DYSMENORRHEA AND ASSOCIATED FACTORS AMONG MEDICAL STUDENTS OF ST PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE, ADDIS ABABA, ETHIOPIA: CROSS SECTIONAL STUDY

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ABSTRACT

BACKGROUND: Dysmenorrhea is one of the most common gynecologic complaints in young women. It is a health burden for most women and key public health problem in the world. Dysmenorrhea affects the quality of life and daily activities of females in school. Despite the presence of different studies that assess its prevalence and associated factors among women in Ethiopia, there is sparse information in relation to medical students which is addressed in this study. The objective of this study was to determine the prevalence of dysmenorrhea and its associated factors among medical students of St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia.

METHOD: An institutional-based analytical cross-sectional study was conducted among female medical students of St. Paul's Hospital Millennium Medical College. A sample of 156 female medical students was included in the survey using simple random sampling technique and female students who were available during the data collection period were eligible to the study. Five trained data collectors collected the data using the English version structured questionnaire that was pretested before the actual data collection. The data collected was entered using Epi info 7.0 and analyzed by SPSS version 23 statistical software. Multivariable logistic regression analysis was used to assess the association between selected explanatory variables and the dichotomous outcome variable. Adjusted odds ratios and 95% confidence intervals were reported and a P<0.05 was taken as statistically significant.

RESULTS: Among the study participants 124(79.5%) had dysmenorrhea. About one third (33.3%) of the participants reported that they have a family history of dysmenorrhea and 39.7% study participants experienced moderate type of pain. Back pain (64.1%), weakness (41%) and loss of appetite (32.7%) are amongst the commonest symptoms with dysmenorrhea. More than half of the participants reported to be irritable (54.6%) and have decreased academic performance (50.6%). Students also reported lack of concentration (42.9%) and poor appetite (41.7%). More than half of the respondents (58.3%) used home remedies as a primary management option. Heat (41%) and tea (41.7%) were the most used home remedies. More than half of the respondents (55.8%) reported to use over the counter drugs such as Ibuprofen and diclofenac. Longer duration of menstruation (AOR 95 % (CI) = 0.308 (0.100, 0.943), p=0.039) and longer menstrual cycle (AOR 95% (CI) =0.247 (0.051, 1.197), p=0.042) had statistically significant association with the occurrence of dysmenorrhea.

CONCLUSION: A high proportion of female medical students experience dysmenorrhea. Decrease academic performance was the most common burden reported. The majority of respondents used home remedies and over the counter medications for treatment.

KEY WORDS: Dysmenorrhea, Medical Students, SPCMMC, Addis Ababa, Ethiopia

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INTRODUCTION

Menstruation is a normal physiological process that occurs approximately every month in women. Most females experience certain degree of pain and discomfort during their menstruation period[1]. Dysmenorrhea is defined as uterine pain or cramps in the lower abdomen, occurring just before and during menstruation, with variations among different females [2]. The pain usually occurs intermittently, ranging from mild to disabling. Other symptoms that may accompany cramping include nausea, diarrhea, dizziness, fatigue, headache, or a flu-like feeling[3]. Risk factors associated with more severe episodes of dysmenorrhea include earlier age at menarche, long menstrual periods, heavy menstrual flow, smoking, positive family history, obesity and alcohol consumption[4,5]. Dysmenorrhea may be categorized into two types as primary and secondary. Primary dysmenorrhea is defined as painful menses among females with normal pelvic anatomy, frequently beginning during adolescence with only ovulatory cycles. Secondary dysmenorrhea is a menstrual pain associated with underlying pathology and its onset might be years after menarche[6].

