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ARAŞTIRMA / RESEARCH

The relationship between dysmenorrhea and sleep quality

Dismenore ile uyku kalitesi arasındaki ilişki

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Abstract

Purpose: This study was conducted to determine the prevalence of dysmenorrhea and the relationship between dysmenorrhea and sleep quality.
Materials and Methods: This was a cross-sectional study. A total of 250 volunteer female university students, who met the inclusion criteria, participated in this study. To collect data a questionnaire form, the Visual Analog Scale (VAS) and Pittsburgh Sleep Quality Index (PSQI) were used.
Results: The prevalence of dysmenorrhea in students was 82.4%. Eighty-two percent of the students with dysmenorrhea had poor sleep quality. It was determined that 96.8% of the students with sleep division in the menstrual period and 96.3% of those with difficulty falling asleep had dysmenorrhea. In participants with dysmenorrhea, there were different level of correlation between poor sleep quality and the number of sleep divisions, severity of dysmenorrhea), and less duration of sleep.
Conclusion: Dysmenorrhea has a negative effect on sleep quality. In accordance with these results, it is advisable to identify students with dysmenorrhea and to give training on methods of coping with it to improve their sleep quality.
Keywords:. Dysmenorrhea, menstrual cycle, sleep quality

Öz

Amaç: Bu çalışma dismenore prevalansını ve dismenore ile uyku kalitesi arasındaki ilişkiyi belirlemek amacıyla yapılmıştır.
Gereç ve Yöntem: Bu çalışma kesitsel olarak yapılmıştır. Bu çalışmaya dahil edilme kriterlerini karşılayan toplam 250 gönüllü üniversite öğrencisi katılmıştır. Veri toplamak için bir anket formu, Görsel Analog Ölçeği (VAS) ve Pittsburgh Uyku Kalitesi İndeksi (PUKI) kullanılmıştır.
Bulgular: Bu grupta dismenore prevalansı %82.4 elde edilmiştir. Dismenoresi olan öğrencilerin %82'sinin uyku kalitesinin düşük olduğu saptanmıştır. Menstrüel dönemde uyku bölünmesi olan öğrencilerin % 96,8'inin, uykuya dalmakta güçlük çekenlerin % 96,3'ünün dismenoresi olduğu belirlenmiştir. Dismenoresi olan katılımcılarda, zayıf uyku kalitesi ile uyku bölünme sayısı, dismenore şiddeti ve daha az uyku süresi arasında farklı düzeylerde korelasyon olduğu saptanmıştır.
Sonuç: Bu çalışmanın sonucunda dismenorenin uyku kalitesini olumsuz etkilediği belirlenmiştir. Bu sonuçlara doğrultusunda, dismenoreli öğrencilerin belirlenmesi ve uyku kalitelerini iyileştirmek için bununla başa çıkma yöntemleri konusunda eğitim verilmesi önerilebilir.

Anahtar kelimeler: Dismenore, menstrual siklus, uyku kalitesi

INTRODUCTION

In order for the reproductive function to continue normally, changes in the whole body, especially in the reproductive organs, from menarche to menopause for every month, are called the menstrual cycle. An ovum develops in each cycle, matures, and prepares for fertilization. Meanwhile, the endometrium is also prepared for the fertilized ovum. If there is no fertilization, that is, if pregnancy is not realized, the functional layer of the endometrium is shed and menstruation occurs[1,2].

Women experience problems related to menstruation and the menstrual cycle. The most prevalent

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menstrual problems are premenstrual syndrome, amenorrhea, abnormal uterine bleeding, and dysmenorrhea[3]. Dysmenorrhea is painful menstruation. Dysmenorrheal pain includes cramps, colic and most commonly abdominal pain. In addition, symptoms such as nausea, vomiting, diarrhea, headache, back and thigh pain can be seen[4,5].

Primary dysmenorrhea is defined as cyclic menstrual pain without any detectable pathology, while secondary dysmenorrhea is often seen as a result of endometriosis, leiomyoma, pelvic inflammatory disease (PID), adenomyosis, endometrial polyps, and cervical stenosis[4,5].

