Development of Coping with Dysmenorrhea Scale in University Students: A Methodological Study

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Abstract

Background: The frequency of dysmenorrhea is quite high in university students and it negatively affects their academic success and social life. There is no standard measurement tool to determine how to cope with dysmenorrhea in Turkey.

Aim: It was aimed to develop a standardized scale to measure university students' coping skills with dysmenorrhea.

Methodology: This methodological research was conducted with 316 nursing and midwifery students studying at a state university. Opinions of 12 experts were received for the draft scale created. Construct validity was determined by Exploratory and Confirmatory Factor Analysis. Cronbach's alpha coefficient, test-retest correlation coefficient, and Pearson correlation coefficient were used for reliability.

Results: A six-factor structure consisting of 17 items, explaining 58.755% of the total variance, emerged: Factor 1 "Taking action", Factor 2 "Taking a rest", Factor 3 "Distraction", Factor 4 "Staying calm", Factor 5 "Seeking Medical Treatment," and Factor 6 "Relaxation." The Cronbach alpha coefficient of the scale was found to be 0.772 and the test-retest correlation coefficient was 0.807.

Conclusions: The results obtained support that the "Coping with Dysmenorrhea Scale" is a valid and reliable measurement tool for university students.

Keywords: Dysmenorrhea; coping; nursing; midwifery; scale development.

Introduction

Dysmenorrhea is defined as a painful clinical picture that occurs with pelvic pain and menstrual disorder during menstruation and is caused by contractions in the uterus (Bernardi et al., 2017). Dysmenorrhea has a high prevalence among university students and affects important aspects of daily activity, psychological health, quality of life, and academic performance (Abu-Helwa et al., 2018; Ameade et al., 2018; Derseh et al., 2017; Hashim et al., 2018). al., 2020). University students report problems such as absenteeism from school, loss of concentration in class, loss of participation in class, limited sports participation, restriction in going out with friends, and inability to do homework (Hailemeskel et al., 2016; Orhan et al., 2018).

The prevalence of primary dysmenorrhea among nursing students in Turkey is 94%, and severe primary dysmenorrhea is high in students who use painkillers, use nonpharmacological methods, have symptoms other than pain, and have a family history of dysmenorrhea (Yılmaz & Sahin, 2019). Another study found that 67.7% of nursing students experienced dysmenorrhea and the pain intensity was 9.07 ± 3.42 (Donmez & Gumussoy, 2019). Karabulutlu (2020) reported that 86.4% of nursing

students had dysmenorrhea and this was related to family history.

There are studies showing the negative effects of dysmenorrhea on university students. Al-Zahrani et al., (2018) revealed that dysmenorrhea negatively affects the academic performance of nursing students, such as course/faculty absenteeism, loss of concentration in class and during exams, inability to complete assignments, and inability to participate in extra activities. It has been determined that midwifery students have problems in family, school and social life, school attendance and exams due to dysmenorrhea (Kusaslan-Avci & Sari, 2018). Some studies have found that students cannot study for exams due to dysmenorrhea, lose concentration in class, cannot do homework, experience problems such as learning disability, loss of participation in class, absenteeism and limited participation in sports (Mesele et al., 2022; Horvat et al., 2023). We can say that dysmenorrhea reduces the quality of life of students by affecting both their academic and social lives.

Apart from the problems experienced, it has been determined that students resort to various coping methods against dysmenorrhea, which affects their lives so negatively. Sahin et al. (2018) determined that university students coping with dysmenorrhea preferred foot heat application, rest/sleep, analgesics, hot baths, hospital treatment, and physical activity. According to Karabulutlu (2020), nursing students preferred to rest, take a hot bath, apply a heat pack to the abdomen, walk, take analgesics, listen to music, and exercise. In the studies conducted, a standard measurement tool was not used, but rather open-ended questions were asked to describe how they coped. There is no standard measurement tool in Turkey to determine how to deal with dysmenorrhea. A standard measurement tool in evaluating the effectiveness of applications in experimental studies will enable a more objective and easier evaluation. Therefore, this study aimed to develop a standard measurement tool to evaluate students' ability to cope with dysmenorrhea.

