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Article

Prevalence, impact, and management perception of dysmenorrhea among university students: A cross-sectional study

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Dysmenorrhea is a common condition among females that is characterized by painful cramps before or during menstruation. It is considered as a common gynecological complaint that affects the quality of women's life. The study evaluated prevalence of dysmenorrhea, its impact, associated risk factors, and the management strategies adopted by female university students in Taif city, Saudi Arabia. A cross-sectional study was conducted among 562 female students aged 18-30 years at the university level. The results showed a high prevalence rate of dysmenorrhea (79.4%) among the students. The most common risk factors were family history (87.4%) and length of menstruation (79%). Half (50.2%) of the respondents were absent at the university at least 1 day every month. The most widely used medications by the respondents were ibuprofen (42%) and paracetamol (40%), whereas only 3% used mefenamic acid, despite that they experienced complete pain relief with mefenamic acid. High prevalence rate of dysmenorrhea associated with risk factors such as family history and length of menstruation, was found among university students. However, pain and associated symptoms affect the quality of life.

Keywords: Dysmenorrhea. Menstruation. Prevalence. Management. Ibuprofen. Paracetamol.

INTRODUCTION

For the last three decades, Saudi Arabia has undergone socioeconomic development with improvements in health education, environment, urban migration, and lifestyle. Hence, they need special care, particularly in medical and educational fields (AlQuaiz *et al*., 2014). Menstruation is a natural phenomenon and is an important indicator of women's reproductive health and their endocrine functions (Sanyal, Ray, 2008; McPherson, Korfine, 2004; Poureslami, Ashtiani, 2002). Menstrual characteristics vary among the adolescents of different age groups and may be affected by the place of residence; rural and urban and socio-economic variables (Sanyal, Ray, 2008; Ray *et al*., 2010). Dysmenorrhea refers to painful menstrual cramps of uterine origin on periodic basis due to cyclic shedding of the inner lining of the uterus (Habibi *et al*., 2015; Aktas, 2015). It is the most common gynecological disorder among adolescent girls and women of reproductive age (Aktas, 2015; Kamel, Tantawy, Abdelsamea, 2017). Dysmenorrhea is classified into two types: primary and secondary (Kamel, Tantawy, Abdelsamea, 2017). Primary dysmenorrhea generally, occurs in adolescent girls and younger women. Secondary dysmenorrhea occurs when menstrual pain is accompanied with gynecological pathologies (Helwa *et al*., 2018).

Dysmenorrhea is associated with many factors, including behavioral and psychological aspects. Symptoms of dysmenorrhea occur 2-4 days before or/and at the onset of menses and may last for 1-3 days (Unsal *et al*., 2010). It is characterized by lower abdominal pain, which is a common menstrual symptom and may radiate to the lower back or thighs before or during menstruation (Aktas, 2015). Dysmenorrhea is one of the most common

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problems affecting adolescent girls. It not only causes physiological disturbance but also affects the quality of life, and daily activities either professional or personal life (Habibi *et al*., 2015; Aktas, 2015; Zurawiecka, Wronka, 2018; Potur, Bilgin, Komurcu, 2014). Pharmacological and non-pharmacological methods are used to relieve the pain during dysmenorrhea. Non-pharmacological methods include fatty diet restriction, herbal remedies, exercise and heat application (Lefebvre *et al*., 2005). The medications used to relieve pain include nonsteroidal anti-inflammatory drugs (NSAIDs) as first-line therapy, combined contraceptives, antispasmodics and vitamins (Buttaravoli, Leffler, 2012; Padubidri, Daftary, 2014).

The prevalence rate of dysmenorrhea among young women and its impact have been investigated in many studies (Kumbhar *et al*., 2011; Wong, 2011; Burnett *et al*., 2005; Rafique, Al-Sheikh, 2018; Feng, Wang, 2018; Gebeyehu *et al*., 2017; Muluneh *et al*., 2018). The prevalence of dysmenorrhea was reported to be 65% in India (Kumbhar *et al*., 2011), 76% in Malaysia (Wong, 2011), and 60% in Canada (Burnett *et al*., 2005). A study among students in Dammam, Saudi Arabia found a high prevalence rate of menstrual problems in adolescent girls (Rafique, Al-Sheikh, 2018). A team of researchers conducted 72 randomized controlled trials on 5723 participants, and 13 drugs were used in the study for pain relief. They found flurbiprofen and tiaprofenic acid as ideal treatment for primary dysmenorrhea (Feng, Wang, 2018). Another study was conducted to analyze the impact of dysmenorrhea among students from University of Gondar, Northwestern Ethiopia and reported that more than half (63%) of the respondents exhibited social withdrawal and reduction in academic performance (51.4%). However, they found that approximately two-thirds (63.8%) of them used home remedies as a primary management option. Ibuprofen and diclofenac were the most commonly used medications as pain killers in dysmenorrhea management (Gebeyehu *et al*., 2017). A study conducted in 2018, found a significant association between incidence of dysmenorrhea and many factors including family history, early and late menarche, age, physical activity, high sugar consumption, sexual activity, and heavier menstrual flow in North-West Ethiopia (Muluneh *et al*., 2018)**.** The present study evaluated the prevalence of dysmenorrhea, its impact, and the management strategies adopted by University students in Taif city, Saudi Arabia.