It was stated that dysmenorrhea affects young people's daytime functionality and nighttime sleep quality. At the same time, young women do not attend school due to dysmenorrhea disrupting their responsibilities and decreasing their social activities[6-8]. Other studies conducted in Turkey have also reported that approximately 67.4% - 89.5% of university students suffer from dysmenorrhea and thus, it can be said that dysmenorrhea is one of the most common complaints of young women[9-14].

Sleep provides the protection of energy and the development and repair of the nervous system. Sleep is a natural process that controls behavior, cognitive functions, and intracellular mechanisms[15-17]. Sleep is one of the basic human needs that must be met. Sleep constitutes on average, 1/3 of the human lifespan. Sleep is not a piece of time that can be left out of everyday life because it is a vital necessity for the body to renew itself, to be healthy, and to be long-lived[17].

Pain is one of the important factors affecting sleep. Individuals with pain have division of sleep, difficulty sleeping, or no sleep at all[17,18]. Patients with acute pain after surgical operations were reported to have increased wakefulness, slow-wave sleep, and reduced REM (Rapid Eye Movement) periods[19]. At the same time, patients with chronic pain (lumbar pain, fibromyalgia, rheumatoid arthritis) were reported to have prolonged falling asleep times, wakefulness periods, non-rapid eye movement (NREM) stage 1 sleeping periods and Electroencephalography (EEG) activities[19]. In one study, sleep and quality of life were found to be adversely affected as the level of pain increased[20].

Dysmenorrhea is also described as painful menstruation and affects sleep quality negatively[7,8,21]. Insufficient sleep leads to interruption of daily living activities, decreased concentration, lower performance, increased mistakes, school absenteeism, psychological, and physiological changes, and immune system failure[21]. Due to the impact of sleep quality on students' health, and their academic achievements, determining the prevalence of dysmenorrhea and the relation between dysmenorrhea and sleep quality is thought to be important. However, previous evidence has been limited to the relation between dysmenorrhea and sleep quality. Examination of the relation between dysmenorrhea and sleep quality and the provision of such evidence may be significant in terms of student's health. The attempt of health staff to reduce or eliminate the pain a woman suffers during the menstruation period will increase the quality of life of these individuals. At the same time, the health professional's knowledge of the sleep regimen in the menstrual period including normal sleep patterns, habits and factors affecting sleep, will significantly affect the quality of care. Therefore, this study was conducted to determine the prevalence of dysmenorrhea and the relationship between dysmenorrhea and sleep quality.

MATERIALS AND METHODS

This was a cross-sectional study. This research was conducted in a private university in Kayseri City Center. At the University, there are five faculties, 1 college and 18 departments: Faculty of Arts and Sciences, Faculty of Health Sciences, Faculty of Law, Faculty of Economics and Administrative Sciences, Faculty of Engineering and Architecture and College of Foreign Languages.The population of the study consisted of female students studying in the faculties of university. Participants were selected from students who were studying at the same university and with similar daily experiences, in order to minimize factors such as environment and stress, which can affect sleep quality.

Ethical approval was obtained from the Institutional Review Board of Erciyes University to conduct this study (Date:30.07.2015, approval number: 2015/344). In the beginning of the study, all participants were informed about the study and, written and verbal informed consent was obtained from all participants.

Sample

The sample size was calculated using the known

universe sample size method based on 1862 female students enrolled at the University in the 2015-2016 academic year. When the sample size was taken as p = 0.75, it was calculated as 250 persons with a 95% confidence interval and 5% probability of error[22]. In order to reach the sample size, the stratified sampling method was used. According to the stratified sampling method, the numbers of students in the faculties of the university were determined and data was collected from simple randomly selected and voluntary students. The study included female students aged 19 and over, with regular menstruation. Chronic illnesses such as diabetes, hypertension, psychiatric dysorders, hypothyroidism, and bleeding disorder, curettage in the past three months, pregnancy, giving birth and breastfeeding, using birth control pills, sleeping pills or sedatives individuals were not included in the study.

Measures

To collect data a questionnaire form, the Visual Analog Scale (VAS) and Pittsburgh Sleep Quality Index (PSQI) were used.

