RESEARCH ARTICLE

Seyda Toprak Celenay[1*]
Serap Ozgul[2]
Funda Demirturk[3]
Ceren Orhan[2]
Emine Baran[2]
Turkan Akbayrak[2]

[1]Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Ankara Yildirim Beyazit University, Ankara, Turkey
[2]Department of Physiotherapy and Rehabilitation, Faculty of Physical Therapy and Rehabilitation, Hacettepe University, Ankara, Turkey
[3] Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Gaziosmanpasa University, Tokat, Turkey

Corresponding Author:
Seyda Toprak Celenay
Ankara Yildirim Beyazit University, Health Sciences Faculty, Department of Physiotherapy and Rehabilitation, Ankara-Turkey,
Phone: +90 3129061000
mail: sydtoprak@hotmail.com

Received: 26.07.2020
Acceptance: 29.05.2021
DOI: 10.18521/ktd.774059

Konuralp Medical Journal
e-ISSN1309–3878
konuralptipdergi@duzce.edu.tr
konuralptipdergisi@gmail.com
www.konuralptipdergi.duzce.edu.tr

Comparison of Physical Activity, Quality of Life and Menstrual Symptoms by Menstrual Pain Intensity in Turkish Women with Primary Dysmenorrhea

ABSTRACT

Objective: The aim of this study was to compare physical activity level, quality of life (QoL), and menstrual symptoms by pain intensity in Turkish women with primary dysmenorrhea.

Methods: Women with primary dysmenorrhea (n = 333) were assigned to three groups based on pain intensity. Physical and demographic characteristics were asked. Pain intensity, physical activity level and QoL were evaluated with Visual Analogue Scale, International Physical Activity Questionnaire-7 (IPAQ-7) and Short Form-36 Health Survey Questionnaire (SF-36), respectively. The menstrual symptoms was recorded.

Results: IPAQ-7 scores did not show significant difference among three groups ($p > 0.05$). Physical functioning, bodily pain, vitality, role limitations because of emotional and physical problems scores of SF-36 in the severe-pain group were lower than in the mild-pain group ($p < 0.05$). Physical functioning and bodily pain scores of SF-36 in the moderate-pain group were lower than in the mild-pain group ($p < 0.05$). Role limitations because of emotional problems and bodily pain scores of SF-36 in the moderate-pain group were higher than in the severe-pain group ($p < 0.05$). Severe-pain group had a greater number of menstrual symptoms than other groups ($p < 0.05$).

Conclusions: In this study, it was observed that there was no difference between physical activity level and menstrual pain intensities in Turkish women having primary dysmenorrhea. In addition, women with higher menstrual pain intensity had lower QoL and higher frequency of menstrual symptoms. Therefore, these parameters should be considered for management of primary dysmenorrhea.

Keywords: Dysmenorrhea, Exercise, Quality of Life

Primer Dismenoreli Türk Kadınlarda Ağrı Şiddetine Göre Fiziksel Aktivite Düzeyi, Yaşam Kalitesi ve Menstrüel Semptomların Karşılaştırılması

ÖZET

Amaç: Bu çalışmanın amacı primer dismenoreli Türk kadınlarda ağrı şiddetine göre fiziksel aktivite düzeyini, yaşam kalitesini ve menstrüel semptomlarını karşılaştırılmaktı.

Gereç ve Yöntem: Primer dismenoreli kadınlar (n = 333) ağrı şiddetine göre hafif, orta ve şiddetli-ağrı gruplarına ayrıldı. Fiziksel ve demografik özellikler sorgulandı. Ağrı şiddeti, fiziksel aktivite düzeyi ve yaşam kalitesi sırasıyla Görsel Analog Skalası, Uluslararası Fiziksel Aktivite Anketi-7 (UFAA-7) ve 36-Maddelik Kısa Form Sağlık Anketi (KF-36) ile değerlendirildi. Menstrüel semptomlar kaydedildi.