Dysmenorrhea is a key women's health burden. The morbidity of dysmenorrhea has a significant impact on public health as it is the leading cause of work or school absenteeism in women and a leading cause of recurrent short-term school absenteeism among adolescent girls. According to Ethiopian standard treatment guideline, dysmenorrhea occurs in about 50% of menstruating women. A study done in University of Gondar shows that prevalence of dysmenorrhea among female students was 77.6 [7]. As many as 90% of adolescent females and 50% of menstruating women worldwide report suffering from it, with 10-20% of them describing their pain as severe and distressing[8]. In Egypt, it was reported a highest prevalence rate of dysmenorrhea (94.4%) with 49% for mild pain, 34.4% for moderate pain and 16.6% for severe pain[9]. Due to its importance, different pharmacological and non-pharmacological treatments have been stated. Pharmacological treatments include NSAID, IUD and OCP. Non pharmacological treatments include application of heat, herbal, dietary therapies, exercise and acupuncture[10]. Data on experiences of menstruation and its impact on the health status, quality of life and social integration among women in developing countries are scanty. Although dysmenorrhea is a common gynecological problem in young females, there are limited studies in this subject especially in Ethiopia. The main aim of the study is to know the actual prevalence of dysmenorrhea and understand the enormity of the problem. It also assesses the impact and management practice of this common health problem that would lighten on the need for appropriate intervention through a change in lifestyle.

METHOD AND MATERIALS

Study Area and Period: This study was conducted in St. Paul's Millennium Medical College from March 4 to April 12, 2019. St. Paul's Hospital was established in 1968 by the late Emperor Haile Selassie, although the medical school opened in 2007. There are 777 medical students, among which 304 are females. First year medical students are 105, among which 52 are females. Second year medical students are 140, among which 69 are females. Third year medical students are 154 among which 58 are females. Fourth year medical students are 109, among which 32 are females. Fifth year medical students are 115, among which 37 are females. Sixth year medical students are 154, among which 56 are females.

Study Design: An institution -based analytic cross-sectional study was conducted to determine the prevalence of Dysmenorrhea and its associated factors among medical students of St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia.

Source population: all female undergraduate medical students.

Study population: all female undergraduate medical students who were at the school at the time of the study and were willing to participate in the study.

Sample Size and sampling technique: the minimum required sample size for this study was obtained using a single population proportion formula. The assumptions considered included: the prevalence of Dysmenorrhea among female medical students (p=77.6%) [2]. Making the reliability coefficient for 95% CI, 5% margin of error, the sample size calculated was 267. Since the source population was 304 female students, which is <10,000, the sample size adjusted using the formula:

nf= ni/(1+ni/N) nf and after 10% consideration for possible nonresponse, the final sample size became 156 female students. The calculated sample size was proportionally allocated to each of the medical year, the total number of female medical students for each year during the study period. A simple random sampling procedure was employed to select the study subjects.