Aim

This study was conducted to develop a valid and reliable measurement tool to evaluate university students' ability to cope with dysmenorrhea.

Research questions:

1.　　Is the Coping with Dysmenorrhea Scale a valid measurement tool?
2.　　Is the Coping with Dysmenorrhea Scale a reliable measurement tool?

Material and Methods

Design: This study is a methodological study.

Study Population and Sample: The research was conducted with female students studying in the nursing and midwifery departments of the Faculty of Health Sciences at a state university in the Eastern Black Sea Region. The population of the research consisted of a total of 650 female students studying in nursing and midwifery departments. In methodological studies, it is recommended that the number of samples be 5-10 times the number of questions, and this number is even defined as "good" when working with at least 300 people (Gunawan et al., 2021). Based on this, since the number of questions was 32, it was aimed to reach 320 students, but for Exploratory Factor Analysis, 165 students were reached (approximately 5 times the number of questions). The sample for Confirmatory Factor Analysis consisted of 151 students who agreed to participate in the research and filled out the form completely (approximately 6 times the number of questions). Analyzes of the research were conducted with a total of 316 students.

Data Collection Tools: Student Information Form and Coping with Dysmenorrhea Scale (CDS) were used as data collection tools.

Student Information Form: The form consists of 9 questions, including the student's age, regular menstruation, how many days the menstrual period lasts, duration of menstrual pain, the severity of menstrual pain, whether or not they currently have a gynecological problem, whether they are receiving medical help for menstrual pain, whether menstrual pain affects the quality of life and smoking status. Coping with Dysmenorrhea Scale: The scale was developed by researchers and consists of 17 items. The five-point Likert type scale items are scored as 1: "Does not describe me at all", 2: "Describes me a little", 3: "I am undecided", 4: "Describes me well", 5: "Describes me very well". There are no inverse expressions in the scale..

Literature review and item pool: Before creating the item pool, a literature review was conducted to fully define the structure on the subject and to determine how existing measurements of the structure could be useful in the development of a new scale. Afterwards, while creating the item pool, individual interviews were held with 45 students and the question "How do you deal with menstrual pain?" was asked. Students were asked to write their answers. An item pool of 32 items was created in line with the findings and relevant literature (Yilmaz et al., 2020).

Expert opinion: To determine the content validity of the created items, expert opinions were received from 12 faculty members, 1 in the field of Public Health and Diseases Nursing, 8 in the field of Gynecology and Obstetrics Nursing, and 3 in the field of Mental Health and Diseases Nursing. Experts were asked to evaluate each item in terms of clarity and relevance to the topic. Each item was graded according to the Davis technique as "quite appropriate", "appropriate", "appropriate but needs change" and "not suitable", and experts were asked to make an evaluation accordingly. The experts' evaluations were examined and the statements 3, 4, 10, 11, 12, 21, 22, 23, 24, 25, 26 and 29 were edited. The expressions have been made more understandable to represent the final version. For each item, the number of experts who responded "appropriate" to that item was divided by the total number of experts who evaluated the item and subtracting 1 from the result obtained, the Content Validity Rate (CVR) and Content Validity Index (CVI) were calculated. Accordingly, the KGOs of all items vary between 0.75-1.00. For this reason, no items were removed from the draft scale and its 32-item version was preserved.

Pilot study: Before collecting data for explanatory and confirmatory factor analyses, a pilot study was conducted with 45 students with similar characteristics to the sample group to evaluate the comprehensibility of the scale. The pilot study group was not included in the sample. In the pilot application, it was determined that there was no problem with the comprehensibility of the scale items.

Data Analysis: The collected data were evaluated by transferring them to the Statistical Package for Social Sciences for Windows 23.0 software. Number, percentage,

mean and standard deviation values are given for descriptive variables. In evaluating expert opinions, CVR and CVI values were calculated. Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), Cronbach's Alpha and test-retest analyzes were performed for the validity and reliability analyzes of the scale. Analysis of Moment Structures (AMOS) 22.0 software was used for CFA. $p<0.05$ was accepted.