Questionnaire form

The questionnaire form prepared in line with the literature consists of two parts. In the first part, questions including socio-demographic characteristics (age, height, weight, marital status) of the participants were included. The second part consists of questions about general health status (presence of chronic disease, medication use, etc.), menstrual characteristics, sleep characteristics during menstrual period and sleep characteristics at other times. The questionnaire form consisted of 34 questions in total.

Visual Analog Scale

The Visual Analog Scale (VAS) was used to determine the dysmenorrhea severity of the students. The VAS is a scale of 0-10, where 0 represents no pain and 10 represents the most pain. Although the VAS is a subjective tool, it is widely used and a valid tool for pain assessment. At the same time VAS score is evaluated as mild between 1 and 4, moderate between 5 and 6, and severe between 7 and 10.[7]

Pittsburgh Sleep Quality Index

The Pittsburgh Sleep Quality Index (PSQI) was used to determine the sleep quality of the students. PSQI was developed by Buysse et al in 1989, and its validity and reliability study were conducted by researchers (Cronbach alfa= 0.83). Turkish validity and reliability study was done by Agargün et al. (Cronbach alpha = 0.80). There are 19 items and seven components in this scale. The components; subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication and daytime dysfunction measures seven subcomponents of sleep quality. Some of the components consist of a single item, while others are obtained by grouping several items. Each item is scored between 0 and 3. '0' indicates no difficulty, while a score of '3' indicates severe difficulty. The sum of these seven component scores gives the total index score. The total score of the PSQI is between 0-21. The higher the total scale score, the worse the sleep quality. A scale score of 5 and above indicates poor sleep quality. PSQI score >5 yielded a diagnostic sensitivity is 89.6% and its specificity is 86.5%. Patients with a total score of 0-4 in the PSQI are classified as having good sleep quality and those with a score 5-21 are classified as poor in sleep quality[23,24].

Procedure

According to the stratified sampling method, the relevant faculty was visited to reach the number of students per faculty. Permission was obtained from the relevant lecturer before any class hour of the basic courses of the departments. Male students were removed from the classroom so that the female students could easily ask questions and fill in the data collection forms. Later, the purpose of the study was explained to the female students, and the Informed Consent Form (ICF) was signed by the students who wanted to participate in the study.

The Questionnaire Form, the Visual Analog Scale and the Pittsburgh Sleep Quality Index were distributed to the female students by the researcher. The students filled in the questionnaire in 15-20 minutes. Since PSQI is a scale that determines last month's sleep state, female students were asked to fill in PSQI based on their menstrual cycle in the previous month. As many forms as the number of students in the relevant stratified were collected.

Statistical analysis

The data obtained in the research were made in computer environment with the SPSS statistics 15.0 package program. Whether the data was normally distributed was evaluated by Shapiro-Wilk test and Q-Q graphics. In the evaluation of the data, Chi-square test was used in comparison of categorical

variables. Spearman correlation analysis were used for the correlations between the PSQI and the sleep characteristics in the menstrual period and out of the menstrual period, and p <0.05 value was considered statistically significant.

RESULTS

The average age of the students was 20.43 ± 1.41, and the 25-75% percentile values were determined as 19-21 years old. The average height of the students was found to be 164.70 ± 5.22, the average weight was 58.08 ± 8.13, and the average BMI was 21.41 ± 2.87. The median menarche age of the students was determined as thirteen, the median of menstrual cycle duration was twenty-eight days, and the median of menstrual bleeding time was six days (Data not included in the table).

The median VAS value of the participants with dysmenorrhea was six, 25% and 75% percentile values are 5-8. The group without dysmenorrhea stated that they did not have pain, and they marked the value of no pain (0) on the visual analog scale. Prevalence of dysmenorrhea was determined in 82.4% in the study (Data not included in the table).