MATERIAL AND METHODS

Study design

This cross-sectional study was conducted from January to May 2019, A total of 800 female students from various colleges of Taif University, Taif, Saudi Arabia were invited to participate. The sample size was calculated using the Rasoft program. The simple random sample technique was adopted. Personal verbal consent was obtained from each participant prior to study enrollment. A total of 562 students from medicine (41), applied medical sciences (70), pharmacy (68), administration and financial sciences (61), education (49), science (57), designs and home economics (52), community service and continuing education (28), computers and information technology (45), AL-Sharia and regulations (49) and literature (42) colleges fulfilled the inclusion criteria and were recruited. The study was approved by the Research Ethics Committee, Taif University, Saudi Arabia (No.: 40-36-0106).

Inclusion criteria

The study enrolled female students aged 18-30 years old who attained menarche, were duly registered at the university, attend classes at the time of the study and were willing to participate.

Exclusion criteria

The study excluded female students older than 30 years, those suffering from gynecological disorders, with a history of pelvic pathologies or any systemic disease, and pregnant women.

Data collection

The questionnaire was developed after extensive literature review related to prevalence of dysmenorrhea, its impact, associated risk factors, and the management

strategies adopted by female students (Gebeyehu *et al*., 2017; Muluneh *et al*., 2018; Alsaleem, 2018). The questionnaire was prepared in both English and in Arabic languages. To address the study objectives, an inclusive well-prepared self-administered questionnaire was used to elicit the students' answers on different variables. To ensure its validity, the questionnaire was reviewed by two experts from College of Pharmacy, Taif University. The questionnaire consisted of 4 sections. The first section contained questions on demographic data, days of menstrual cycle, regularity of the menstrual cycle, grade of dysmenorrhea, puberty, and family history of dysmenorrhea. The second section included questions focusing on students' knowledge related to things such as treatment without medication, relation between dysmenorrhea and consumption of food. The third section was confined to questions about factors that may lead to dysmenorrhea such as early menstruation, unhealthy diet and use of contraceptives. The last section covered questions regarding effect of dysmenorrhea on quality of life and management of dysmenorrhea. Many other questions in this section were about the number of days of absence from university, symptoms, and usage of pharmacological and non-pharmacological treatment to relive pain. A pilot study was conducted among 40 students from the same age group to test the quality and clarity of the questions and to ensure the validity of the questionnaire. Data from the pilot study are not included in the study results.

Statistical analysis

The collected data were entered, processed, and analyzed using the IBM-SPSS (Statistical Package for Social Sciences program Version 22). Frequencies and percentages were computed for discrete variables. The chi-square test was used to determine the association between different variables. The level of significance ($P<0.05\%$) was considered to test the significance of obtained results.

RESULTS AND DISCUSSION

The demographic characteristics of the participants are presented in Table I. Almost 88% of the participants who never had children were suffering from dysmenorrhea more than those participants (62.5%) having children ($p = 0.030$). Approximately two third of the participants (371; 66.0%) reported the duration of their menses were between 4 to 6 days, while 164 (29.2%) of them had it between 7 to 9 days. Length of menstruation had a significant impact on the presence of dysmenorrhea, the longer the menstrual cycle, greater the probability of dysmenorrhea incidence ($p = 0.006$). A total of 385 (68.5%) participants reported regular menses. Participants who had a family history of dysmenorrhea experienced more menstrual pain than those who did not (87.4% vs 67.0%; $p < 0.001$). A majority of the participants (446; 79.4%) admitted that they suffered from dysmenorrhea (Figure 1). Among the participants who reported dysmenorrhea, approximately one-third (27%) were stated to have severe dysmenorrhea, more than half (59%) confirmed moderate, while 78 participants (14%) experienced mild dysmenorrhea (Figure 2).

TABLE I - Demographic characteristics of 562 participants and relation to prevalence of dysmenorrhea

Characteristics	Category	Total	Students with dysmenorrhea	Students without dysmenorrhea	*p*-value
Age (in years)	<20	127 (22.6%)	101 (79.5%)	26 (20.6%)	0.401
	20-25	421 (74.9%)	336 (75.3%)	85 (20.2%)	
	>25	14 (2.5%)	9 (64.3%)	5 (35.7%)	

TABLE I - Demographic characteristics of 562 participants and relation to prevalence of dysmenorrhea

