching area layers was completed (n_{health sciences} =69, n_{social sciences} =242, n_{natural sciences} =33). However, since the targeted number of students according to class level could not be reached, it was continued to collect data from the first year class, which had missing number. Twenty seven more students were reached and seven of these students were found to fill the data collection forms incompletely. The study was completed with 364 students (n_{preparatory} =87, n_{first year} =65, n_{second year} =66, n_{third year} =69, n_{fourth year} =77).

Criteria For Inclusion In the Study

The inclusion criteria of the study; 1) Students having premenstrual symptoms (Students marking at least one of the items of 1st-14th items of the Premenstrual Symptoms Screening Tool (PSST) as “mild”, “moderate” or “severe”), 2) students having regular menstruation every 24-35 days (22), 3) students who did not have pregnancy or lactation for the past 12 months, 4) students who did not use oral contraceptives, 5) students who were literate in Turkish, and 6) students who volunteered to participate in the study.

Data Collection Tools

The Inclusion Criteria Questionnaire: The Inclusion Criteria Questionnaire prepared by the researchers in line with the literature review (1,2,5,14) consisted of 6 items containing the inclusion criteria of the study. The students who stated the 1st, 2nd, 5th and 6th questions of the Inclusion Criteria Questionnaire as “yes”, and the 3rd, 4th questions as “no” were included in the study.

The Premenstrual Symptoms Screening Tool (PSST): The PSST was developed by Steiner et al. (28) to identify premenstrual symptom, PMS or premenstrual dysphoric disorder. The scale, which is a four-point Likert type scale and consists of 22 items, determines the degree of premenstrual symptoms and how much they affect life. Marking at least one of the items of 1st-14th items of the scale as “mild” or “moderate” or “severe” is considered as “having premenstrual symptom”. The Turkish validity and reliability study of the scale was done by Özdel et al. (29) and Cronbach’s alpha reliability coefficient was determined as 0.92.

In our study, Cronbach alpha reliability coefficient was calculated as 0.92.

Personal Information Form (PIF): PIF was prepared by researchers in line with the literature review (1,2,5,14) and opinions were received from three experts. The form contained a total of 12 items related to the individual and sociodemographic characteristics of the students such as education area, class, age, residential area, and family type.

Premenstrual Coping Measure (PCM): The PCM was developed by Read et al. (2) to evaluate the coping status of Australian women aged 18-49 with symptoms in the premenstrual period. Each item of the scale, which consists of 5 sub-dimensions in five-point Likert type, is scored between 1-5. There is no evaluation on the total score of PCM. As the score obtained from the sub-dimensions of the measure increases, the ability to cope with premenstrual symptoms increases. With the measure structure consisting of 32 items, 38.9% of the variance is explained. In addition, the sub-dimensions of the measure are in a meaningful relationship with each other, and the coefficients of coherence vary between 0.188 -0.518. The items in the measure sub-dimensions, the lowest and highest scores that can be obtained from the sub-dimensions and the Cronbach alpha reliability coefficients of the sub-dimensions are given in Table 1 (2).

Application of the Research

The measure validity was evaluated by language, scope and construct validity methods, and the measure reliability was evaluated by calculating Cronbach alpha reliability coefficients and test-retest method (Figure 1).

Language Validity: The measure items were translated from English to Turkish by three different foreign language experts and from Turkish to English by three different foreign language experts for the language validity. A single Turkish draft measure form was prepared by comparing the English translations with the original measure and selecting the most appropriate expressions from the Turkish translations.

Scope Validity: Davis Technique was used to evaluate the scope validity of the study. For the Turkish draft measure form, it was sent to 13 experts in the field of women’s health, mental health, child health, public health and measurement-evaluation and a Turkish language expert (n=14). The experts were asked to evaluate each measure item in the range of 1-4 points in terms of language, expression, understandability, and suitability, and the

Table 1. Features related to the sub-dimensions of PCM (2)

Sub-dimensions	Items	Min. point	Max. point	Cronbach alpha
1. Avoiding harm	1-8	8	40	0.89
2. Awareness and Acceptance of premenstrual change	9-18	10	50	0.86
3. Adjusting energy	19-23	5	25	0.73
4. Self-care	24-27	4	20	0.81
5. Communicating	28-32	5	25	0.68