Results

Demographic characteristics

The average age of the students participating in the research is 20.78 ± 2.35 (min = 18, max = 45). 76.6% of the participants have regular menstrual periods; 59.8% menstrual period lasts 5-6 days; 52.8% of menstrual pain continues for more than two days; 8.9% have a gynecological problem; and 45.6% receive medical help such as taking medication or going to hospital during menstrual pain. When students scored their pain according to the pain scale, the average pain score is 6.36 ± 2.50. Of the students, 81.6% report that menstrual pain reduces their quality of life and 17.7% of them smoke.

Validity of the Scale

Content validity

The content validity index (CVI) was calculated, and the decision was made by looking at the total CVI averages of the items that were significant at the 0.05 level and formed the final version of the form (Yurdugül, 2005). Accordingly, CVI was calculated as 0.96 and it was determined that 0.96 was greater than the minimum value determined for the number of 12 experts, that is, 0.56. Since the scale met the condition of CVI≥CVR (0.96≥0.56) for the first version of the scale with 32 items, its content validity was found to be sufficient and was considered statistically significant ($p<0.05$).

Construct Validity

Exploratory Factor Analysis: First, the total correlations of each item were examined. Items with item-total correlations below 0.30 (items 1, 4, 16, 18, 23, 27, 28 and 29) were discarded (Table 1). Before removing the item, sample adequacy was calculated and as a result of the Bartlett test, $\chi 2= 3169.279$, df =

496, p < 0.001, and the Kaiser-Meyer-Olkin (KMO) index was determined as 0.820.

After removing those with a total item correlation below 0.30 from the scale, 24 items remained. As a result of the Bartlett test applied to the 24-item version of the scale, it was found that χ2= 2399.552, df=276, p < 0.001 and the KMO index was 0.822 (Table 2).

As a result of the first principal component analysis, it was determined that the individual contribution of each item was above 0.40 and varied between 0.413-0.771. After the component analysis, it was checked whether the eigenvalue of the 24 items included in the analysis was above 1 and it was determined that there were six components that met this criterion. Therefore, it was determined that the scale had a 6-factor structure and that the scale explained 58.755% of the total variance (Table 3).

Factor loadings for CDS items are given in Table 4. As can be seen, there is no item with a factor loading below 0.400. Factor 1 is named "Taking action", Factor 2 is "Taking a rest", Factor 3 is "Distraction", Factor 4 is "Staying calm", Factor 5 is "Seeking Medical Treatment," and Factor 6 is "Relaxation."

Confirmatory Factor Analysis

According to the EFA results, no items were removed from the scale. CFA was applied to verify the 24-item and 6-factor structure of the scale. In the CFA analysis, the 24-item structure did not show adequate fit, and therefore re-analyses were conducted to improve the model. The items 5, 11, 12, 17, 21, 24 and 32 with low factor loadings were removed and the final version of 17 items was obtained (Figure 1).

When the fit index values (Table 5) obtained for the measurement model were examined, it was determined that Chi Square / Degrees of Freedom ($χ^2$/sd) and Goodness of fit index

(GFI) values showed perfect fit. Adjusted goodness of fit index (AGFI), Root Mean Square of Error Approximation (RMSEA) and SRMR values were found to show acceptable fit. Comparative Fit Index (CFI), Incremental Fit Index (IFI) and Non-Normed Fit Index (TLI (NNFI)) values showed poor fit. EFA results were validated by CFA.

Reliability Studies of the Scale

In the internal consistency analysis conducted to determine the reliability of the scale, the Cronbach Alpha value of the CDS was 0.772, 0.784 for "Taking Action" sub-dimension, 0.684 for "Taking a rest" sub-dimension, 0.822 for "Distraction" sub-dimension, 0.625 for "Staying calm" sub-dimension, 0.586 for "Seeking Medical Treatment" sub-dimension, and 0.569 for "Relaxation" sub-dimension, so the scale was deemed to have sufficient internal consistency.

The ability of the scale to show invariance over time was examined with test-retest reliability. To measure the stability of the CDS, the scale was applied to 36 people apart from the 316 people who participated in the study, with an interval of 15 days, and the intraclass correlation coefficient was calculated between the two applications. The test-retest correlation coefficient was found to be r=0.807 (p<0.001). According to this result, there is no change in the scale scores over time.