Characteristics	Category	Total	Students with dysmenorrhea	Students without dysmenorrhea	*p*-value
Marital status	Single	497 (88.4%)	399 (80.3%)	98 (19.7%)	0.235
	Married	57 (10.1%)	42 (73.7%)	15 (26.3%)	
	Divorced	8 (1.4%)	5 (62.5%)	3 (37.5%)	
Use of oral contraceptives	Yes	18 (3.2%)	13 (72.2%)	5 (27.8%)	0.865
	No	39 (6.9%)	29 (74.4%)	10 (25.6%)	
Number of children	Yes	32 (5.7%)	20 (62.5%)	12 (37.5%)	0.030
	No	25 (4.4%)	22 (88.0%)	3 (12.0%)	
Age at menarche (years)	<11	42 (7.5%)	32 (76.2%)	10 (23.8%)	0.856
	11-15	449 (79.9%)	358 (79.7%)	91 (20.3%)	
	>15	71 (12.6%)	56 (78.9%)	15 (21.1%)	
Number of days of menstruation	1-3	23 (4.1%)	12 (52.2%)	11 (47.8%)	0.006
	4-6	371 (66.0%)	293 (79.0%)	78 (21%)	
	7-9	164 (29.2%)	137 (83.5%)	27 (16.5%)	
	> 9	4 (0.7%)	4 (100.0%)	0	
Regularity of the menstrual cycle	Regular	385 (68.5%)	297 (77.1%)	88 (22.9%)	0.056
	Irregular	177 (31.5%)	149 (84.2%)	28 (15.8%)	
Family history of dysmenorrhea	Yes	341 (60.7%)	298 (87.4%)	43 (12.6%)	< 0.001
	No	221 (39.3%)	148 (67.0%)	73 (33.0%)	

P-value <0.05 is statistically significant.

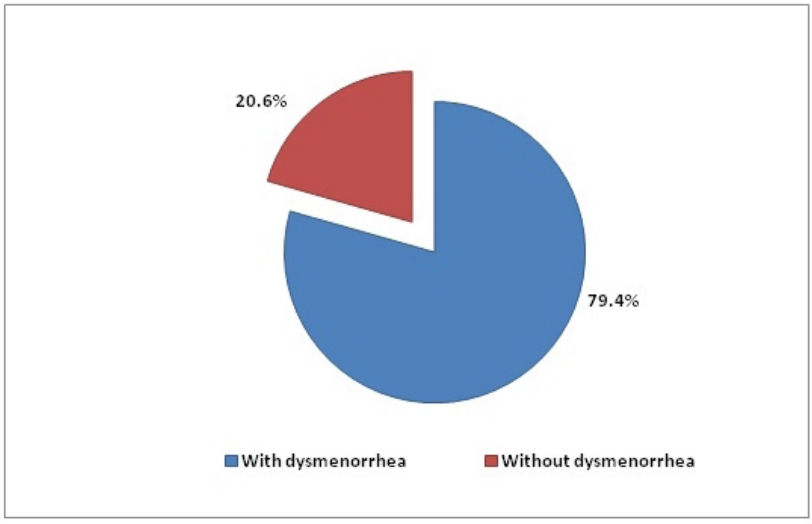

FIGURE 1 - The prevalence rate of dysmenorrhea among the study participants.

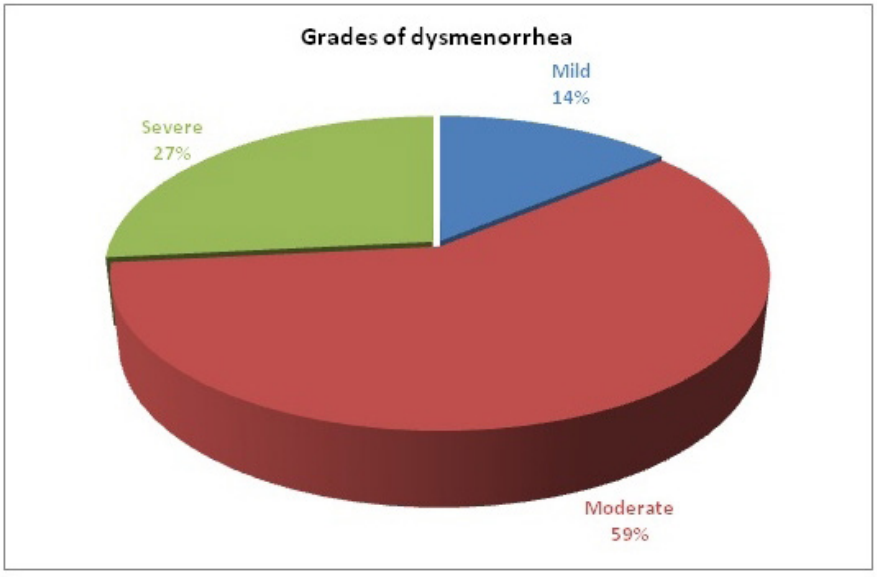

FIGURE 2 - The grades of dysmenorrhea among the study participants.

The level of knowledge about dysmenorrhea among female students is presented in Table II. Nearly 157 (27.9%) of the participants thought that dysmenorrhea would disappear or decrease after childbirth. A total of 431 (76.7%) participants admitted that the main cause of absenteeism from university classes was dysmenorrhea. Majority of the participants (489; 87.0%) believed that dysmenorrhea affects the psychology of female students. More than half of the respondents (332; 59.1%) supposed that dysmenorrhea can be treated without medication, while 291 (51.8%) of them did not agree.