Min: Minimum, Max: Maximum, PCM: Premenstrual coping measure

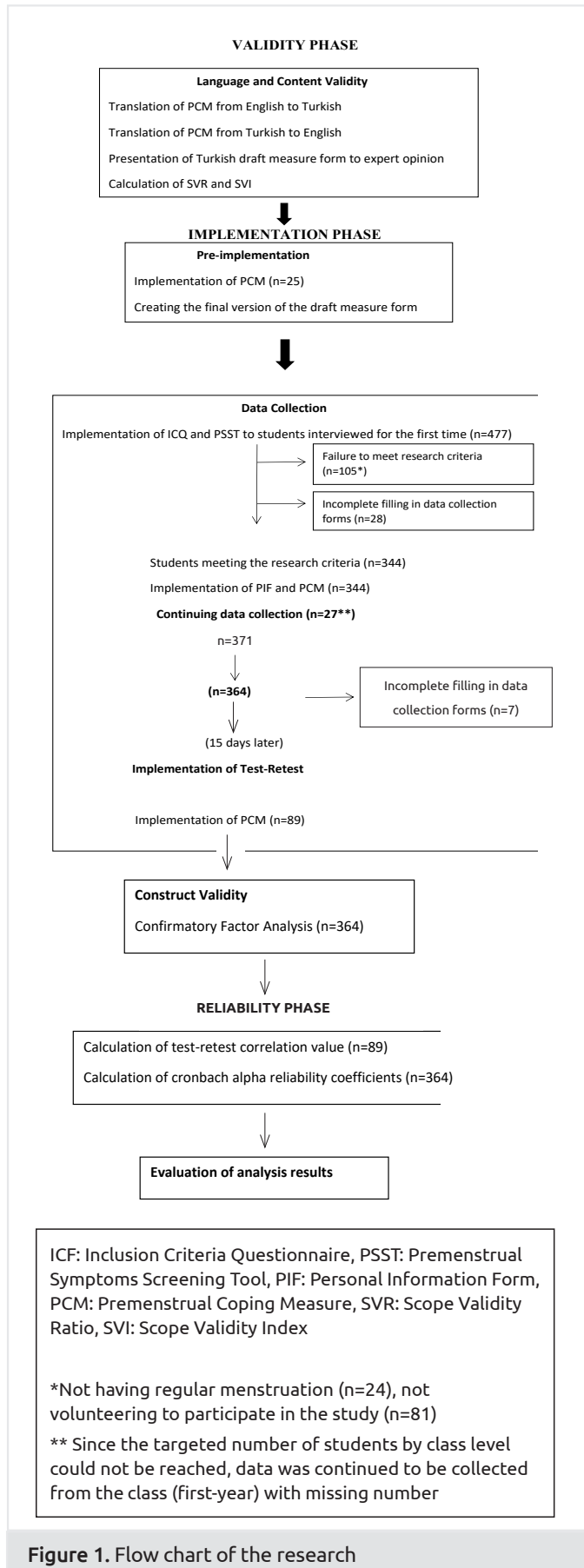


Figure 1. Flow chart of the research

Turkish language specialist was asked to evaluate the final version of the Turkish measure in terms of compliance with Turkish language rules. According to the evaluations from the experts, the scope validity ratio (SVR) of each item was calculated and Scope Validity index (SVI) was calculated for the requirement and eligibility level of each item.

Pre-Application: In order to evaluate the comprehensibility of PCM and whether there was any change in perception while applying the measure, 25 students in accordance with the research criteria were reached and the measure was pre-applied. The data obtained in the pre-application were not included in the study. In this context, some structural changes were made in the sentences, and the draft measure form was rearranged.

Data Collection: Within the scope of the study, students were informed about the research at a time when they did not have lessons in the classroom. PSST, PIF and PCM were given to the students who volunteered to participate in the study and students who answered “yes” to 1st, 2nd, 5th and 6th items of the Inclusion Criteria Questionnaire and “no” to 3rd and 4th items were asked to continue to fill the forms. The students were asked to continue filling out the data collection forms. Of the 477 students interviewed, 372 students met the inclusion criteria. As 28 of these students filled the data collection forms incomplete, the study was completed with 344 students.

Test-retest Application: The reliability of the measure was evaluated with the test-retest method. The test-retest application of the study was carried out after 15 days by reaching students (25% of 224=56). In this context, PSST was sent to 364 students via e-mail. Eighty nine students sent back the PSST, which they filled in, and the test-retest application of the study was completed.