Table 1. Distribution of sleep characteristics according to the presence of dysmenorrhea

Sleep Features	**Presence of Dysmenorrhea**				***P***
	Yes		No		
	N	%	N	%	
Sleep division condition during the menstrual period					
Yes	90	96.8	3	3.2	<0.001[1]
No	116	73.9	41	26.1	
Falling asleep during the menstrual period					
Easy	56	65.1	30	34.9	<0.001[1]
Takes some time	124	90.5	13	9.5	
Difficult	26	96.3	1	3.7	
Self-rested feelings when waking up during the menstrual period.					
Rested	37	75.5	12	24.5	0.170[1]
A little rested	74	80.4	18	19.6	
Tired	95	87.2	14	12.8	
Sleep division condition in general					
Yes	41	82.0	9	18	0.934[1]
No	165	82.5	35	17.5	
Falling asleep in general					
Easy	117	80.7	28	19.3	0.068[1]
Takes some time	83	87.4	12	12.6	
Difficult	6	60	4	40	
Self-rested feelings when waking up in general					
Rested	99	80.5	24	19.5	0.120[1]
A little rested	86	87.8	12	12.2	
Tired	21	72.4	8	27.6	

[1] Chi-Square Test

Table 1 shows the distribution of sleep characteristics according to dysmenorrhea status of students. It was determined that 96.8% of the students with dysmenorrhea experienced sleep division. There was

a statistically significant relationship between sleep division status and dysmenorrhea during the menstrual period (p<0.001). When the state of falling asleep during the menstrual period was examined, it was found that in 65.1% of those who fell asleep easily, in 90.5% of those who said that it took time to fall asleep, and in 96.3% of the students who stated that it was difficult to fall asleep had dysmenorrhea. There was a statistically significant difference between dysmenorrhea status and status of falling asleep in the menstrual period (p<0.001), (Table 1). Table 2 shows the distribution of PSQI according to the presence of dysmenorrhea among the students. Eighty- two percent of the students with dysmenorrhea and 77.3% of the student without dysmenorrhea had poor sleep quality. No statistically significant relationship was found between dysmenorrhea and sleep quality (p=0.436). Table 3 shows the correlations between PSQI and sleep characteristics in the menstrual period and outside of the menstrual period. In participants with dysmenorrhea, there was a correlation between the PSQI and dysmenorrhea severity and as the severity of dysmenorrhea increased, sleep quality decreased (rho=0.303; p<0.001).

There was a moderate correlation between PSQI and the number of sleep divisions in the menstrual period and as the number of sleep division increased, sleep quality decreased (rho=0.439, p<0.001). There was a statistically significant, negative and good relationship between PSQI and duration of sleep during the menstrual period. This means that as the duration of sleep increased, sleep quality also increased (rho=-.640; p<0.001). In participants without dysmenorrhea, there was a negative and modorate relationship between PSQI and duration of sleep during the menstrual period (rho=-.441; p<0.001) and out of the menstrual period (rho=-.344; p<0.005).

Table 2. PSQI distribution according to the presence of dysmenorrhea

	Presence of Dysmenorrhea				p^1
PSQI	**Yes**		**No**		
	N	***%***	***N***	**%**	
Good Sleep Quality	37	18	10	22.7	
Bad Sleep Quality	169	82	34	77.3	0.436
Total	206	100	44	100	

[1] Chi-Square Test

Table 3. The correlations between the PSQI and the sleep characteristics in the menstrual period and out of the menstrual period.

Characteristics (rho, p)	**Presence of Dysmenorrhea**	
	Yes	No
	PSQI	PSQI
Severity of dysmenorrhea	.303**, <0.001	
Number of sleep divisions in menstrual period	.439**,<0.001	.305, .802
Duration of sleep divisions in menstrual period	.162, .128	305, .802
Duration of sleep in menstrual period	-.640**, <0.001	-.441**, .003
Number of sleep divisions in out of menstrual period	.075, .643	.445, .230
Duration of sleep divisions in out of menstrual period	.171, . 284	.072, . 855
Duration of sleep in out of menstrual period	-.145*, .037	-.344*, .022

[1] Spearman's rho ; 0 <r <0.20: Very Weak Relationship; 0.20 ≤ r <0.40: Weak Relationship; 0.40 ≤ r <0.60: Moderate Relationship; 0.60 ≤ r <0.80: Good Relationship; 0.80 ≤ r ≤ 1: Strong Relationship

DISCUSSION

In this study, which was conducted to determine the prevalence of dysmenorrhea and the relationship between dysmenorrhea and sleep quality, the prevalence of dysmenorrhea (82.4%) was similar to that of other studies. In Turkey, the prevalence of dysmenorrhea was determined as 67.4% to 89.5% in studies conducted with university students, without discriminating between primary and secondary dysmenorrhea[9,10,14]. The prevalence of dysmenorrhea ranges from 28% to 85% worldwide[25-31].