TABLE II - Comparison between medical and non-medical students with their knowledge about dysmenorrhea

Variables	Category	Total	Students		*p*-value
			Medical	Non-medical	
Definition of dysmenorrhea	Agree	471 (83.8%)	157 (87.7%)	314 (82.0%)	0.158
	Don't agree	63 (11.2%)	17 (9.5%)	46 (12.0%)	
	Don't know	28 (5.0%)	5 (2.8%)	23 (6.0%)	
Younger female suffers from dysmenorrhea more than older ones	Agree	341 (60.7%)	94 (52.5%)	247 (64.5%)	0.022
	Don't agree	111 (19.8%)	41 (22.9%)	70 (18.3%)	
	Don't know	110 (19.6%)	44 (24.6%)	66 (17.2%)	
Dysmenorrhea disappears or decreases after delivery	Agree	157 (27.9%)	47 (26.3%)	110 (28.7%)	0.626
	Don't agree	77 (13.7%)	28 (15.6%)	49 (12.8%)	
	Don't know	328 (58.4%)	104 (58.1%)	224 (58.5%)	

TABLE II - Comparison between medical and non-medical students with their knowledge about dysmenorrhea

Variables	Category	Total	Students		*p*-value
			Medical	Non-medical	
Dysmenorrhea is the main cause of absenteeism from University	Agree	431 (76.7%)	129 (72.1%)	302 (78.9%)	0.002
	Don't agree	60 (10.7%)	31 (17.3%)	29 (7.6%)	
	Don't know	71 (12.6%)	19 (10.6%)	52 (13.6%)	
Dysmenorrhea affects the psychology of girls	Agree	489 (87.0%)	162 (90.5%)	327 (85.4%)	0.085
	Don't agree	23 (4.1%)	8 (4.5%)	15 (3.9%)	
	Don't know	50 (8.9%)	9 (5.0%)	41 (10.7%)	
Dysmenorrhea can be treated without medications	Agree	332 (59.1%)	116 (64.8%)	216 (56.4%)	0.152
	Don't agree	125 (22.2%)	36 (20.1%)	89 (23.2%)	
	Don't know	105 (18.7%)	27 (15.1%)	78 (20.4%)	
Dysmenorrhea can only be treated with medications	Agree	164 (29.2%)	44 (24.6%)	120 (31.3%)	0.053
	Don't agree	291 (51.8%)	106 (59.2%)	185 (48.3%)	
	Don't know	107 (19.0%)	29 (16.2%)	78 (20.4%)	

P-value <0.05 is statistically significant

Table III presents a statistically significant difference between severity of dysmenorrhea and students' absenteeism in university (p = 0.003). Least absenteeism was observed among students with mild pain (12.9%), while the students with moderate to severe pain had more absenteeism (63.5% vs 62.8%). A total of 74.4% students with severe pain had hindered daily activities compared with 47.1% and 27.4% of students with moderate and mild pain, respectively. This indicated that the severity of dysmenorrhea significantly hindered the daily activities of female students (p < 0.001). A significant association was observed between dysmenorrhea symptoms during menstruation and the severity of dysmenorrhea. The pain during dysmenorrhea was higher among students suffering from severe dysmenorrhea (90.9%) than among those with mild dysmenorrhea (75.8%) (p = 0.021). Students with severe dysmenorrhea had higher proportion of medication usage (73.6%) than those with moderate (61.2%) and mild (58.1%) dysmenorrhea. A significant difference was observed between medication usage and severity of pain (p = 0.033) (Table III). Figure 3 presents the pain-relieving methods used among the study participants. Half of the students (284; 50.5%) used medications to relieve dysmenorrhea, while 293 (52.1%) of them used non-pharmacological remedies such as drinking hot water and other hot drinks, bed rest (280; 49.8%) and warm compresses (282; 50.2%). Different types of medications were used by the respondents for the relief of menstrual pain (Figure 4). Ibuprofen had been used by 120 (42%) of them, 115 (40%) of the participants used paracetamol, while only 7 (3%) of them used mefenamic acid. Majority of the students (71.4%) who used mefenamic acid experienced complete relief from pain and 14.3% had slight relief. Students admitted that the level of pain relief varied between the participants depending on different medications used. This difference was statistically significant (p = 0.040) and is presented in Table IV.

TABLE III - Impact, symptoms and management of dysmenorrhea based on severity of pain

Variables	Category	Severity of dysmenorrhea			*p*-value
		Mild	Moderate	Severe	
Days of absence	1	39 (62.9%)	167 (63.5%)	76 (62.8%)	0.003
	2-4	8 (12.9%)	59 (22.4%)	37 (30.6%)	
	Never	15 (24.2%)	37 (14.1%)	8 (6.6%)	
Hinder daily activities	Yes, totally	17 (27.4%)	124 (47.1%)	90 (74.4%)	< 0.001
	To some extent	42 (67.7%)	132 (50.2%)	31 (25.6%)	
	Not affected	3 (4.8%)	7 (2.7%)	0	
Suffering from dysmenorrhea symptoms	Always	13 (21.0%)	131 (49.4%)	101 (83.5%)	< 0.001
	Sometimes	49 (79.0%)	132 (50.2%)	20 (16.5%)	
Time of dysmenorrhea symptoms	Before	43 (69.4%)	192 (73.0%)	94 (77.7%)	0.456
	During	47 (75.8%)	218 (82.9%)	110 (90.9%)	0.021
	After	0	14 (5.3%)	4 (3.3%)	0.135
Using medications	Yes	36 (58.1%)	161 (61.2%)	89 (73.6%)	0.033
	No	26 (41.9%)	102 (38.8%)	32 (26.4%)	

P-value <0.05 is statistically significant.