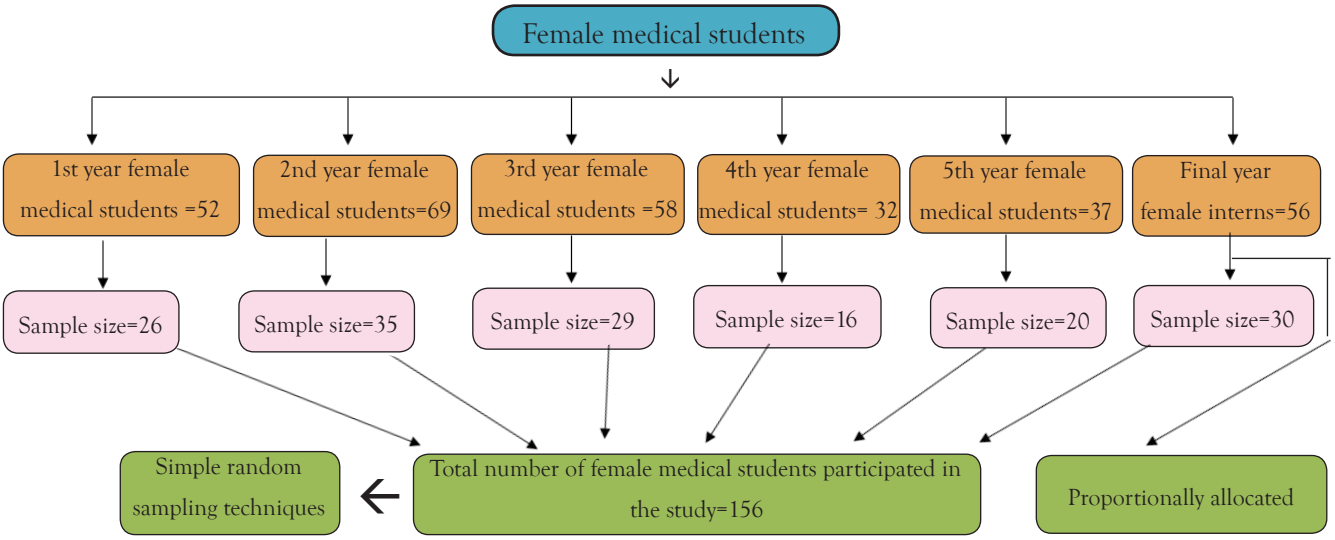

Figure1. Schematic presentation of sampling procedure

Study Variables: The outcome variable was the presence of Dysmenorrhea. The explanatory variables included socio-demographic characteristic of the students, variables related to menstruation characteristics and management practice of dysmenorrhea.

Data Collection Procedures: Data were collected using a structured and self-administered questionnaire that was adopted in English version from previous studies [7, 11]. Five data collectors and one supervisor were trained for two days on the data collection and supervision procedures. The data collectors administered the questionnaire after obtaining verbal informed consent from selected female medical college students.

Data quality assurance: The quality of data was assured through careful design of the study procedure, proper training of the data collectors and the supervisor. Pretest of the data collection tool involving the data collectors and supervisors was conducted on 5% of sample size in the medical college. Close supervision of the data collection procedures, proper categorization and coding were also employed. The principal investigator and the data collectors reviewed the questionnaires on a daily basis in the field to ensure completeness and consistency. To minimize data entry error, double entry procedure was conducted and the data were cleansed before analysis.

Data Analysis: The data was entered, cleaned and coded using Epi info software version 7.0 and analyzed by SPSS version 23 statistical software. Descriptive analysis using frequencies and percentage was used to characterize different variables of the study participants. Bivariate analysis was used for unadjusted analysis factors associated with the presence of Dysmenorrhea and variables with $p< 0.2$ were selected for the multivariable binary logistic regression model. Multivariable logistic regression analysis was conducted to adjust for the effect of confounders. Both crude and adjusted odds ratio with 95% confidence interval were reported and statistical significance was considered at a significance level of 5%.

Ethical considerations

Ethical clearance for the study was obtained from the Institutional Ethical Review Board (IRB) of St. Paul's Hospital Millennium Medical College. The detail nature and objective of the study was fully explained to all female medical students who participated in

the study before the actual data collection and verbal informed consent was received.

RESULTS

The response rate was 100%. The mean (±1SD) age of the participants was 21 (± 1.93) years. Eighty (51.3%) were in the age range of 15 to 20 (Table 1). All the 156 (100%) of the study participants had started menstruation. The mean age of menarche (±SD) of the study participants was 12.97(± 1.37). The mean length of menstrual cycle (±SD) of the study participant was 29.7 (± 5.51) days with a range of 20 to 48 days. Most of the students (n=111, 71.1%) had normal menstrual cycle duration of 21-35 days. Students with menstrual cycle duration longer than 35 days were 36 (23.1%) (Table 1).

The mean length of menstrual bleeding (±SD) of the study participants was 5.2 (± 1.51) days, ranging from 2 to 8 days. Majority of participants (n=86, 55.1%) had normal bleeding duration ranging between 3-5 days. More than one third of the participants' (n=59, 37.8%) bleeding duration was more than 5 days (Table 1).

Most of the participants (n=124, 79.5%) had painful menstruation. Among those who had painful menstruation, eighty two (66%) started to have pain at the onset of menstruation and fourteen (11.5%) experienced severe menstrual pain. The most frequent symptoms associated with dysmenorrhea were back pain (64.1%) and weakness (41%) (Table 2). Seventy nine (50.6%) study participants had experienced decreased academic performance (Figure 2). About two thirds of the respondents (n=72, 58.3%) were using home remedies as a non-pharmacological treatment option of dysmenorrhea whereas only 22.4% sought medical help for their dysmenorrhea. The most commonly used home remedies were heat (41%) and tea (41.7%). Only (n=17, 10.9%) of them did routine physical exercises. About 56% of the respondents used over the counter medications, such as ibuprofen (50%) and diclofenac (21.2%). Out of all the respondents who were using medications, more than half of them (n=96, 61.8%) started to take the medications with the onset of the pain on per need base (49.4%). The most common route of administration is PO (87.6%). Majority of the respondents (n= 116, 74.2% and n=96.4, 61.8%) knew about the precaution and contraindication of the drugs used respectively (Table 3).