Following the validity and reliability analyses, the scale took its final form with 17 items. Scale item numbers have been rearranged according to sub-dimensions. The scale, organized as a 5-point Likert, consists of 6 sub-dimensions. It is scored as "Does not describe me at all = 1" and "Describes me very well = 5". The total score of the scale varies between 17-85 points. As the scores obtained from each subscale increase, it shows that that method is used more. Additionally, the total score of the scale can also be calculated.

Table 1. Item Total Correlations of the Coping with Dysmenorrhea Scale

Number	Items	Item total correlation	Internal consistency coefficient when item is deleted
1.	CDS2	0.321	0.833
2.	CDS3	0.384	0.832
3.	CDS5	0.367	0.831
4.	CDS6	0.432	0.827
5.	CDS7	0.460	0.825
6.	CDS8	0.469	0.827
7.	CDS9	0.362	0.832
8.	CDS10	0.304	0.836
9.	CDS11	0.448	0.826
10.	CDS12	0.336	0.830
11.	CDS13	0.416	0.828
12.	CDS14	0.346	0.831
13.	CDS15	0.402	0.830
14.	CDS17	0.379	0.828
15.	CDS19	0.394	0.828
16.	CDS20	0.302	0.834
17.	CDS21	0.393	0.829
18.	CDS22	0.311	0.833
19.	CDS24	0.457	0.824
20.	CDS25	0.493	0.823
21.	CDS26	0.431	0.827
22.	CDS30	0.377	0.829
23.	CDS31	0.378	0.830
24.	CDS32	0.336	0.834

Table 2. KMO Value and Bartlett Sphericity Test Results

Kaiser-Meyer-Olkin (KMO)		0.822
Bartlett's Test of Sphericity	χ2	2399.552
	df	276
	p	<0.001

Table 3. Variance Explanation Table of the Coping with Dysmenorrhea Scale

Factor	Initial eigenvalues			Total Factor Loadings (Rotated)		
	Total	Explained variance %	Cumulative %	Total	Explained variance %	Cumulative %
Factor 1	5.361	22.336	22.336	4.018	16.742	16.742
Factor 2	3.104	12.935	35.271	2.432	10.134	26.876
Factor 3	1.863	7.764	43.035	2.097	8.739	35.615
Factor 4	1.355	5.646	48.680	1.988	8.283	43.899
Factor 5	1.293	5.389	54.070	1.786	7.440	51.339
Factor 6	1.124	4.685	58.755	1.780	7.416	58.755

Table 4. Factor Loadings for Coping with Dysmenorrhea Scale Items

	Scale items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
CDS30	1. I do sports.	0.770					
CDS31	2. I do yoga.	0.721					
CDS19	3. I move (walk, etc.).	0.706					
CDS26	4. I meditate.	0.683					

CDS25	5. I take care to have an adequate and balanced diet.	0.644				
CDS9	6. I rest.		0.706			
CDS15	7. I cover myself/wrap myself in a blanket.		0.684			
CDS8	8. I drink something hot.		0.616			
CDS20	9. I sleep/try to sleep.		0.611			
CDS13	10. I watch something.			0.844		
CDS14	11. I spend time on the internet.			0.835		
CDS7	12. I do breathing exercises.				0.757	
CDS6	13. I dream.				0.691	
CDS22	14. I go to the health institution.					0.778
CDS10	15. I cry.					0.696
CDS3	16. I apply heat to my stomach, feet, back, etc.					0.760
CDS2	17. I massage my belly.					0.720

