

Dysmenorrhea: Prevalence, Impacts and Coping Mechanisms among Medical Students in South East Nigeria.

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ABSTRACT:

Background: Dysmenorrhea refers to the pain and discomfort associated with the monthly menstrual period in women of child bearing age. It commonly presents as pain or cramps in the lower abdomen in addition to any of the following symptoms; bloating, diarrhea, nausea, waist pain etc. Dysmenorrhea is, reportedly, one of the commonest reasons for gynecological consultations in adolescents and young women. This study was aimed at determining the prevalence, impacts and coping mechanisms for dysmenorrhea.

Methods: This was a descriptive cross-sectional study in which data on prevalence, impacts and coping variables were collected from 110 female clinical medical students at Chukwuemeka Odumegwu Ojukwu University Awka using self-administered questionnaires. Same was analyzed and data presented in frequency tables.

Results: The prevalence of dysmenorrhea was 82.7%. Severe pain was reported by 53.8% of respondents with the pain majorly located in the lower abdomen (91.2%) and causing school absenteeism (69.2%). Combined pharmacologic and non-pharmacologic methods were adopted as coping mechanisms by 69.7% of respondents. Only 19.8% had ever consulted a doctor on account of dysmenorrhea. Family history of dysmenorrhea was significantly associated with prevalence of dysmenorrhea.

Conclusions: Dysmenorrhea is very common among the medical students yet, very few of them seek professional medical assistance. Increased awareness to aid prompt diagnosis and proper management of dysmenorrhea is essential to reduce its impact.

KEYWORDS: dysmenorrhea, prevalence, impacts, coping mechanisms

I. INTRODUCTION

Menstruation is a natural phenomenon that occurs in women of child bearing age monthly once fertilization does not occur, with most experiencing certain degree of pain and discomfort which neither disrupts their routine daily activities nor incapacitates them [1,2]. When these discomforts have significant impacts on their daily activities which could in turn disturb their productivity at home or work place, it is termed dysmenorrhea [1,2,3]. It usually presents as pelvic pain or cramping sensation in the lower abdomen and may be accompanied by other symptoms namely headache, nausea, dizziness, diarrhoea, bloated feeling, fever, vomiting, backache, back pain, breast tenderness, mood swings among others [1,2,4,5,6].

These symptoms are reportedly the most common reasons for gynaecologic consultations among female adolescents and young women [1,2,7,8,9,10]. Dysmenorrhea can be primary or secondary. Primary dysmenorrhea occurs in the presence of a normal ovulatory function without any underlying pelvic pathology commonly seen in young women <25 years, whereas secondary dysmenorrhea is usually associated with an underlying pelvic pathology commonly endometriosis [1,2,6,10,11,12,13]. The prevalence of dysmenorrhea varies significantly among countries ranging between 16% and 91% [1,2,4,12 – 20]. The higher prevalence rates were found in younger women <20 years of age [12].

Up to 20% of women who suffer from dysmenorrhea were unable to carry out their routine daily activities during each menstrual period [21]. Dysmenorrhea remains a significant reason for recurrent short-term school and work absenteeism [4,21]. In spite of

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the common occurrence of dysmenorrhea and the notable impacts on activities of daily living, majority of the women affected neither report the pain nor seek medical attention leading to a situation where it is underdiagnosed and undertreated [22,23,24]. Only about 14% of women seek medical attention for dysmenorrhea [25]. Both pharmacologic and non-pharmacologic methods are employed by women in the relief of dysmenorrhea with varied benefits [2,6,13].

Dysmenorrhea has received the least attention compared to other health problems especially in the developing countries [21]. In spite of dysmenorrhea being a very common gynaecological problem, it remains poorly understood and is rarely taken into consideration when assessing female health and life experiences [26]. Dysmenorrhea is psychologically tasking and exhausting, posing a great challenge on women who experience it [26]. It also poses a significant public health challenge as it affects not only the quality of life of women, but also the national economy due to frequent school absenteeism, lack of concentration in class and reduced productivity in the work place [26,27]. Hence, this study attempted to determine the prevalence, impacts and coping mechanisms relating to dysmenorrhea among clinical medical students in South East Nigeria.