Bulgular: UFAA-7 skorları üç grup arasında fark göstermedi ($p > 0,05$). Şiddetli-ağrı grubunda KF-36'nın fiziksel fonksiyon, vücut ağrısı, emosyonel ve fiziksel problemlere bağlı rol kısıtlaması skorları hafif-ağrı grubundan daha azdı ($p < 0,05$). Orta-ağrı grubunda KF-36'nın fiziksel fonksiyon ve vücut ağrısı skorları hafif - ağrı grubundan daha azdı ($p < 0,05$). Orta-ağrı grubunda KF-36'nın emosyonel problemlere bağlı rol kısıtlaması ve vücut ağrı skorları şiddetli-ağrı grubundan daha fazlaydı ($p < 0,05$). Şiddetli ağrı grubunda diğer gruplardan daha fazla sayıda menstrüel semptom vardı ($p < 0,05$).

Sonuç: Bu çalışmada primer dismenoreli Türk kadınlarda fiziksel aktivite düzeyi ve menstrüel ağrı şiddeti arasında fark olmadığı görüldü. Ek olarak daha yüksek menstrüel ağrı şiddetine sahip olan kadınlar daha düşük yaşam kalitesi ve daha yüksek menstrüel semptom sıklığına sahipti. Böylece primer dismenorenin yönetiminde bu parametreler dikkate alınmalıdır.

Anahtar Kelimeler: Dismenore, Egzersiz, Yaşam Kalitesi

INTRODUCTION

Primary dysmenorrhea, one of the most common gynecologic problems, has been defined as a menstrual pain related to a normal ovulatory cycle and without a pelvic pathology (1). It is characterized by spasmodic cramps in the lower abdomen that can spread to the back and thighs, and is generally accompanied by some typical symptoms (2). Prevalence of primary dysmenorrhea, generally among menstruating young adults and adolescents, ranges between 20 and 90% (1,3). This pain causes recurrent short-term school and work absenteeism in this population (4).

Primary dysmenorrhea has been attributed to excessive prostaglandin production, leading uterin hyper-contraction, during menstruation (5). Physical activity or exercise may be effective in the frequency and/or severity of dysmenorrhea. The increasing endorphin levels, decreased stress or sympathetic over-activity and increased local blood flow at the pelvic region through exercise might cause changes in pain perception (6,7). Although physical exercise has been advocated as a non-medical intervention for the relief of dysmenorrhea, there are insufficient and contradictory datas related to dysmenorrhea and physical activity level. Exercise or physical activity has been linked with reduced prevalence of dysmenorrhea and associated symptomatology in some studies; whereas in some published articles, no correlation was found between physical activity level and dysmenorrhea (8-10).

The prevalence of primary dysmenorrhea, which is also a significant health problem, is high among the female adolescents (11). Lots of women with very severe menstrual pain have some systemic symptoms including nausea, vomiting, nervousness, and insomnia (13). Menstrual pain and its accompanying symptoms affect quality of life (QoL) (12-15). In this way, the effects of the menstrual pain intensity on QoL and the existence of its accompanying symptoms should be evaluated. In literature, previous studies have reported lower QoL in women with dysmenorrhea; however, they did not adequately elucidated associations between the intensity of the menstrual pain and QoL (16-18).

Accordingly, this study aimed to compare the physical activity level, QoL and menstrual symptoms in women with primary dysmenorrhea who had different pain intensities. The following hypothesis was investigated: Physical activity level, QoL and menstrual symptoms would be different among women with mild, moderate and severe menstrual pain intensity.

MATERIAL AND METHODS

Subject: Nulliparous women, aged 18–25 years, referred to the physiotherapy clinics of the three different universities, with a history of primary dysmenorrhea, with no previous history of gynecological diseases and a normal pelvic examination, having regular menstrual cycles (28 ± 7 days), and being volunteer were recruited in this study. Participants who had history of secondary dysmenorrhea, urogynecologic disease, neuropsychiatric or metabolic disease, pelvic surgery, and positive pregnancy test were excluded. The University's Ethics Committee approved the protocol of the present study (Approval date and number: 27.03.2013 and GO 13/60-17) and conducted within the framework of the Helsinki Declaration principles. Written informed consent forms were provided to participants.

Assessments: Physical characteristics such as age, height, and weight were recorded. In menstrual examination, age of menarche, menstrual cycle duration length and onset of menstrual pain were asked. Information about oral contraceptive or intrauterine device use, parity, history of gynecological diseases, family history, smoking and alcohol use status were also collected.