Table 5. Fit Index Values and Good Fit Values of Confirmatory Factor Analysis

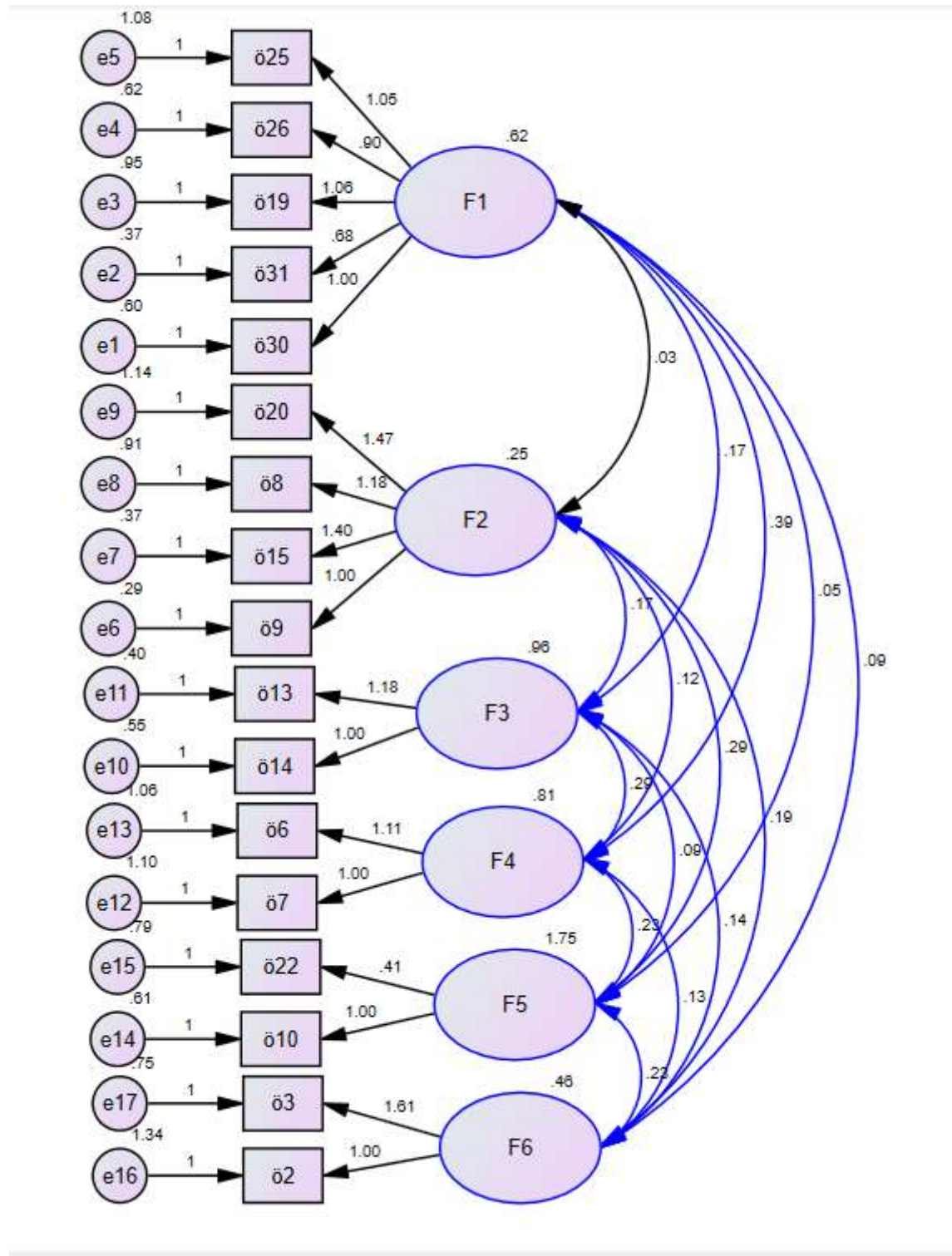|	Model Fit Index Values	Good Fit Values (Acceptable Fit)
χ^2/sd	2.717	≤3 (4-5)
GFI	0.906	≥0.90 (0.89-0.85)
AGFI	0.862	≥0.90 (0.89-0.85)
IFI	0.877	≥0.95 (0.94-0.90)
TLI (NNFI)	0.835	≥0.95 (0.94-0.90)
CFI	0.874	≥0.97 (0.95)
RMSEA	0.074	≤0.05 (0.06-0.08)
SRMR	0.0675	≤0.05 (0.06-0.08)

Figure 1. Path analysis of Coping with Dysmenorrhea Scale

Discussion

This study aimed to develop a standard measurement tool to evaluate the methods used by university students to cope with dysmenorrhea. For this purpose, Coping with Dysmenorrhea Scale was developed and validity and reliability analyzes were conducted.