Construct Validity: Confirmatory Factor Analysis (CFA) method was used to evaluate the construct validity of PSST. With this method, the suitability of the measure’s factor and item structure to the Turkish culture and the verification of the measure model were evaluated. The measurement model established to verify the structure consisting of 32 items was analyzed and item factor loads and fit index values were examined.

Measure Reliability: Cronbach alpha reliability coefficients of the measure sub-dimensions in evaluating the internal consistency of PSST were used and in determining the stability, Intraclass Correlation Coefficient (ICC) was calculated by looking at the correlation between the retest and the first test.

Ethical Aspect of the Study

In order to carry out the validity and reliability study of PCM in Turkish, written permission was obtained from the measure owner and the author for the use of PMST. Ethical approval (date/number: 10.09.2017/08) was obtained from Ankara Yıldırım Beyazıt University Ethics Committee and institutional permission was obtained from the faculties. Volunteerism was used in participation in the study and informed written consents of those who agreed to participate were obtained. In the study,

the ethical principles of “Confidentiality and protection of confidentiality”, “Respect for autonomy” and “Do not harm/benefit” were followed (30). This research was carried out outside the course hours of the students and education was not disrupted. There was no relationship of interest between researchers and students.

Evaluation of the Data

Data were transferred to IBM SPSS Statistics 23 package program and analyzes were done. While analyzing the data, frequencies (number, percentage) were given for categorical variables and descriptive statistics [mean (\bar{x}), standard deviation (SD)] were given for numerical variables. Language, scope and construct validities of the study within the scope of measure validity were evaluated and within the scope of measure reliability, test-retest method was used and Cronbach alpha reliability coefficients were calculated.

Results

The average age of students was 21.42 ± 1.82 , 65% of them were in the field of social sciences and 24% in preparatory class. Of the students 63% lived in the Central Anatolia Region and 66% lived in the city centers. Of the students 79% stated that their income covered the expenses of their income and 87 of them had nuclear families. The education level of the mother of 50% of the students was primary school and the education level of 66% was high school and above. According to the statements of the students and the results of PSST, 58% of the students experienced PMS and 14% had premenstrual dysphoric disorder (Table 2).

When the scope validity results of PCM were examined, it was determined that the SVR value of item 8 was 0.923 and the SVR values of other items were 1. In addition, the measure's SVI value was found to be 0.997.

The measurement model established to verify the structure consisting of 32 items was analyzed with CFA which was used in evaluation of the structure. As a result of the analysis, it was seen that the model did not show enough compliance. For this reason, model improvement studies were carried out. Firstly, by looking at the modification index table, Chi-Square drop values (“M.I.” values) for possible changes in the model were examined. The modification demonstrated by highest “M.I.” was tied to situations that were conceptually appropriate and the model was executed. “Item 8” which was loaded with too many modifications, and “item 9”, “item 19”, “item 23” and “item 31” of which factor loads were low, were removed from the structure. As a result, the model was confirmed. It is seen in Figure 2 and Table 3 that with which items the measurement model confirmed with 27 items are formed. In Figure 2 and Table 3, there are standardized regression coefficients, namely factor loads, that are belong to ways on One-Way arrows.

The fit index values of PCM are as follows: The ratio of chi-square to degrees of freedom (χ^2/SD) is 2.353, Goodness of Fit Index (GFI) is 0.868, Incremental Fit index (IFI) is 0.920,

Table 2. Individual characteristics of students

Individual characteristics	n	%
Age ($\bar{x} \pm SD = 21.42 \pm 1.82$)		
Educational field		
Social sciences	237	65.1
Health sciences	86	23.6
Natural sciences	41	11.3
Class		
Preparatory class	87	23.9
First year	65	17.9
Second year	66	18.1
Third year	69	19.0
Fourth year	77	21.2
Region in which the individual lived longest		
Mediterranean Region	36	9.9
Eastern Anatolia Region	14	3.8
Aegean Region	15	4.1
Southeast Anatolia Region	8	2.2
Central Anatolian Region	230	63.2
Marmara Region	28	7.7
Black Sea Region	33	9.1
Residential area		
Provincial Center	240	65.9
District center, parish, village, abroad	124	34.1
Economical status		
Income more than expense	45	12.4
Income equal to expense	286	78.6
Income less than expense	33	9.1
Family type		
Nuclear family	318	87.4
Extended family, mother-father divorced	46	12.6
Educational status of the mother		
Illiterate, literate	33	9.1
Primary school	184	50.5
High school and \uparrow	147	40.4
Educational status of the father		
Illiterate, literate	12	3.3
Primary school	113	31.1
High school and \uparrow	239	65.6
Menarche age ($\bar{x} \pm SD = 13.19 \pm 1.246$)		
Experiencing PMC (According to PSST)		
Yes	210	57.7
No	154	42.3
Experiencing premenstrual dysphoric disorder (According to PSST)		
Yes	51	14.0
No	313	86.0