The intensity of menstrual pain was evaluated with the Visual Analog Scale (VAS) (consisting of a 10 cm horizontal line in length, in which "0" remarks "no pain" and "10" remarks "excruciating pain''). Clark et al (19) demonstrated its reliability in the assessment of pain intensity. Pain scores of ≤ 3 cm were defined as "mild pain", 3.1 cm to 6.9 cm "moderate pain", and ≥7.0 cm as "severe pain" on VAS (20). According to the pain intensity, the participants were assigned to mild (n=60), moderate (n=141) and severe (n=132) pain groups. Moreover, the presence of systemic menstrual symptoms including nausea, vomiting, nervousness, headache, dizziness, fatigue and insomnia were recorded as "yes" or "no".

The International Physical Activity Questionnaire-7 (IPAQ-7), a valid and reliable questionnaire in Turkish people, was used to assess the physical activity level of the participants (21). The total score of the IPAQ-7 is obtained based on the duration and frequency of weekly vigorous and moderate intensity physical activities and walking activities.

The Short Form-36 Health Survey Questionnaire (SF-36), a valid and reliable questionnaire in Turkish people, was used to measure the QoL (22). The SF-36 consists 1) physical functioning, 2) role limitations (due to physical problems), 3) bodily pain, 4) general health, 5) vitality, 6) social functioning, 7) role limitations (due to emotional problems), and 8) mental health domains. The domain scores range from 0 (the worst QoL) to 100 (the best QoL) individually for each domain separately.

Statistical Analysis: The sample size calculation was used the G*Power package software program (G*Power Version 3.0.10, Franz Faul, Universität Kiel, Germany). According to the IPAQ-7 scores, it was calculated that 159 subjects

(53 per group) was needed to obtain 80 % power with f = 0.25 effect size, α = 0.05 type I error, and β = 0.20 type II error (23).

IBM SPSS Statistics 22.0 (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.) was used for data analysis. The distribution of normality was examined several methods such as visual (histograms, probability plots) and analytical (Kolmogorov-Simirnov test). Descriptive statistics were presented by mean±standard deviation (X±SD), frequency (n), or percentage (%).

The Chi-square tor the Fisher's exact tests were used for comparisons of the categorical variables. Parametric quantitative variables were analyzed by the one-way ANOVA. The homogeneity of the variances was assessed with Levene test. Tukey's test was used to conduct pair-wise analyses if it was found an overall significance. A p-value <0.05 was considered statistically significant.

RESULTS

Three hundred and seventy women were asked and/or evaluated (12 not willing to participate in the research, 10 having urogynecologic disease, 5 having neuropsychiatric, and 10 having a history of secondary dysmenorrhea). As a result, 333 women were participated in the present study. It was found no statistical difference among the physical characteristics of the groups (p > 0.05), except the menstrual pain intensity, smoking and alcohol consumption parameters (p < 0.05) (Table 1).

Table 1. Physical and menstrual characteristics of the groups

Characteristics	Mild-pain group (n = 60)	Moderate-pain group (n = 141)	Severe-pain group (n = 132)	p
Age (year, X±SD)	20.36 ± 1.62	20.60 ± 1.75	20.86 ± 1.66	0.147[a]
Body mass index (kg/m2, X±SD)	21.32 ± 3.20	21.32 ± 3.24	20.68 ± 2.65	0.172[a]
Menarche age (year, X±SD)	13.63 ±1.27	13.33 ± 1.31	13.33 ± 1.21	0.273[a]
Menstrual cycle (days, X±SD)	29.26 ± 5.17	29.29 ± 5.21	30.10 ± 1.40	0.655[a]
Duration of menstruation (days, X±SD)	5.88 ± 1.12	5.87 ± 1.18	6.00 ±1.18	0.642[a]
Menstrual pain intensity (VAS, cm, X±SD)	2.92 ± 0.08	5.02 ± 1.13	8.47 ± 1.02	< 0.001[a]*
Family history (n, %)				
Yes	30, 50.0	80, 56.7	84, 63.6	0.184[b]
No	30, 50.0	61, 43.3	48, 36.4	
Smoking (n, %)				
Yes	1, 1.7	13, 9.2	17, 12.9	0.046[c]*
No	59, 98.3	128, 90.8	115, 87.6	
Alcohol consumption ((n, %)				
Yes	3, 5.0	16, 11.3	23, 17.4	0.047[b]*
No	57, 95.5	125, 88.7	109, 82.6	