Dysmenorrhea is a common health problem that negatively affects young women's quality of life, academic success, and social relationships (Sener and Tashan, 2020). When we look at the studies evaluating university students' methods of coping with dysmenorrhea, it is seen that a standard measurement tool is not used (Kusaslan-Avci and Sari, 2018; Sahin et al., 2015; Yilmaz et al., 2020). It is also reported that students have insufficient knowledge about coping with dysmenorrhea (Karabulutlu, 2020). It is thought that a scale is needed to be used in descriptive and experimental studies in this field.

It is reported that in creating the item pool, cognitive interviews or focus group discussions with the target group were used to evaluate whether the questions reflect the field of study and meet the necessary standards (Boateng et al., 2018). In this study, interviews were conducted to determine the methods used by students to cope with dysmenorrhea, and an item pool was created in line with the findings. After the item pool was created, expert opinion was taken to evaluate the ability of the prepared items to represent the measured variable, their understandability and content validity (Gungor, 2016). It was emphasized that the number and quality of experts are important in order to obtain objective results in the evaluation. The recommended number of experts varied between 5-40 (Yesilyurt & Capraz, 2018). In this study, content validity was carried out by consulting the opinions of 12 experts from different fields on the subject.

The KMO value was used to evaluate whether the sample was sufficient for the measured variable, and the Bartlett test of sphericity was used to evaluate the strength of the relationship. A KMO value between 0.7 and 0.8 is considered "good" and a value between 0.8 and 0.9 is considered excellent (Ul-Hadi et al., 2016). In this study, the Bartlett test

result was found to be $\chi 2$= 2399.552, df=276, p<0.001 and the KMO index was 0.822. According to this result, it was determined that the sample size was sufficient and perfect (Yaslioglu, 2017). According to the Bartlett test result, the sample was found to be multivariate normal and acceptable for further analysis (Ul-Hadi et al., 2016).

After determining which item was related to which factor in the explanatory factor analysis, Confirmatory Factor Analysis was performed. Confirmatory Factor Analysis is a method that examines the relationship and the resulting structure between observed and latent variables. The items of the scale are observed and the obtained factors are latent variables (Evci & Aylar, 2017). In confirmatory factor analysis, fit indices such as $\chi 2$, $\chi 2$/sd, GFI, AGFI, RMSEA, RMR, SRMR, NFI, CFI are used (Evci & Aylar, 2017). With Confirmatory Factor Analysis, it was determined that χ^2/sd, GFI and SRMR values showed perfect fit. It was determined that AGFI, RMSEA and SRMR values showed acceptable fit. CFI, IFI and TLI (NNFI) values showed poor fit. EFA results were validated with CFA (Gungor, 2016). Compared to the studies conducted, we can say that the values obtained in this study are acceptable (Bal et al., 2022; Kovanci & Ozbas, 2022).

Reliability analysis is performed to determine the degree of consistency of the responses in the scale items. Reliability analysis is determined by calculating the Cronbach Alpha coefficient and item-total correlation coefficient. In order for the Cronbach Alpha (α) coefficient to be accepted, the value must be 0.70 and above (Gungor, 2016; Evci & Aylar, 2017). In this study, the Cronbach Alpha value of DIBEÖ was found to be 0.772. In this regard, we can say that the scale is reliable in measuring the desired variable. The Cronbach Alpha value of the "Pain Coping Inventory" developed by Hocaoglu et al. (2019) varied between 0.53 and 0.77 and was similar to our study finding.

To determine the stability of the scale over time, that is, its continuity, the scale was applied twice with an interval of 15 days and the test-retest correlation coefficient was found to be r = 0.807. If the relationship is positive and approaches +1, it indicates the

existence of a perfect relationship. It is expected to be at least 0.70, indicating that the scale is stable (Karakoc & Donmez, 2014). According to this finding, we can say that the stability level of CDS is quite high.