PMS: Premenstrual syndrome, PSST: Premenstrual Symptoms Screening Tool

Tucker-Lewis index (TLI) is 0.909, Comparative Fit index (CFI) is 0.920, The Root Mean Square Error of Approximation (RMSEA) is 0.061 and Standardized Root Mean Square Residual (SRMR) is 0.063 (Table 4).

Table 5 shows the item statistics for the measurement model created with 27 items. Since no reliability of the items was negatively affected, no other item was removed from the measure.

As a result of the reliability analysis of PCM, the Cronbach alpha reliability coefficient of the 7-item “Avoiding Harm” sub-dimension is 0.885. The Cronbach’s alpha reliability coefficient for the sub-dimension of “Awareness and Acceptance of Premenstrual Change”, consisting of 9 items, is 0.890. The Cronbach alpha reliability coefficient of the “Adjusting Energy” sub-dimension consisting of 3 items is 0.775. The Cronbach alpha reliability coefficient for the “Self Care” sub-dimension consisting of 4 items is 0.831 and the Cronbach alpha reliability coefficient for the “Communicating” sub-dimension consisting of 4 items is 0.860 (Table 6).

When the correlation between retest and first test for the subdimensions of PCM is examined, the ICC value of the sub-

dimension of “Avoiding Harm” and “Awareness and Acceptance of Premenstrual Change” is 0.713, the ICC value of the sub-dimension of “self-care” is 0.734, and the ICC value of the “Communicating” sub-dimension is 0.719 (Table 7).

Discussion

Premenstrual symptoms experienced by women negatively affect the quality of life. For this reason, it is important to determine the coping status of women experiencing PMS and develop a coping approach accordingly. In this study, Turkish validity-reliability of PCM, which evaluated the individual’s behavior to cope with PMS in five basic areas, such as harm avoidance, awareness and acceptance of premenstrual symptoms, adapting energy, self-care and communication, was evaluated in university students.

It is expected from a scale to have two characteristics: Validity and reliability. In the study, validity of PCM was evaluated by using content validity and construct validity methods. Scope validity is determined by the scale’s inclusion of all important subtopics of the subject studied. It is recommended that the number of experts consulted for this evaluation should be between 5 and 40 (31). In our study, the draft measure form was sent to 13 experts and their opinions were received. When the smallest acceptable SVR are examined according to the number of experts, if the opinions of 13 experts are received, the SVR values should be above 0.54 (32). According to the results of the analysis of expert evaluations, the SVR values of all items were found to be greater than 0.80. It is recommended that the SVI value of multidimensional scales should be greater than 0.80 (33). In the study, the SVI value of the scale was calculated as 0.997. The SVI represents the dimensions of the overlap detected between the functional capacity of a defined task performance area and the performance observed in the test under examination. Functionally, the SVI is the average percentage of overlap between test items and the task performance area (34,35). The high SVI value in the study indicated that the measure items were good at measuring the coping behaviors with premenstrual symptoms.

In our study, the construct validity of PCM was evaluated with CFA and five items (item 8, item 9, item 19, item 23, item 31) were removed from the measurement model established to confirm the structure consisting of 32 items. Thus, all of the item factor loads were found above 0.40. Regardless of the sign in the literature, load values of 0.60 and above are defined as high, and load values between 0.30 and 0.59 are defined as medium values (36). Factor load, which was a coefficient that explains the relationship of items with factors, was sufficient for each item in the measurement model, which was confirmed with 27 items in our study. Thus, it could be said that the items were related to the factor they were involved in.