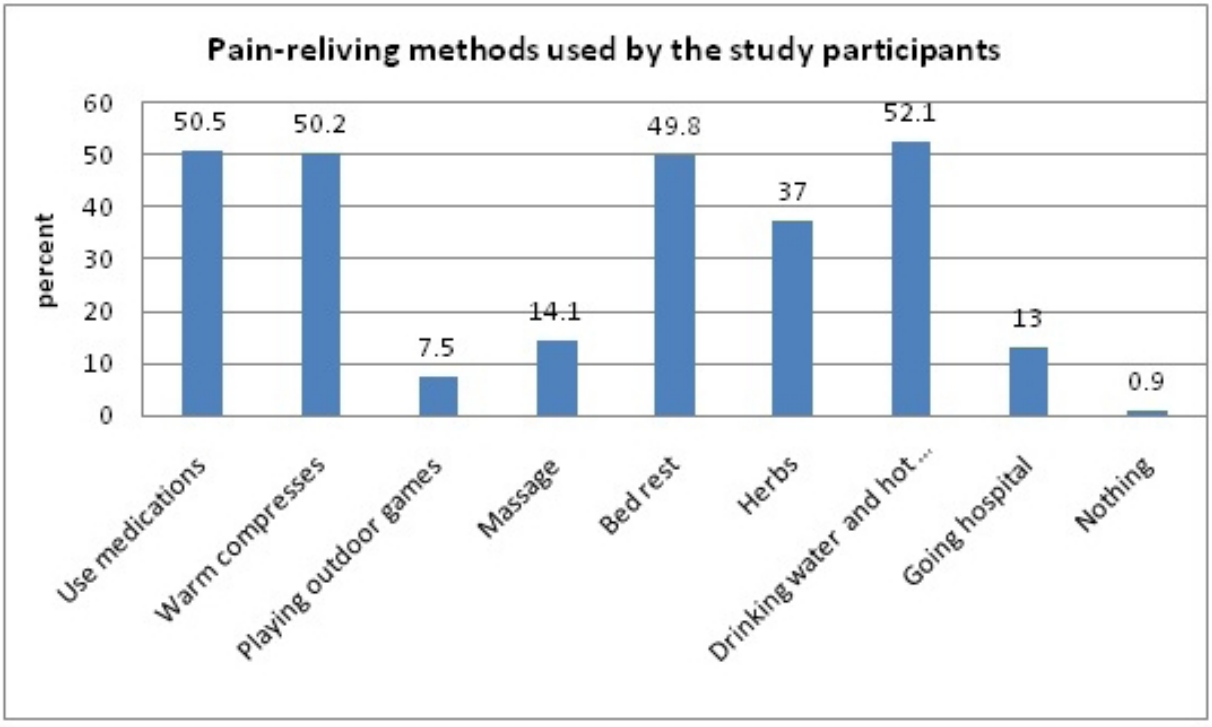

FIGURE 3 - Pain-reliving methods used by the study participants.

TABLE IV - Pain status after use of different types of medications

Drugs	Pain status			*p* -value
	Complete relieving	Slight relieving	Never	
Paracetamol	40 (34.8%)	75 (65.2%)	0	0.040
Ibuprofen	43 (35.8%)	76 (63.3%)	1 (0.8%)	
Diclofenac	4 (33.3%)	8 (66.7%)	0	
Mefenamic acid	5 (71.4%)	1 (14.3%)	1 (14.3%)	
Hyoscine-N-butylbromide	1 (14.3%)	6 (85.7%)	0	
Others	9 (37.5%)	15 (62.5%)	0	

P-value <0.05 is statistically significant.