Strengths and Limitations of the Study

This study is the first standard measurement tool developed in Turkey to determine how nursing and midwifery students cope with dysmenorrhea. It is anticipated that it will make a great contribution to the studies carried out in this sense. However, the research has some limitations. Some factors of the scale included two items each. To prevent this, thematic analysis could have been done while creating the item pool as a result of interviews with 45 students.

Conclusion: In conclusion, the results obtained support that the "Coping with Dysmenorrhea Scale" is a valid and reliable measurement tool for university students. CDS can be used in future studies to determine the methods used by university students to cope with dysmenorrhea. Additionally, pretest and posttest comparisons can be made by conducting experimental studies on this subject. It is thought that it will contribute to the studies on this subject.

References

Abu-Helwa, H. A., Mitaeb, A. A., Al-Hamshri, S., & Sweileh, W. M. (2018). Prevalence of dysmenorrhea and predictors of its pain intensity among Palestinian female university students. *BMC Women's Health*, 18(1), 18. doi: 10.1186/s12905-018-0516-1

Al-Zahrani, A., Alabdulaziz, H., & Alghamdi, F. (2018). The impact of dysmenorrhea on academic performance among female nursing students at King Abdulaziz University. *Journal of Nursing and Health Science*, 7 (6), 1-7.

Ameade, E. P. K., Amalba, A., & Mohammed, B. S. (2018). Prevalence of dysmenorrhea among university students in Northern Ghana; its impact and management strategies. *BMC Women's Health*, 18, 39. doi: 10.1186/s12905-018-0532-1

Bal, B., Kaba, N. K., Apaydin, E., & Kurt, Y. (2022). Validity and reliability of the Turkish version of the patient evaluation scale of nursing students: A methodological study. *Turkiye Klinikleri Journal of Nursing Sciences*,

14(4), 1057-1063. doi: 10.5336/nurses.2022-89837 (in Turkish)

Bernardi, M., Lazzeri, L., Perelli, F., Reis, F. M., & Petraglia, F. (2017). Dysmenorrhea and related disorders. *F1000Research*, 6, 1645. doi: 10.12688/f1000research.11682.1

Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quiñonez, 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. doi: 10.3389/fpubh.2018.00149

Derseh, B. T., Afessa, N., Temesgen, M., Semayat, Y. W., Kassaye, M., Sieru, S., Gizachew, S., & Ketsela, K. (2017). Prevalence of dysmenorrhea and its effects on school performance: A crosssectional study. *Journal of Women's Health Care*, 6(2), 1000361. doi: 10.4172/2167-0420.1000361

Donmez, S., & Gumussoy, S. (2019). Premenstrual syndrome in nursing students and the affecting factors. *Kocaeli Medical Journal*, 8 (2), 38-45.

Evci, N., & Aylar, F. (2017). Use of confirmatory factor analysis in scale development studies. *The Journal of Social Science*, 4(10), 389-412. doi: 10.16990/SOBIDER.3386 (in Turkish)

Gunawan, J., Marzilli, C., & Aungsuroch, Y. (2021). Establishing appropriate sample size for developing and validating a questionnaire in nursing research. *Belitung Nursing Journal*, 7(5), 356-360. doi: 10.33546/bnj.1927

Gungor, D. (2016). A guide to scale development and adaptation in psychology. *Turkish Psychological Articles*, 19(38), 104-112. (in Turkish)

Hashim, R., Alkhalifah, S. S., Alsalman, A. A., Alfaris, D. M., Alhussaini, M. A., Qasim, R. S., & Shaik, S. A. (2020). Prevalence of primary dysmenorrhea and its effect on the quality of life amongst female medical students at King Saud University, Riyadh, Saudi Arabia. *Saudi Medical Journal*, 41 (3), 283-289. doi: 10.15537/smj.2020.3.24988

Hailemeskel, S., Demissie, A., & Assefa, N. (2016). Primary dysmenorrhea magnitude, associated risk factors, and its effect on academic performance: evidence from female university students in Ethiopia. *International Journal of Womens Health*, 8, 489-496. doi: 10.2147/IJWH.S112768