*p < 0.05, X: Mean, SD: Standart deviation, VAS: Visual Analog Scale, [a]: One-way ANOVA test, [b]: Chi-square test, [c]: Fisher's exact test

It was seen that there were no difference among the three groups in terms of IPAQ-7 and social functioning, mental health and general health scores of the SF-36 (p > 0.05) (Table 2). It was found a difference in physical functioning, role limitations due to emotional problems and physical problems, bodily pain, and vitality items of the SF-36 among three groups (p < 0.05) (Table 2). The scores of physical functioning, role limitations due to emotional problems and physical problems, bodily pain and vitality in severe dysmenorrhea group were lower than the mild group (p < 0.05) (Table 2). Also in mild group, physical functioning and bodily pain scores were higher than moderate group (p < 0.05) (Table 2). The scores of role limitations because of emotional problems and bodily pain in moderate group were higher compared to severe group (p < 0.05) (Table 2). Moreover, it was shown that women in severe group had higher frequency of nervousness, headache, nausea, vomiting, fatigue and insomnia symptoms than those in mild and moderate group (p < 0.05, Table 3)

DISCUSSION

The study put forward that some parameters of the quality of life such as physical functioning and role limitations, bodily pain and vitality of women with severe pain were more affected than those with mild pain. Additionally, women with moderate pain demonstrated a lower physical functioning and bodily pain than those with mild pain. Furthermore, women with moderate pain indicated greater role limitations because of emotional problems and bodily pain than those with severe pain. Based on the findings regarding the symptoms of dysmenorrhea, women with severe pain had higher frequency of some menstrual symptoms than those with mild and moderate-pain. However, no difference was detected in physical activity level and social functioning, mental health and general health perception domains of QoL among three groups.

Table 2. Physical activity levels and quality of life variables in the groups

Variable	Mild-pain group (n = 60)	Moderate-pain group (n = 141)	Severe-pain group (n = 132)	**Δ1**	**Δ2**	**Δ3**	**p1**	**p2**	**p3**	**F**
IPAQ-7	1470.93 ± 2348.57	1241.48 ± 1452.38	1565.76 ±1804.23	229.45 (-569.23,1028.14)	-94.83 (-926.53,736.86)	-324.28 (807.04,158.46)	0.864[d]	0.990 [d]	0.289 [d]	1.146[a]
SF-36 Physical functioning	90.85 ± 12.61	84.32 ± 20.13	82.57 ± 21.25	6.53 (0.86,12.20)	8.27 (2.33,14,21)	1.74 (-4,28,7.77)	0.018[d]*	0.003[d]*	0.866[d]	3.798[a]
Social functioning	70.62 ± 21.69	66.99 ± 18.10	64.86 ± 23.32	3.63 (-4.11, 11.38)	5.75 (-2.01, 14.13)	2.12 (-3.97, 8.22)	0.590[d]	0.268 [d]	0.788[d]	1.567[a]
Role-emotional	65.90 ± 38.27	61.34 ± 41.15	49.07 ± 42.81	4.55 (-10.08, 19.18)	16.82 (1.85, 31.80)	12.27 (0.002, 24.52)	0.836[d]	0.022 [d]*	0.049 [d]*	4.587[a]
Role-physical	80.45 ± 30.55	75.86 ± 33.63	65.45 ± 40.0	4.58 (-7.19, 16.35)	14.99 (2.25, 27.72)	10.41 (-0.41, 21.23)	0.723[d]	0.015 [d]*	0.064[d]	4.632[a]
Bodily pain	71.63 ± 20.20	60.80 ± 19.06	51.44 ± 21.80	10.82 (3.42, 18.22)	20.18 (12.71, 27.66)	9.36 (3.54, 15.17)	0.002[d]*	<0.001 [d]*	0.001 [d]*	21.115 [a]
Vitality	63.05 ± 59.71	54.63 ± 16.08	51.70 ± 19.06	8.41 (-2.41, 19.25)	11.35 (0.40, 22.29)	2.93 (-5.58, 11.44)	0.162[d]	0.040[d]*	0.696[d]	2.998[a]
Mental health	58.68 ± 15.28	57.93 ± 16.27	57.64 ± 17.95	0.74 (-5.35, 6.84)	1.03 (-5.11, 7.19)	0.29 (-4.49, 5.08)	0.956[d]	0.917[d]	0.988[d]	0.079[a]
General health	63.23 ± 14.84	58.53 ± 17.50	59.24 ± 18.35	4.69 (-1.62, 11.01)	3.99 (-2.38, 10.37)	-0.70 (-5.66, 4.26)	0.188[d]	0.305[d]	0.941[d]	1.595[a]