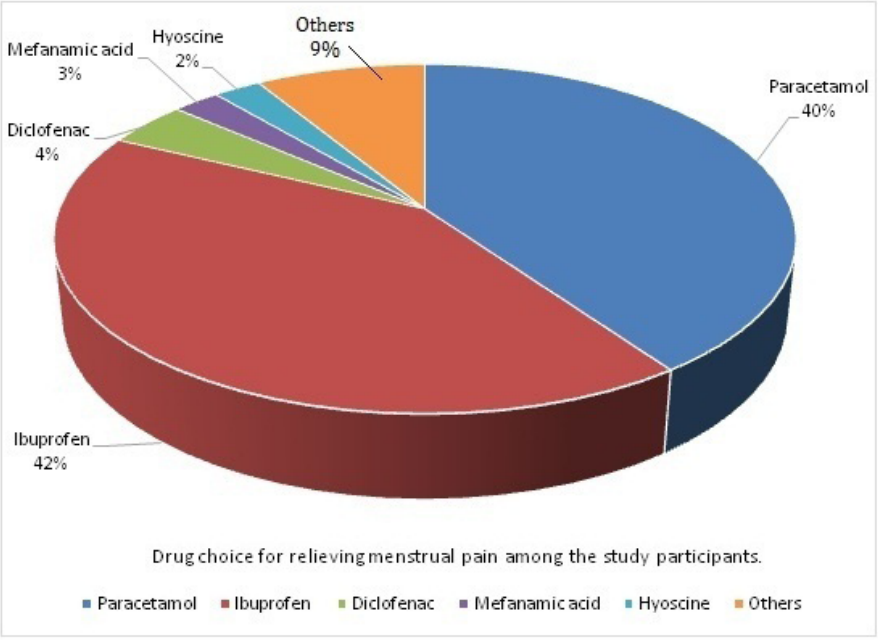

FIGURE 4 - Drug choice for relieving menstrual pain among the study participants.

In this study, the prevalence of dysmenorrhea was 79.4% among female students aged between 20 and 25 years. In Arab countries such as Oman, Iraq and Lebanon, the reported prevalence rate of dysmenorrhea were 94% (Al-Kindi, Al-Bulushi, 2011), 89.4% (Al-Asadi, 2013) and 74.3% (Santina, Wehbe, Ziade, 2012), respectively. Variation in prevalence rates of dysmenorrhea might be due to the differences in age ranges, target populations, lifestyle, or socio-cultural factors among the study groups. Among students who suffered from dysmenorrhea, 11.0% experienced mild pain, 46.8% had moderate pain, and 21.5% had severe pain. A previous study reported similar results in which 18%, 46.8% and 5.2% of the students suffered from mild, moderate and severe pain, respectively (Alsaleem, 2018). This indicates that dysmenorrhea can be considered as

one of the most common health problems that may affect health, psychological status, and daily activities of female students at the university level. In the current study, no significant association was observed between early age menarche and dysmenorrhea (p = 0.856), which is inconsistent with the results of recently published reports that observed a significant effect of age at menarche on dysmenorrhea (p = 0.005) (Al-Matouq *et al*., 2019). Regarding menstrual length, approximately two-thirds (66.0%) of the students had their menses between 4 to 6 days, and dysmenorrhea increased with increasing days of menstruation (p = 0.006). This result was compatible with the study conducted in Turkey (Unsal *et al*., 2010). In this study, the prevalence of dysmenorrhea was higher among female students who had a family history of dysmenorrhea (Table I). Similar results were disclosed in a study that reported 65.6% of the students had a family history of dysmenorrhea (El-Mawgod *et al*., 2016). This result may be attributed to the behavioral or genetic pattern of family members. In the present study, married female students without children had a higher rate of dysmenorrhea than those having children (p = 0.030). This result may have been observed due to the alterations in the hormones of married female participants after childbirth.

The present study also assessed the knowledge of university students about dysmenorrhea, which represents a normal phenomenon in all female students. Majority of the students (83.8%) knew the meaning of dysmenorrhea, which indicates that university students have sound knowledge about this disorder. Most of the participants (60.7%) believed that younger females suffer from dysmenorrhea more than older ones and 58.4% of the participants had no idea, whether dysmenorrhea would disappear or decrease after childbirth. However, participants in other studies believed that an increase in dysmenorrhea is linked to an increase in age and childbirth (Chen, Kwekkeboom, Ward, 2016; Ju, Jones, Mishra, 2014).

Interestingly, non-medical students appeared to be more knowledgeable than medical students about the idea that younger females suffer from dysmenorrhea more than older ones (52.5% vs 64.5%) (p = 0.022). This statistical significance may be attributed to the differences in culture and social environment. Approximately 76.7% of the participants in this study stated, "dysmenorrhea is the main cause of absenteeism from university". This is similar to the findings of previous studies (Ameade, Amalba, Mohammed, 2018; Hailemeskel, Demissie, Assefa, 2016). In addition, a significant difference was observed between knowledge of medical and non-medical students about absenteeism (72.1% vs 78.9%; p = 0.002).