Hocaoglu, A., Sertel Berk, H. Ö., & Ketenci, A. (2019). The study of reliability and validity of the pain coping inventory. *Agri*, 31(1), 32-41. doi: 10.5505/agri.2018.46503 (in Turkish)

Horvat, M., Pavan Jukić, D., Marinović, L., Bursać, D., Ribić, R., Neuberg, M., & Bursać, D. Prevalence of primary dysmenorrhoea and its impact on academic performance among

Croatian students during the COVID-19 pandemic. *Obstetrics & Gynecology International*, 2023, 2953762. doi: 10.1155/2023/2953762

Karabulutlu, O. (2020). Nursing students experienced dysmenorrhoea and their applications to cope with it. *Caucasian Journal of Science*, 7(1), 28-41. (in Turkish)

Karakoc, F. Y., & Donmez, L. (2014). Basic principles of scale development. *Tip Egitimi Dunyasi*, 40, 39-49. (in Turkish)

Kovanci, M. S., & Ozbas, A. A. (2022). Adaptation of moral distress scale for nursing students into Turkish: A validity and reliability study. *Journal of Hacettepe University Faculty of Nursing*, 9(2), 123-132. doi: 10.31125/hunhemsire.1166957(in Turkish)

Kusaslan-Avci, D., & Sari, E. (2018). Approach to dysmenorrhea and effect of dysmenorrhea on social life and school performance in the university students. *Van Medical Journal*, 25 (2), 188-193. doi: 10.5505/vtd.2018.65807

Mesele, T. T., Ayalew, H. G., Syoum, A. T., & Antehneh, T. A. (2022). Impact of dysmenorrhea on academic performance among Haramaya University undergraduate regular students, Eastern Ethiopia. *Frontiers in Reproductive Health*, 4, 939035. doi: 10.3389/frph.2022.939035

Orhan, C., Toprak-Celenay, S., Demirturk, F., Ozgul, S., Uzelpasaci, E., & Akbayrak, T. (2018). Effects of menstrual pain on the academic performance and participation in sports and social activities in Turkish university students with primary dysmenorrhea: A case control study. *Journal of Obstetrics and Gynaecology Research*, 44 (11), 2101-2109. doi: 10.1111/jog.13768

Sahin, S., Kaplan, S., Abay, H., Akalin, A., Demirhan, I., & Pinar, G. (2015). Evaluation of the frequency of dysmenorrhea and associated factors among the university students. *Journal of Ankara Health Sciences*, 4 (1), 25-43.

Sener, N., & Tashan, S.T. (2020). Evaluating the relationship between dysmenorrhea and personality traits in university students. *Journal of Education and Research in Nursing*, 17(2), 148-154. doi:10.5222/HEAD.2020.46667 (in Turkish)

Ul-Hadi, N., Abdullah, N., & Sentosa, I. (2016). An easy approach to exploratory factor analysis: Marketing perspective. *Journal of Educational and Social Research*, 6(1), 215-223. doi: 10.5901/JESR.2016.V6N1P215

Yaslioglu, M. M. (2017). Factor analysis and validity in social sciences: Application of exploratory and confirmatory factor analyses. *Istanbul University Journal of the School of Business*, 46(Special Issue), 74-85. (in Turkish)

Yesilyurt, S., & Capraz, C. (2018). A road map for the content validity used in scale development studies. *Erzincan University Journal of Education Faculty*, 20(1), 251-264. doi: 10.17556/erziefd.297741

Yilmaz, T., Nuraliyeva, Z., & Dinc, H. (2020). The methods of young women to cope with dysmenorrhea. *Journal of Aacademic Research in Nursing*, 6(2), 294-299. doi: 10.5222/jaren.2020.48344(in Turkish)

Yilmaz, B., & Sahin, N. (2019). The prevalence of primary dysmenorrhea and menstrual attitudes of nursing students. *Mersin University Journal of Health Sciences*, 12 (3), 426-438. doi: 10.26559/mersinsbd.508609(in Turkish)

Yurdugul, H. (2005). Using content validity indices for content validity in scale development studies. XIV. National Educational Sciences Congress, Pamukkale. (in Turkish)