*p < 0.05, IPAQ-7: International Physical Activity Questionnaire-7, SF-36: Short Form-36 Health Survey Questionnaire, Δ1: Change in outcome variables from mild group and to moderate group, Δ2: Change in outcome variables from mild group and to severe group, Δ3: Change in outcome variables from moderate group, and to severe group, p1: Comparison of changes between mild and moderate group, p2: Comparison of changes between mild and severe group, p3: Comparison of changes between moderate and severe group, a: One-way ANOVA test, d: Pairwise post-hoc test with Tukey's test

Table 3. Menstrual symptoms of the groups

Menstrual symptoms	Mild-pain group (n = 60)	Moderate-pain group (n = 141)	Severe-pain group (n = 132)	**p**
Nervousness (n, %)				
Yes	38, 63.3	88, 62.4	105, 79.5	0.005[b]*
No	22, 36.7	53, 37.6	27, 20.5	
Headache (n, %)				
Yes	4, 10.0	40, 28.4	46, 34.8	0.002[b]*
No	56, 90.0	101, 71.6	86, 65.2	
Dizziness (n, %)				
Yes	9, 15.0	25, 17.7	30, 22.7	0.380[b]
No	51, 85.0	116, 82.3	102, 77.3	
Nausea (n, %)				
Yes	14, 23.3	56, 39.7	81, 61.4	< 0.001[b]*
No	46, 76.7	85, 60.3	51, 38.6	
Vomiting (n, %)				
Yes	4, 6.7	16, 11.3	36, 27.3	< 0.001[b]*
No	56, 93.3	125, 88.7	96, 72.7	
Fatigue (n, %)				
Yes	40, 66.7	89, 63.1	104, 78.8	0.015[b]*
No	20, 33.3	52, 36.9	28, 21.2	
Insomnia (n, %)				
Yes	14, 23.3	57, 40.4	104, 78.8	< 0.001[b]*
No	46, 76.7	84, 59.6	28, 21.2	

*p < 0.05, [b]: Chi-square test

Physical activity or exercise has been shown to reduce the intensity of dysmenorrhea with various mechanisms (6,7). Recent studies in the literature have focused on different exercise interventions to deal with dysmenorrhea symptoms. Mahvash et al. (7) investigated the effect of an 8-week physical activity program on primary dysmenorrhea. The results of the current study suggested that performing regular physical activity reduces the symptoms of primary dysmenorrhea. Ortiz et al. (24) evaluated the efficacy of a physiotherapy program, consisting of stretching, Kegel, jogging and relaxation exercises, in primary dysmenorrhea. They stated that this program is effective for reducing dysmenorrhea symptoms when they are regularly performed. In another study, Vaziri et al. (25) compared the effects of exercises (aerobic and stretching) on severity of primary dysmenorrhea. They reported that both interventions resulted in a significant reduction in dysmenorrhea severity. In addition, some studies also showed that there was no association between dysmenorrhea and physical activity level. Blakey et al. (26) put forward no association between participation in physical activity and primary dysmenorrhea. Maruf et al. (27) demonstrated no association between physical activity level and adiposity in school adolescents with primary dysmenorrhea. Our study also found that there was no difference in physical activity levels according to menstrual pain intensity. These results might suggest that the physical activity level may be insufficient on changing menstrual pain level. And also, doing exercise regularly may be needed for decreasing the severity of dysmenorrhea or menstrual pain intensity.