Majority of the participants believed that dysmenorrhea affects the psychology of females, which is consistent with the results of several studies that showed stress and emotional instability were commonly associated with dysmenorrhea (Chen, Kwekkeboom, Ward, 2016; Ibrahim *et al*., 2015). More than half of the respondents believed that dysmenorrhea can be treated without medications, and 51.8% of the students did not agree and thought that dysmenorrhea can only be treated with medications. This result is consistent with previous findings, which showed that 63.8% of females used home remedies as a primary management option (Gebeyehu *et al*., 2017). In this study, the university absenteeism rate among female students was 76.7%, which is higher than those previously reported as 53.0% (Mohamed, 2012) and 12% (Zannoni *et al*., 2014). The differences in university absenteeism rates among these studies may be related to differences in pain threshold and responses to pain. In this study, the most common associated symptoms with dysmenorrhea observed by the participants were lower abdominal pain, back pain, mood change, and sleep disorders. A similar pattern of symptoms was reported in a previous study (Khamdan *et al*., 2014). Some of the participants used non-pharmacological medications such as drinking hot water and other hot drinks (52.1%), bed rest (49.8%) and warm compresses (50.2%). Whereas, in another study, only a small percentage of females had sought pharmacological management (25.5%), while the majority used herbs and other non-pharmacological methods to decrease pain (Omidvar *et al*., 2016). This difference in pain management may be attributed to the cultural variation between the countries. In this study, up to 32.7% of female students had slight pain reduction, which may be due to the use of inappropriate analgesic. Complete pain relief was observed in 34.8% and 35.8% of the participants, whereas slight relief was reported in 65.2% and 63.3% of the participants with the administration of paracetamol and ibuprofen, respectively. However, only 3% of the participants used mefenamic acid to reduce pain

and it was a more effective analgesic in dysmenorrhea, and these differences were statistically significant ($p = 0.040$). An earlier study reported that mefenamic acid was the safest NSAID in primary dysmenorrhea and was considered an effective medication for pain relief in dysmenorrhea (Feng, Wang, 2018).

Regarding study limitations, it was a cross-sectional study and results of the current study cannot be generalized because the participants were limited to a specific region. Moreover, perception of pain varies from one person to another and it is not appropriate to compare our results regarding pain with those of other studies that used scales for measuring pain.

CONCLUSION

The prevalence of dysmenorrhea was high among female student of Taif University, Taif, Saudi Arabia. Dysmenorrhea pain and associated symptoms affected the academic performance, daily activities, and psychological status of female students. Moreover, dysmenorrhea was significantly associated with several risk factors such as family history and length of menstruation. The primary option of medications was ibuprofen and paracetamol. Mefenamic acid was the most effective medication with complete pain relief. Majority of the participants used medications on the basis of their personal experience. Raising the consciousness and knowledge in females about the general information of dysmenorrhea and correcting the wrong concepts are required. All university students should be provided with short workshops on stress management practices as part of their curriculum. An educational program to increase awareness about the effective medication that provides complete pain relief is required to avoid overdoses and other side effects. Students suffering from dysmenorrhea regularly should be provided with appropriate gynecological and psychological counselling including approaches against future complications.

CONFLICT OF INTEREST

The authors confirm that the article content has no conflict of interest.

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REFERENCES

Aktas D. Prevalence and factors affecting dysmenorrhea in female university students: Effect on general comfort level. Pain Manag Nurs. 2015;16(4):534-43.

Al-Asadi JN, Abdul-Qadir RA. Dysmenorrhea and its impact on daily activities among secondary school students in Basra, Iraq. J Fac Med Baghdad. 2013;55(4):339-44.

Al-Kindi R, Al-Bulushi A. Prevalence and impact of dysmenorrhoea among Omani high school students. Sultan Qaboos Univ Med J. 2011;11(4):485-91.

Al-Matouq S, Al-Mutairi H, Al-Mutairi O, Abdulaziz F, Al-Basri D, Al-Enzi M, et al. Dysmenorrhea among high-school students and its associated factors in Kuwait. BMC pediatrics. 2019;19(1):1-12.

Alquaiz AM, Siddiqui AR, Qureshi RH, Fouda MA, Almuneef MA, Habib FA, et al. Women health in Saudi Arabia: A review of non-communicable diseases and their risk factors. Pak J Med Sci. 2014;30(2):422-31.

Alsaleem MA. Dysmenorrhea, associated symptoms, and management among students at King Khalid University, Saudi Arabia: An exploratory study. J Family Med Prim Care. 2018;7(4):769-74.

Ameade EPK, Amalba A, Mohammed BS. Prevalence of dysmenorrhea among University students in Northern Ghana; its impact and management strategies. BMC Womens Health. 2018;18(39):1-9.

Burnett MA, Antao V, Black A, Feldman K, Grenville A, Lea R, et al. Prevalence of primary dysmenorrhea in Canada. J Obstet Gynaecol Can. 2005;27(8):765-70.

Buttaravoli P, Leffler SM. Minor Emergencies: Dysmenorrhea (Menstrual Cramps). Elsevier-Health Sciences Division: E-Book; 2012. 342-4 p.

Chen CX, Kwekkeboom KL, Ward SE. Beliefs About Dysmenorrhea and Their Relationship to Self-Management. Res Nurs Health. 2016;39(4):263-76.

El-Mawgod MMA, Alshaibany AS, Al-anazi AM. Epidemiology of dysmenorrhea among secondary-school students in northern Saudi Arabia. J Egypt Public Health Assoc. 2016;91(3):115-9.

Feng X, Wang X. Comparison of the efficacy and safety of non-steroidal anti-inflammatory drugs for patients with primary dysmenorrhea: A network meta-analysis. Mol pain. 2018;14:1-14.