To identify factors independently associated with the presence of dysmenorrhea, bivariate analysis was used considering the presence of dysmenorrhea as an outcome variable. Accordingly, family history of dysmenorrhea, age range of 15-20 years, alcohol consumption, smoking, age of menarche >15 years, length of menstrual cycle > 35 days and length of menstruation lasting >5 days were found to be associated with the presence of dysmenorrhea ($p<0.2$). Based on the finding of multivariable logistic regression analysis conducted using significant variables in the bivariate analysis, the most important covariates identified after controlling the potential confounders were length of menstrual cycle > 35 days and length of menstruation lasting >5 days **(Table 4).**

Table 1: Sociodemographic and menstrual characteristics and factors associated with dysmenorrhea on bivariate analysis of medical students at St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia, 2019.

	Coding categories	Dysmenorrhea			
		Yes No. (%)	No No. (%)	Total No. (%)	P-value
Age	15- 20 years	54 (71.1)	22 (28.9)	80 (51.3)	0.013*
	21-25 years	70(87.5)	10(12.5)	76 (48.7)	
Year at medical school	1st year	19 (73.1)	7 (26.9)	26 (16.7)	0.255
	2nd year	24 (68.6)	11 (31.4)	35 (22.4)	0.223
	3rd year	25 (83.3)	5 (16.7)	29 (19.2)	0.242
	4th year	12 (80)	3 (20)	16 (9.6)	0.200
	5th year	16 (80)	4 (20)	20 (12.8)	0.210
	Intern	28 (93.3)	2 (6.7)	30 (19.2)	
Age of menarche	9-15 years	121 (42.8)	28 (18.8)	149 (95.5)	
	>15 years	3 (42.8)	4 (57.2)	7 (4.5)	0.027*
Length of menstrual cycle	<21 days	8 (88.9)	1 (11.1)	9 (5.8)	0.370
	21-35 days	91(75.2)	30 (24.8)	111(71.1)	
	>35 days	25 (96.2)	1 (3.8)	36 (23.1)	0.043*
Length of menstruation	<3 days	7 (63.6)	4(36.3)	11(7.1)	0.500
	3-5 days	63 (73.2)	23 (26.7)	86 (55.1)	
	>5days	54 (91.5)	5 (8.5)	59 (37.8)	0.090*
Family history	Yes	46 (88.5)	6 (11.5)	52 (33.3)	0.055*
	No	78 (50.6)	26 (49.4)	104 (66.7)	
Smoking history	Yes	20 (90.9)	2 (9.1)	22 (14.1)	0.169*
	No	104 (77.6)	30 (22.4)	134 (85.9)	
Alcohol history	Yes	26 (92.8)	2 (7.2)	28 (17.9)	0.070*
	No	98 (76.5)	30 (23.5)	128 (82.1)	
History of STI symptoms	Yes	10 (90.9)	1 (9.1)	11(7.1)	0.349
	No	114 (78.6)	31 (21.6)	145 (92.9)	
History STI treatment	Yes	7 (87.5)	1 (12.5)	8 (5.1)	0.570
	No	117 (79)	31 (21)	148 (94.9)	
Routine physical exercise	Yes	12 (70.5)	5 (29.5)	17 (10.9)	
	No	112 (80.5)	27(19.5)	139(89.1)	0.340