When determining whether the measurement model is compatible with the theory, fit indices are used (37). Among the fit indices, it is recommended that χ^2/SD should be ≤ 3 , GFI ≥ 0.90 (0.85-0.90), IFI ≥ 0.95 (0.90-0.95), TLI (NNFI) ≥ 0.95 (0.90-0.95), CFI ≥ 0.95 (0.90-0.95), RMSEA ≤ 0.05 (0.05-0.08)

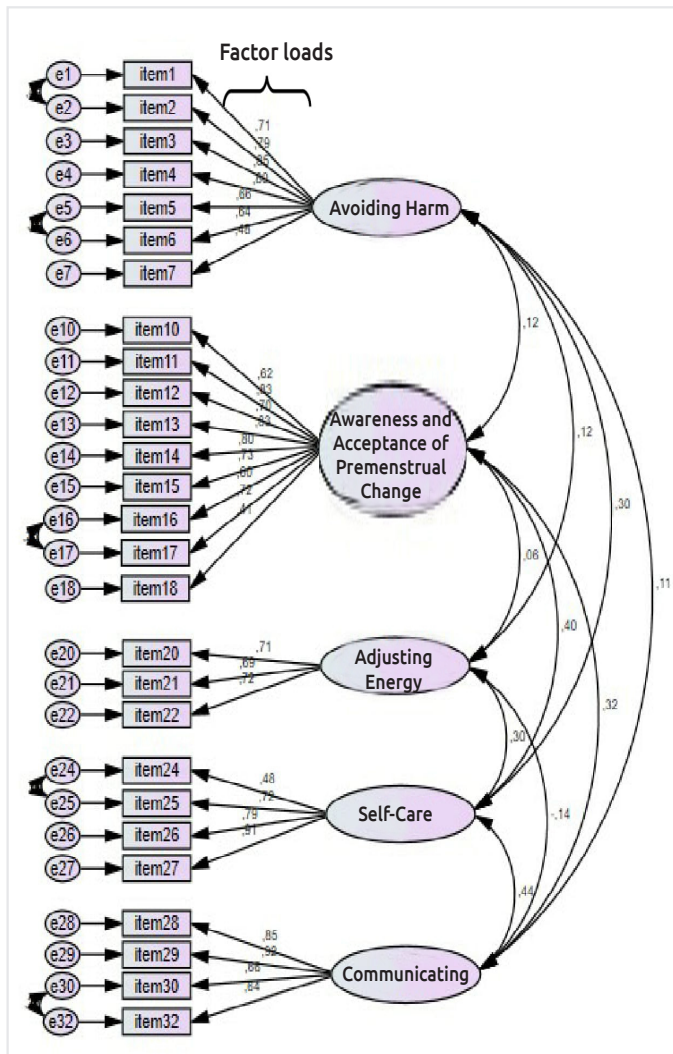


Figure 2. Measurement model of PCM

Table 3. Item factor loads

		Factor load
Avoiding harm		
Item 1	I avoid situations that have the potential to provoke me	0.715
Item 2	I avoid people that have the potential to provoke me	0.786
Item 3	I avoid raising topics that have the potential to create conflict	0.852
Item 4	I remove myself from a situation if it starts to provoke me	0.799
Item 5	I avoid situations where I know I will feel vulnerable	0.658
Item 6	I avoid having conversations that are liable to upset me	0.644
Item 7	I try to avoid dealing with difficult family issues	0.477
Awareness and acceptance of premenstrual change		
Item 10	I am aware that my premenstrual changes are only temporary	0.620
Item 11	I think it is okay to be feeling differently when I am premenstrual	0.827
Item 12	I am aware of my bodily changes	0.700
Item 13	I think it is okay to be more emotional or sensitive when I am premenstrual	0.830
Item 14	I am aware of my emotional changes	0.804
Item 15	I think that my premenstrual changes are a normal part of a woman's experience	0.731
Item 16	I know that other women go through this	0.596
Item 17	I think it is okay that my physical needs may be different	0.715
Item 18	I know what I need to do to support myself	0.406
Adjusting energy		
Item 20	I decrease my social activities	0.713
Item 21	I focus less on the needs of others	0.693
Item 22	I exercise less	0.719
Self-care		
Item 24	I spend time doing things that help me relax e.g. have a bath, massage, read a book	0.481
Item 25	I take time to focus on my own needs	0.718
Item 26	I allow myself extra time to rest	0.793
Item 27	I do things to make myself more comfortable	0.913
Communicating		
Item 28	I feel confident to tell people how I feel	0.845
Item 29	I feel confident to tell people what I need	0.918
Item 30	I tell others about how I am feeling	0.656
Item 32	I feel comfortable when asking for help from others	0.636

and SRMR ≤ 0.05 (0.05-0.10) (36,37). In this study, χ^2/SD was below 3, GFI was above 0.85, IFI, TLI and CFI values were above 0.90, RMSEA was below 0.08 and SRMR was below 0.10. The results provided acceptable fit values and the measurement model appeared to be compatible with the theory.