Many pain conditions are related to reducing QoL (16, 17, 28-31). Primary dysmenorrhea is also a recurrent pain condition linked to menstruation (1). To our knowledge, there are few studies related to the associations between the menstrual pain intensity and QoL (16-18, 31). Unsal et al. (18) investigated the dysmenorrhea prevalence and determined its effect on QoL among female university students. They observed a significant decrease in most items of QoL as the intensity of dysmenorrhea increased. Weisberg et al. (17) declared severe menstrual pain with heavy menstrual bleeding affects all aspects of women's QoL much more than heavy menstrual bleeding alone. Iacovides et al. (18) showed that severe menstrual pain associated with primary dysmenorrhea impacts QoL. Tanmahasamut and Chawengsettakul (31) stated that dysmenorrhea in university students has high prevalence and moderate to severe dysmenorrhea have negative impact on daily and academic activities, and QoL. Similarly, our study also put forward that the on many parameters of the QoL show change according to menstrual pain intensity in women with primary dysmenorrhea. Our results suggest that management of menstrual pain might improve QoL. And also, increasing QoL may be a significant indicator of improvements in dysmenorrhea managements. Moreover, the menstrual pain together with the increasing the menstrual symptoms could be related to the intensity of dysmenorrhea.

According to our knowledge, there was no study investigating the menstrual symptoms in terms of menstrual pain intensity. In this study, it was seen that the women with severe menstrual pain intensity had more menstrual symptoms such as nervousness, headache, nausea, vomiting, fatigue and insomnia than those with mild and moderate pain. Therefore, in clinical practice, it should be considered that the menstrual pain intensity may be marker for the frequency and severity of menstrual symptoms in women with primary dysmenorrhea.

There were some limitations in this study. First limitation was the inclusion of women having primary dysmenorrhea with similar characteristics to the study. Because, most of them were university students and their age was changing between 18 and 25. They had also similar physical activity level. To increase generalizability, the students from three different universities were included. Especially for the physical activity level in different groups of the menstrual pain intensity, a population includes individuals with a wide range of physical activity level should be included in further studies. On the other hand, we evaluated the physical activity level using self-reported measures. However, the Turkish version of the IPAQ-7 was a valid and reliable questionnaire. More objective assessment methods for the measurement of physical activity level may be used in future studies.

CONCLUSION

In the current study, it was shown that there was no difference between physical activity level and menstrual pain intensities in women having primary dysmenorrhea. Moreover, women with higher menstrual pain intensity had lower QoL and higher frequency of menstrual symptoms. In clinics, these findings should be considered for the management of women with primary dysmenorrhea. However, there is a need for further studies linked to this condition.

Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. Harel Z. Dysmenorrhea in adolescents and young adults: etiology and management. J Pediatr Adol Gynecol. 2006;19:363–71
2. Ruoff G, Lema M. Strategies in pain management: new and potential indications for COX-2 specific inhibitors. J Pain Symptom Manage. 2003;25(2):21-31.
3. Polat A, Celik H, Gurates B, Kaya D, Nalbant M, Kavak E, et al. Prevalence of primary dysmenorrhea in young adult female university students. Arch Gynecol Obstet. 2009;279(4):527-32.
4. Bernard K, Frayne SM, Skinner KM, Sullivan LM. Health status among women with menstrual symptoms. J Womens Health 2003;12(9):911-9.
5. Iacovides S, Avidon I, Baker FC. What we know about primary dysmenorrhea today: a critical review. Hum Reprod Update. 2015;21(6):762-78.
6. Goldfarb AH, Jamurtas AZ. Beta-endorphin response to exercise. An update. Sports Med. 1997;24(1):8-16.
7. Mahvash N, Eidy A, Mehdi K, Zahra MT, Mani M, Shahla H. The effect of physical activity on primary dysmenorrhea of female university students. World Appl Sci J 2012:17(10);1246-1252.
8. Daley AJ. Exercise and primary dysmenorrhea. Sports Med. 2008;38(8):659-670.
9. Gordley LB, Lemasters G, Simpson SR, Yiin JH. Menstrual disorders and occupational, stress, and racial factors among military personnel. J Occup Environ Med. 2000;42(9):871-81.
10. Jarrett M, Heitkemper MM, Shaver JF. Symptoms and self-care strategies in women with and without dysmenorrhea. Health Care Women Int. 1995;16(2):167-78.
11. Potur DC, Bilgin NC. Komurcu N. Prevelance of dysmenorrhea in university students in Turkey: effect on daily activities and evaluation of different pain management methods. Pain Manag Nurs. 2014;15(4):768-77.
12. Patel V, Tanksale V, Sahasrabhojanee M, Gupte S, Nevrekar P. The burden and determinants of dysmenorrhoea: a population based sur survey of 2262 women in Goa, India. BJOG. 2006;113(4):453-63
13. Parker MA, Sneddon AE, Arbon P. The menstrual disorder of teenagers (MDOT) study: determining typical menstrual patterns and menstrual disturbance in a large population based study of Australian teenagers. BJOG. 2010;117(2):185-92.
14. Chantler I, Mitchell D, Fuller A. Actigraphy quantifies reduced voluntary physical activity in women with primary dysmenorrhea. J Pain. 2009;10(1):38-46.
15. Banikarim C, Chacko MR, Kelder SH. Prevelance and impact of dysmenorrhea on Hispanic female adolescents. Arch Pediatr Adolesc Med. 2000;154(12):1226-9.
16. 16.Unsal A, Ayranci U, Tozun M, Arslan G, Calik E. Prevalence of dysmenorrhea and its effect on quality of life among a group of female university students. Ups J Med Sci. 2010;115(2):138-45.
17. Weisberg E, McGeehan K, Fraser IS. Effect of perceptions of menstrual blood loss and menstrual pain on women's quality of life. Eur J Contracept Reprod Health Care. 2016;21(6):431-
18. Iacovides S, Avidon I, Bentley A, Baker FC. Reduced quality of life when experiencing menstrual pain in women with primary dysmenorrhea. Acta Obstet Gynecol Scand. 2014;93(2):213-7.