*p-value <0.2

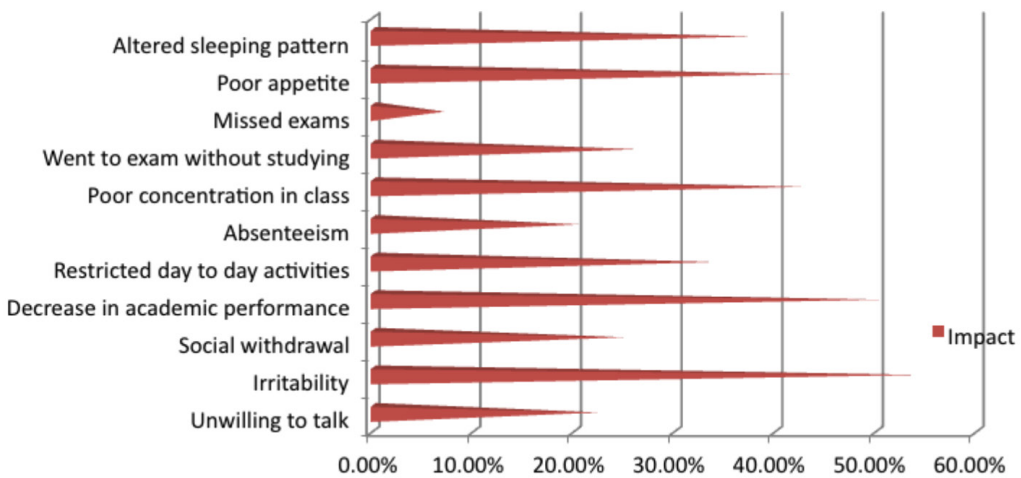

Figure 2: Impact of dysmenorrhea among female medical students of SPHMMC, Addis Ababa, 2019

Table 2: Characteristic of dysmenorrhea among female medical students at St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia, 2019.

Coding variables		Number	Percent
Menstrual pain	Yes	124	79.5
	No	32	20.5
Degree of menstrual pain	Mild	61	48.7
	Severe	14	11.5
Onset of Dysmenorrhea	One week prior to menstruation	11	9.6
	2 to 3 days prior to menstruation	25	20
	At the onset of menstruation	82	66
	After the onset of menstruation	6	4.8
Associated symptoms	Back pain	100	64.1
	Weakness	64	41
	Loss of appetite	51	32.7
	Nausea	50	32.1
	Headache	45	29
	Diarrhea	39	25
	Dizziness	33	21.2
	Sweating	28	17.9
	Vomiting	20	12.8

Table 3: Medical practice and knowledge about drugs used among female medical students at St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia, 2019.

Coding variables		Number	Percent
Medication practice	Home remedy	91	58.3
	Medication	87	55.8
Type of Home remedy used exclusively	Heat	64	41
	Coca cola	28	17.9
	Coffee	8	5.1
	Tea	65	41.7
	Massage	34	21.8
Over the counter medications used exclusively over the past 6 months	Ibuprofen	78	50
	Diclofenac	33	21.2
	Paracetamol	22	14.1
	Tramadol	12	7.7
	Contraceptives	9	
Route of administration	PO	78	87.6
	Combination (PO with IM/IV)	11	12.4
Initiation of over the counter medication used (Ibuprofen, diclofenac, paracetamol or tramadol)	Before pain starts	19	21.3
	When pain starts	55	61.8
	After pain starts	15	16.9
Frequency of over the counter medication used per day (Ibuprofen diclofenac, paracetamol or tramadol)	1-2 times per day	37	41.6
	3-4 times per day	8	
	PRN(when needed)	44	49.4,
Knowledge on the precaution/warning of over the counter drugs utilized (Ibuprofen, diclofenac, paracetamol and tramadol)	Yes	66	73.3
	No	24	16.7
Knowledge on contraindication of over the drugs utilized (Ibuprofen, diclofenac, paracetamol and tramadol)	Yes	55	61.1
	No	35	38.9
Knowledge on maximum recommended dose of over the counter drugs utilized (Ibuprofen, diclofenac, paracetamol and tramadol)	Yes	68	74.4
	No	22	25.6
Knowledge on the risk and adverse effect of over the counter drugs utilized (Ibuprofen, diclofenac, paracetamol and tramadol)	Yes	72	80
	No	18	20

Table 4: Multivariable Logistic Regression Analysis Output of associated factors among female medical students at St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia, 2019