In our study, the reliability of PBSS was evaluated using the Cronbach alpha reliability coefficients and test-retest methods. In

our study, PCM's "Harm Avoidance" sub-dimension was highly reliable ($\alpha=0.885$), "Awareness and Acceptance of Premenstrual Change" sub-dimension was highly reliable ($\alpha=0.890$), "Adjusting Energy" sub-dimension was reliable ($\alpha=0.751$), "self-care" sub-dimension was highly reliable ($\alpha=0.831$), and "Communicating" sub-dimension was highly reliable ($\alpha=0.860$) (31). This showed that PCM was a consistent measurement tool.

Table 4. Fit index values of the measurement model and acceptable fit values

	Fit index values	Acceptable fit values
χ^2/df (Ratio of chi-square to degree of freedom)	2.353	≤ 3
GFI (Goodness of Fit index)	0.868	≥ 0.90 (0.85-0.90)
IFI (Incremental Fit index)	0.920	≥ 0.95 (0.90-0.95)
TLI (Tucker-lewis index)	0.909	≥ 0.95 (0.90-0.95)
CFI (Comparative Fit index)	0.920	≥ 0.95 (0.90-0.95)
RMSEA (The root mean square error of approximation)	0.061	≤ 0.05 (0.05-0.08)
SRMR (Standardized root mean square residual)	0.063	≤ 0.05 (0.05-0.10)

Table 5. Item statistics

	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
Item 1	88.86	194.163	0.457	0.637	0.863
Item 2	88.78	193.169	0.469	0.721	0.862
Item 3	88.80	194.712	0.425	0.679	0.864
Item 4	88.89	193.768	0.440	0.611	0.863
Item 5	88.75	192.045	0.487	0.695	0.862
Item 6	88.83	193.010	0.447	0.692	0.863
Item 7	88.88	196.389	0.331	0.375	0.867
Item 10	87.66	197.565	0.396	0.467	0.864
Item 11	87.68	194.263	0.526	0.673	0.861
Item 12	87.57	195.667	0.492	0.554	0.862
Item 13	87.62	194.875	0.537	0.652	0.861
Item 14	87.58	196.338	0.479	0.636	0.862
Item 15	87.74	196.060	0.432	0.580	0.863
Item 16	87.62	198.303	0.395	0.482	0.864
Item 17	87.68	195.667	0.502	0.598	0.862
Item 18	88.29	193.530	0.459	0.364	0.863
Item 20	89.04	202.979	0.156	0.425	0.871
Item 21	89.05	203.213	0.153	0.394	0.871
Item 22	88.75	203.462	0.129	0.421	0.873
Item 24	88.02	195.421	0.419	0.436	0.864
Item 25	88.15	191.958	0.564	0.626	0.860
Item 26	87.93	193.698	0.501	0.601	0.862
Item 27	87.88	191.989	0.600	0.666	0.859
Item 28	88.70	194.568	0.413	0.648	0.864
Item 29	88.72	193.821	0.433	0.692	0.863
Item 30	88.85	195.682	0.390	0.500	0.865
Item 32	88.88	197.286	0.339	0.485	0.866

Table 6. Reliability analysis results of PCM sub-dimensions

	Items	Cronbach alpha	Reliability level
Avoiding harm	1-7	0.885	Highly reliable
Awareness and acceptance of premenstrual change	8-16	0.890	Highly reliable
Adjusting energy	17-19	0.751	Reliable
Self-care	20-23	0.831	Highly reliable
Communicating	24-27	0.860	Highly reliable

PCM: Premenstrual coping measure

Table 7. Compliance of sub-dimensions of PCM between test and retest

	ICC	95% confidence interval
Avoiding harm	0.712	0.561-0.811
Awareness and acceptance of premenstrual change	0.712	0.562-0.811
Adjusting energy	0.713	0.561-0.811
Self-care	0.734	0.595-0.825
Communicating	0.719	0.572-0.815