Almost all of the students whose sleep was divided during the menstrual period were found to have dysmenorrhea. There was a statistically significant difference between sleep division status and dysmenorrhea status in the menstrual period. When the state of falling asleep in menstrual period was examined, the majority of those who said that it took time to fall asleep and almost all of the students, who stated that it was difficult to fall asleep, were determined to have dysmenorrhea. Considering all the students participating in the study, nearly all of the students, who stated that it was difficult to fall asleep, had dysmenorrhea. From this result, it can be said that students with dysmenorrhea have disturbed sleep and difficulty falling asleep during the menstrual period and that sleep qualities are affected negatively. In a study, the sleep efficiency of the group without dysmenorrhea was found to be higher than that of the group with dysmenorrhea, but no statistically significant relationship was determined between them[32]. In another study, it was reported that uterine contractions were significantly higher and painful in women with dysmenorrhea compared to those without dysmenorrhea, and therefore, the total duration of REM sleep in women with dysmenorrhea decreased compared to those without dysmenorrhea[33]. In a study conducted by Sahin et al. on female university students, it was determined that students with dysmenorrhea had significantly impaired sleep quality compared to those who did not[34].

According to the presence of dysmenorrhea, students with dysmenorrhea were found to have poor sleep quality compared to those students without dysmenorrhea. In a similar study, women with dysmenorrhea had poor sleep quality, and women with dysmenorrhea were found to have decreased sleep activity, frequent awakening, and movement in NREM stage 1, and low REM sleep periods compared to women without menstrual problems[8]. In a study, it was reported that the results of the group, which was categorized in the intense menstruation pain group, had a more unfavorable sleep quality score, compared to the other groups[21]. In another study, dysmenorrhea was reported to cause sleep disturbance in women[35]. At the sametime it was emphasized that students with a history of dysmenorrhea had worse sleep quality [34]. Wang et al. stated that there was a negative correlation between pain and sleep quality; moreover, they found a relationship between sleep and menstrual pain[36]. Supporting this result, in our study, there was a correlation between the PSQI and dysmenorrhea severity and as the severity of dysmenorrhea increased, sleep quality decreased. It is described that pain is a factor that affects sleep quality by shortening the duration of REM and the total sleep duration[37]. This makes the individual more sensitive to pain. The vicious cycle between sleep and pain reveals how these two factors are interrelated[34].

In the present study, in participants with dysmenorrhea there was a negative and good correlation between PSQI and duration of sleep during the menstrual period. That is, as the duration of sleep decreased, the PSQI score increased and the sleep quality decreased. It was determined that there was a moderate correlation between PSQI and the number of sleep divisions in the menstrual period. This finding shows that the number of sleep divisions increased in the menstrual period, the PSQI score increased, and sleep quality was negatively affected. At the same time, painful uterine cramps may be the cause of a vicious cycle of negative events; menstrual pain reduces sleep quality and efficiency, and the consequent fatigue experienced by these women is likely to intensify the negative effect of the pain on daytime functioning and mood. In a study emphasized that young women with insomnia experience more severe menstrual pain compared with young women who do not have insomnia[7].

In line with these results, to protect the health of students; identification and regular follow-up of university students with dysmenorrhea, preparing training programs on methods of coping with dysmenorrhea to improve the quality of sleep of students studying at the university, preparation of training booklets including interventions and practices for dysmenorrhea and accompanying findings, and informing healthcare professionals about relevant study results may be important.

This study has some limitations. The most important of these is that the study was conducted in a center and does not represent all layers of the society. Since PSQI is a scale created to evaluate the sleep quality of the previous month, the possibility of the participants forgetting the sleep data of the last month during data collection.

In conclusion, students included in the study were found to have a high prevalence of dysmenorrhea. It was determined that students with dysmenorrhea had a hard time falling asleep, and had sleep division during the menstrual period. Students with

dysmenorrhea were found to have poorer sleep quality than students without dysmenorrhea. In accordance with these results, it is advisable to identify students with dysmenorrhea and to give training on the methods of coping with dysmenorrhea to improve their sleep quality.

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