Variable		Dysmenorrhea		COR (95%CI)	AOR(95%CI)	p-value (<0.05)
		Yes (%)	No (%)			
Age	15-20 years	54 (71.05%)	22(28.9%)	2.852[1.247,6.524]	1.901[0.717,5.037]	0.197
	21- 35 years	70 (87.5%)	10 (12.5%)	1	1	
Age of menarche	<9 years	-	-	-	-	-
	9-15 years	121(81.2%)	28(18.8%)	1	1	
	>15 years	3(42.8%)	4 (57.2%)	5.762[1.220,27.211]	0.199[0.036,1.083]	0.062
Family history of dysmenorrhea	Yes	46 (88.5%)	6 (11.5%)	0.391[0.150, 1.022]	0.343[0.108,1.089]	0.069
	No	78 (50.6%)	26 (49.4%)	1	1	
Length of menstrual cycle	<21 days	8(88.9%)	1(11.1%)	0.379[0.046, 3.157]	-	0.370
	21-35 days	91 (75.2%)	30(24.8%)	1	1	
	>35 days	25 (96.2%)	1(3.8%)	0.166 [0.038, 0.736]	0.247 [0.051,1.197]	0.042*
Length of menstruation	<3 days	7(63.6%)	4(36.3%)	1.565 [0.419, 5.848]	-	0.50
	3-5 days	63(73.2%)	23(26.7)	1	1	
	>5days	54(91.5%)	5(8.5%)	0.254 [0.09,0.713]	0.308 [0.100,0.943]	0.039*
Smoking history	Yes	20 (90.9%)	2 (9.1%)	0.347 [0.077,1.568]	1.038 [0.173,6.220]	0.967
	No	104 (77.6%)	30 (22.4%)	1	1	
History of STI symptom	Yes	10 (90.9%)	1 (9.1%)	0.368 [0.045,2.984]	-	0.349
	No	114 (78.6%)	31 (21.4%)	1	1	
History of STI treatment	Yes	7 (87.5%)	1 (12.5%)	0.539 [0.064,4.548]	-	0.570
	No	117 (79%)	31 (21%)	1	1	
Routine physical exercise	Yes	12 (70.5%)	5 (29.5%)	1	1	
	No	112(80.5%)	27 (19.5%)	1.728 [0.561,5.322]	-	0.340

*statistically significant

DISCUSSION

Most women experience a monthly cyclic lower abdominal pain during menstruation called dysmenorrhea. The results of the present study showed that the overall prevalence of dysmenorrhea was 79.5%. This result is comparable to 76.6% in University Gondar[7] and 80% in Hong Kong University[14]. A higher prevalence was recorded in other studies like Tamale campus of the University for Developmental Studies in Ghana which reported a prevalence of 83.6%[11] and Beni-Suef University of Egypt which reported a prevalence of 92.9% [15]. This conspicuous discrepancy of prevalence rates of dysmenorrhea across different countries could be attributed to the lack of universally accepted and standard definition of dysmenorrhea as well as the use of different categories of subjects.

In this study, more than half of the students (51.2%) described the pain as moderate to severe. It was revealed that 48.7%, 39.7% and 11.5% of females had mild, moderate and severe pain respectively. These results go in accordance with a study conducted by Ortiz in 1539 students of Mexican University, where

the author concluded that dysmenorrhea was mild in 36.1%, moderate in 43.8% and severe in 20.1%[13]. This indicates that dysmenorrhea is still an important public health problem which has a negative impact on health, social environment, work and psychological status.