19. Clark P, Lavielle P, Martínez H. Learning from pain scales: patient perspective. J Rheumatol. 2003;30(7):1584-8.
20. Collins SL, Moore RA, McQuay HJ. The visual analogue pain intensity scale: what is moderate pain in millimetres? Pain. 1997;72(1-2):95-7.
21. Saglam M, Arikan H, Savci S, Inal-Ince D, Bosnak-Guclu M, Karabulut E, et al. International physical activity questionnaire: reliability and validity of the Turkish version. Percept Mot Skills. 2010;111(1):278-84.
22. Kocyigit H, Aydemir O, Fisek G, Olmez N, Memis A. Reliability and validity of the Turkish version of Short-Form-36 (SF-36). Turkish J Drugs Therap. 1999; 12:102–6.
23. Faul F, Erdfelder E, Lang AG, Buchner A. G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behav Res Methods. 2007; 39(2):175-191.
24. Ortiz MI, Cortés-Márquez SK, Romero-Quezada LC, Murguía-Cánovas G, Jaramillo-Díaz AP. Effect of a physiotherapy program in women with primary dysmenorrhea. Eur J Obstet Gynecol Reprod Biol. 2015;194:24-9.
25. Vaziri F, Hoseini A, Kamali F, Abdali K, Hadianfard M, Sayadi M. Comparing the effects of effects of aerobic and stretching exercises on the intenstity of primary dysmenorrhea in the students of universities of bushehr. J Family Reprod Health. 2015;9(1):23-8.
26. Blakey H, Chisholm C, Dear F, Harris B, Hartwell R, Daley AJ, et al. Is exercise associated with primary dysmenorrhoea in young women? BJOG. 2010;117(2):222-4.
27. Maruf FA, Ezenwafor NV, Moroof SO, Adeniyi AF, Okoye EC. Physical activity level and adiposity: are they associated with primary dysmenorrhea in school adolescents? Afr J Reprod Health. 2013;17(4):167-74.
28. 28.Skevington SM.Investigating the relationship between pain and discomfort and quality of life, using the WHOQOL. Pain. 1998;76(3):395-406.
29. Abu Farha NH, Khatib MT, Salameh H, Zyoud SH. Cancer-related post-treatment pain and its impact on healthrelated quality of life in breast cancer patients: A cross sectional study in Palestine. Asia Pac Fam Med. 2017;16:7.
30. Zhang Y, Liang D, Jiang R, Ji X, Wang Y, Zhu J, et al. Clinical, psychological features and quality of life of fibromyalgia patients: a cross-sectional study of Chinese sample. Clin Rheumatol. 2018;37(2):527-537.
31. Tanmahasamut P, Chawengsettakul S. Dysmenorrhea in Siriraj medical students prevelance, quality of life, and knowledge of management. J Med Assoc Thai 2012;95(9):1115-21.