Gebeyehu MB, Mekuria AB, Tefera YG, Andarge DA, Debay YB, Bejiga GS, et al. Prevalence, impact, and management practice of dysmenorrhea among University of Gondar Students, Northwestern Ethiopia: a cross-sectional study. Int J Reprod Med. 2017;3208276:1-8.

Habibi N, Huang MS, Gan WY, Zulida R, Safavi SM. Prevalence of primary dysmenorrhea and factors associated with its intensity among undergraduate students: A cross-sectional study. Pain Manag Nurs. 2015;16(6):855-61.

Hailemeskel S, Demissie A, Assefa N. Primary dysmenorrhea magnitude, associated risk factors, and its effect on academic performance: evidence from female university students in Ethiopia. Int J Womens Health. 2016;8:489-96.

Helwa HAA, Mitaeb AA, Al-Hamshri S, Sweileh WM. Prevalence of dysmenorrhea and predictors of its pain intensity among Palestinian female university students. BMC Women's Health. 2018;18(1):18.

Ibrahim NK, AlGhamdi MS, Al-Shaibani AN, AlAmri FA, Alharbi HA, Al-Jadani AK, et al. Dysmenorrhea among female medical students in King Abdulaziz University: Prevalence, Predictors and outcome. Pak J Med Sci. 2015;31(6):1312-7.

Ju H, Jones M, Mishra GD. Premenstrual syndrome and dysmenorrhea: symptom trajectories over 13 years in young adults. Maturitas. 2014;78(2):99-105.

Kamel DM, Tantawy SA, Abdelsamea GA. Experience of dysmenorrhea among a group of physical therapy students from Cairo University: An exploratory study. J Pain Res. 2017;10:1079-85.

Khamdan HY, Aldallal KM, Almoosa EM, AlOmani NJ, Haider ASM, Abbas ZI, et al. The impact of menstrual period on physical condition, academic performance and habits of medical students. J Women's Health Care. 2014;3(5):1-4.

Kumbhar SK, Reddy M, Sujana B, Reddy R, Bhargavi D, Balkrishna C. Prevalence of dysmenorrhea among Adolescent girls (14-19 yrs) of kadapa district and its impact on quality of life: A cross Sectional study. Nat J Community Med. 2011;2(2):265-8.

Lefebvre G, Pinsonneault O, Antao V, Black A, Burnett M, Feldman K, et al. Primary dysmenorrhea consensus guideline. J Obstet Gynaecol Can. 2005;27(12):1117-46.

McPherson ME, Korfine L. Menstruation across time: menarche, menstrual attitudes, experiences, and behaviors. Women's Health Issues. 2004;14(6):193-200.

Mohamed EM. Epidemiology of dysmenorrhea among adolescent students in Assiut City, Egypt. Life Sci J. 2012;9(1):348-53.

Muluneh AA, Nigussie TS, Gebreslasie KZ, Anteneh KT, Kassa ZY. Prevalence and associated factors of dysmenorrhea among secondary and preparatory school students in Debremarkos town, North-West Ethiopia. BMC Womens Health. 2018;18(57);1-8.

Omidvar S, Bakouei F, Amiri FN, Begum K. Primary dysmenorrhea and menstrual symptoms in Indian female students: prevalence, impact and management. Glob J Health Sci. 2016;8(8):135-44.

Padubidri VG, Daftary S. Shaw's Textbook of Gynecology. India: Elsevier; 2014.

Potur DC, Bilgin NC, Komurcu N. Prevalence 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.

Poureslami M, Ashtiani FO. Attitudes of female adolescents about dysmenorrhea and menstrual hygiene in Tehran suburbs. Arch Iran Med. 2002;5(4):219-24.

Rafique N, Al-Sheikh MH. Prevalence of menstrual problems and their association with psychological stress in young female students studying health sciences. Saudi Med J. 2018;39(1):67-73.

Ray S, Mishra SK, Roy AG, Das BM. Menstrual characteristics: a study of the adolescents of rural and urban West Bengal, India. Ann Hum Biol. 2010;37(5):668-81.

Santina T, Wehbe N, Ziade F. Exploring dysmenorrhoea and menstrual experiences among Lebanese female adolescents. East Mediterr Health J. 2012;18(8):857-63.

Sanyal S, Ray S. Variation in the menstrual characteristics in adolescents of West Bengal. Singapore Med J. 2008;49(7):542-50.

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.

Wong LP. Attitudes towards dysmenorrhoea, impact and treatment seeking among adolescent girls: A rural school-based survey. Aust J Rural Health. 2011;19(4):218-23.

Zannoni L, Giorgi M, Spagnolo E, Montanari G, Villa G, Seracchioli R. Dysmenorrhea, absenteeism from school,

and symptoms suspicious for endometriosis in adolescents. J Pediatr Adolesc Gynecol. 2014;27(5):258-65.

Zurawiecka M, Wronka I. Association of primary dysmenorrhea with anthropometrical and socio-economic factors in Polish university students. J Obstet Gynaecol Res. 2018;44(7):1259-67.

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