Epidemiological studies have shown link between dysmenorrhea and several environmental risk factors, including cigarette smoking and consumption of alcohol. However, this study did not find a significant association between smoking and alcohol consumption with dysmenorrhea. This can be attributed to the fact that many students are unwilling to disclose this information i.e. consumption of alcohol and cigarette smoking and hence are subject to social desirability bias. This study found a significant association between longer menstrual cycle and longer menstrual duration with dysmenorrhea. This goes in accordance to a study done in high school students in Kuwait where cycle irregularity and longer cycle was associated with dysmenorrhea (P=0.018) [16]. As it is evident in this study and other studies, anomalous menstrual cycle i.e. longer menstrual duration and longer menstrual cycle predisposes women to dysmenorrhea [7,16]. Subsequently, such conditions should not be overlooked rather they should be properly evaluated and managed so as to alleviate dysmenorrhea. In this study, the most disrupted activities were decrease in academic performance (50.6%), poor concentration in class (42.9%) and poor appetite (41.7%). Regarding this, similar results were reported in University of Gondar which shows that there has been an increase in number of decrease in academic performance and poor concentration in class[7]. Another study in university students of Northern Ghana also stated that absenteeism and poor concentration in class were the most disrupted daily life activities[11]. This shows that dysmenorrhea causes a great burden in female students, especially where the school load and stress can be high as where this study was conducted.

It would have been expected that the undesirable effects of dysmenorrhea and menstruation associated symptoms on daily activities of respondents would cause them to be eager to seek medical help but only 22.4% of the respondents ever did so. Similarly, hospital attendance rates were reported low (16.3%) in Ghana[11]. This low hospital visit could be attributed to the mere fact that most females are not comfortable with presenting to their doctor with a sensitive complaint like painful menstruation. Females also do not give enough emphasis to the pain as they consider it normal thus not worth taking to a hospital where there are long and daunting queues to consult their doctors. A study conducted in Iran stated the use of physical activity had positive impact on most of dysmenorrheal symptoms [12]. However, only 10.9% respondents in this study carried out routine physical exercise. Majority of the respondents restrained from conducting routine physical examination due to severity of the pain. This indicates that physical activity should be fiercely advocated to females as it is one of the preventive and alleviating methods.

Self-medication with analgesics and NSAIDs and home remedies like direct application of heat are common effective strategies. The present study showed that most of the students (58.3%) used home remedies as a non-pharmacological treatment option, heat being the most used home remedy (41%). NSAIDs and combined OCs are the most commonly used therapeutic modalities for the management of primary dysmenorrhea [2]. More than half of the respondents (55.8%) reported that they use OTC medications, ibuprofen being the most common drug used (50%). The pain is effectively reduced if the OTC medications are taken before the onset of pain[2]. However, 61.8% of the respondents stated that they start using these medications at the onset of menses and pain. This indicates that more than half of the participants are not aware of the effective time when the medication should be taken.

About 38.2% and 25.8% of the respondents reported that they don't know the contraindication and the maximum recommended dose of OTC medications. These figures are higher than expected for medical students as they take pharmacology courses during the first two years of medical school. This could be attributed to the self- treatment of dysmenorrhea by many female medical students rather than paying a hospital visit where they could gain more information on these commonly utilized drugs. They should be aware that the misuse of these drugs has potential complications like gastrointestinal bleeding and worsen existing case of

peptic ulcer disease. Students should be well trained on how to use these medications appropriately.

CONCLUSION AND RECOMMENDATION

The overall prevalence of dysmenorrhea in female medical students of SPHMMC was found to be high. More than half of the respondents stated that their pain is in the moderate to severe range and the pain starts to occur during the onset of menstruation. Half of the respondents stated that they encountered irritability and decrease in academic performance. More than half of the respondents stated that they use OTC medications to control their pain. About one third of those using the medications stated that they don't know the contraindication of the medications used. Longer menstrual duration and longer menstrual cycle were found to have independent determining factors for the occurrence of dysmenorrhea. Proper health education should be given more emphasis to alter students' habit so as to seek medical attention for their menstrual pain, to make life style modifications by decreasing alcohol intake, cessation of smoking, and do routine physical exercise. Most importantly, the students should be well taught about the precaution, contraindication, maximum recommended dose and risk and adverse effects of OTC medications used to treat dysmenorrhea. The rules and regulations of the teaching process should also be flexible enough to allow female medical students who suffer from severe dysmenorrhea to rest when needed. This study also calls for further study on a nationwide scale to identify and address the major problems associated with dysmenorrhea and educate the society on how to manage it by using home remedies and OTC drugs without misusing them.