ICC: Intraclass correlation coefficient

Supplementary 1. The premenstrual coping measure

Women cope with their premenstrual experience in a variety of ways. We are interested in what you do when you are premenstrual. Tick the response choice which indicates how the following statements apply to your premenstrual experience

Coping statements	Doesn't apply to me	Seldom applies to me	Sometimes applies to me	Applies to me	Almost always applies to me
1. I avoid situations that have the potential to provoke me					
2. I avoid people that have the potential to provoke me					
3. I avoid raising topics that have the potential to create conflict					
4. I remove myself from a situation if it starts to provoke me					
5. I avoid situations where I know I will feel vulnerable					
6. I avoid having conversations that are liable to upset me					
7. I try to avoid dealing with difficult family issues					
*8. I challenge my negative thoughts					
*9. I accept my changeable moods					
10. I am aware that my premenstrual changes are only temporary					
11. I think it is okay to be feeling differently when I am premenstrual					
12. I am aware of my bodily changes					
13. I think it is okay to be more emotional or sensitive when I am premenstrual					
14. I am aware of my emotional changes					
15. I think that my premenstrual changes are a normal part of a woman's experience					
16. I know that other women go through this					
17. I think it is okay that my physical needs may be different					
18. I know what I need to do to support myself					
*19. I vent my feelings through emotional outbursts					
20. I decrease my social activities					
21. I focus less on the needs of others					
22. I exercise less					
*23. I eat more sugary foods					
24. I spend time doing things that help me relax e.g. have a bath, massage, read a book					
25. I take time to focus on my own needs					
26. I allow myself extra time to rest					
27. I do things to make myself more comfortable					
28. I feel confident to tell people how I feel					
29. I feel confident to tell people what I need					
30. I tell others about how I am feeling					
*31. I try not to express how I am feeling					
32. I ask for help from others					

* These items were removed in the Turkish version of the measure

In the study of Read et al., where PCM was developed, “Avoiding Harm” sub-dimension was highly reliable ($\alpha=0.89$), “Awareness and Acceptance of Premenstrual Change” sub-dimension was highly reliable ($\alpha=0.86$), “Adjusting Energy” sub-dimension was reliable ($\alpha=0.73$), “self-care” sub-dimension was highly reliable ($\alpha=0.81$) and “Communicating” sub-dimension was reliable ($\alpha=0.68$) (2). It was determined that the results reached by Read et al. (2) were similar to our study’s findings. Therefore, it can be said that PCM is open to international use.

Another method in which scale reliability is evaluated is the test-retest method. This method is based on determining the stability of a scale by applying it again in the same individuals, in the same conditions, but with a certain time interval. In this context, the ICC, which is sensitive to changes in the averages, is calculated. Values in the behavioral sciences in the range of 0.70-0.80 are considered “acceptable” (31). In this study, it was determined that the ICC of the measure sub-dimensions ranged between 0.712 and 0.734. It was concluded that the retest and the first test averages of the sub-dimensions of the measure were compatible and did not show a change in time.

Study Limitations

This measure adaptation study was conducted at a university where students came from different regions of Turkey, and adopted different aspects of Turkish culture. This situation constituted the limitation of the study. At the same time, the validity and reliability study of PCM was carried out to be used in the second stage of the doctorate thesis titled “Evaluation of the Effectiveness of the Training Program for Coping with the Premenstrual Symptoms in the University Students Based on the IMB Model”. As the sample of this study consisted of only female students studying at the university, the validity and reliability of PCM in university students were evaluated. This was the other limitation of the study.

Conclusion

In this study, it was concluded that PCM is a valid and reliable measurement tool that can be used to evaluate the coping situation of female students studying at university and experiencing premenstrual symptoms. PCM is recommended for evaluation of coping with PMS consultancy given to female students studying at the university. Since the measure makes a comprehensive assessment in determining the individual’s approaches to coping with PMS, routine use is recommended by healthcare professionals working in primary care by evaluating the validity-reliability in different populations.

Ethics

Ethics Committee Approval: Ethical approval (date/number: 10.09.2017/08) was obtained from Ankara Yıldırım Beyazıt University Ethics Committee and institutional permission was obtained from the faculties.

Informed Consent: Obtained.

Peer-review: Internally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: H.A., Concept: H.B., S.K., Design: H.A., S.K., Data Collection or Processing: H.A., Analysis or Interpretation: H.A., S.K., Literature Search: H.A., Writing: H.A.

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