ABBREVIATIONS

SPHMMC- St. Paul's Hospital Millennium Medical College, OTC- Over the Counter, OCP- Oral Contraceptive Pills, PRN. Per Need , IUD- Intrauterine Device, NSAID- Non Steroidal Anti Inflammatory Drug, STI- Sexually Transmitted Infection

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COMPETING INTERESTS

The authors declare that there is no conflict of interest regarding the conduct and publication of this research work.

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REFERENCES

1. Aktas D. (2015). Prevalence and Factors affecting dysmenorrhea in female university students: Effect on General Comfort Level. Pain Management Nurs, 16: 534-543.
2. S. Kaur, P.Sheoran, and J. Sarin. (2015). Assessment and comparison of dysmenorrhea in terms of severity of pain and utilization of nonsteroidal anti-inflammatory drugs among unmarried and married women. International Journal of caring sciences, 8(3): 737-745.
3. B. Kiran, T. Sandozi, L. Akila, A. Chakraborty, Meherban, RJ. Rani. (2012). Study of the prevalence, severity, and treatment of dysmenorrhea in medical and nursing students. International Journal of Pharma and Bio Sciences, 3(1): 161-170.
4. Ju H, Jones M, Mishra GD. (2014). Smoking and trajectories of dysmenorrhea among young Australian women. Tobacco Control, 25(2): 195-202
5. Unsal A, Ayranci U, Tozun M, Arslan G, Calik E. (2010). Prevalence of dysmenorrhea and its effect on quality of life among a group of female university students. Ups J Med Sci, 115: 138-145.
6. N. Sharma, M. Sagayaraj, and B. Sujata. (2014). Menstrual characteristics and prevalence of dysmenorrhea in college students. International Journal of Scientific and Research Publications, 4(10): 1-6.
7. Minalshewa Biruk Gebeyehu, Abebe Basazn Mekuria (2017) Prevalence, Impact, and Management Practice of Dysmenorrhea among University of Gondar Students, Northwestern Ethiopia. International Journal of Reproductive Medicine, 3:1-8
8. K.J. Berkley. (2013). Primary dysmenorrhea: an urgent mandate. International Association for the Study of Pain, 21(3): 1-8.
9. El-Hameed NA, Mohamed MS, Ahmed NH, Ahmed ER. (2011). Assessment of dysmenorrhea and menstrual hygiene practices among adolescent girls in some nursing schools at EL-Minia Governorate, Egypt. J Am Sci, 7: 223
10. N. Mahvash, A. Eidy, and K. Mehdi. (2012). The effect of physical activity on primary dysmenorrhea of female university students. World applied sciences journal, 17(10):1246-1255.
11. Evans Paul Kwame Ameade, Anthony Amalba, Baba Sulemana Mohammed. (2018). Prevalence of dysmenorrhea among University students in Northern Ghana; its impact and management practice. BMC Women's Health, 18:39
12. N. Mahvash, A. Eidy, and K. Mehdi. (2012). The effect of physical activity on primary dysmenorrhea of female university students. World applied sciences journal, 17(10): 1246-1255.
13. Mario I. Ortiz. (2010). Primary dysmenorrhea among Mexican university students: prevalence, impact and treatment. Eur J Obstet Gynecol Reprod Biol, 152(1): 73-7
14. CF Chia, Joyce HY Lai, PK Cheung, LT Kwong, Fiona PM Lau, KH Leung, MT Leung, Francis CH Wong, SF Ng. (2013). Dysmenorrhea among Hong Kong university students: prevalence, impact, and management. Hong Kong Med J, 19(3):222-8
15. Nesreen AA Shehata, Ahmed E Arafa, Hamada A Abd El Wahed, Ashraf S Fahim, Gaber K Hussein. (2017). Epidemiology of Dysmenorrhea among University Students in Egypt. Int J Womens Health Wellness, 4:073
16. Sharefah Al-Matouq, Hessah Al-Mutairi, Ohood Al-Mutairi, Fatima Abdulaziz, Dana Al Basri, Mona Al Enzi. (2019). Dysmenorrhea among high school students and its associated factors in Kuwait. BMC Pediatrics, 19(1)