2. MATERIALS AND METHODS

2.1 DESCRIPTION OF STUDY AREA

This study was conducted at the College of Medicine Chukwuemeka Odumegwu Ojukwu University Awka campus, one of the three campuses of Chukwuemeka Odumegwu Ojukwu University, Anambra state.

2.2 STUDY POPULATION

The study population was made up of female clinical medical students (those in 4th, 5th and 6th year of study) of College of medicine, Chukwuemeka Odumegwu Ojukwu University, Awka.

2.3 STUDY DESIGN

This study was a descriptive, cross sectional study that utilized semi-structured interviewer administered questionnaires to obtain information from female clinical medical students of College of Medicine, Chukwuemeka Odumegwu Ojukwu University, Awka between August and September 2022.

2.4 SAMPLE SIZE DETERMINATION

Minimum sample size for the study was determined using the Cochran's formula for estimated population less than 10,000 [28],

$$n_0 = \frac{Z^2 pq}{e^2}$$

Where:

e = desired level of precision (0.05)

p = prevalence of dysmenorrhea (82.2% = 0.822) [29]

q = 1 - p (1 - 0.822 = 0.178)

z = standard normal deviate, 1.96 (at 95% confidence interval)

Therefore,

$$n_0 = \frac{1.96^2 \times 0.822 \times 0.178}{0.05 \times 0.05}$$

$$n_0 = \frac{0.56208755}{0.0025}$$

$$n_0 = 224.8 \text{ (approximately 225)}$$

The estimated population of female clinical medical students is 224, n_0 will be modified using the following equation [28];

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

Where:

n = new adjusted sample size

N = 224

n_0 = 225

n = $\frac{225}{1 + 224/224}$

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n = 112.5

2.5 SAMPLING TECHNIQUE

Stratified sampling technique was utilized to select the respondents, who were first divided into three strata of 4th, 5th and 6th year students. From each stratum (year of study), the respondents were finally selected using a simple random sampling method.

2.6 DATA ENTRY AND ANALYSIS

Data collected were entered and analysed with the aid of the computer software: SPSS version 20 after verification and consistency checks by the investigator. Frequency distribution of all relevant variables was represented in tables for easy appreciation. Relevant means and standard deviations were also calculated and tests of statistical significance carried out using appropriate statistical tests like the chi square test for proportions, with statistical significance set at $p < 0.05$.

2.7 ETHICAL CONSIDERATIONS

Ethical clearance and approval for this study was obtained from the Chukwuemeka Odumegwu Ojukwu University Teaching Hospital (COOUTH) Health Research Ethical Committee. In addition, informed consent was obtained from all the respondents, they were assured of confidentiality and participation was voluntary.

2.8 LIMITATIONS OF THE STUDY

This study depended solely on the self-report of the participants, which could have been tainted with poor recall or exaggeration, with no means of verification.

The study did not differentiate between primary and secondary dysmenorrhea as this could have changed some of the narratives in the discussion.

Pain is a subjective feeling which is difficult to quantify and visual analogue scale which is the best method of this quantification was not used in this study. This allowed the students to guess the feeling of pain which may not fully express or may exaggerate the level of pain.

3. RESULTS

Table I: Sociodemographic Characteristics of Respondents

Variable	Frequency (110)	Percentage
Age in years		
19 – 23	87	79.1
24 – 28	18	16.4
29 – 33	2	1.8
34 – 38	1	0.9
≥39	2	1.8
Mean ± SD	22.58 ± 3.559	
Age at Menarche (years)		
< 11	12	10.9
11 – 14	92	83.6
≥ 15	6	5.5
Mean ± SD	12.15 ± 1.441	
Year of Study		
4 th year	68	61.8
5 th year	34	30.9
6 th year	8	7.3
Marital Status		
Single	107	97.3
Married	3	2.7
Ever had a vaginal delivery?		
Yes	2	1.8
No	108	98.2

The age of the respondents ranged from 19 to 42 years with a mean age of 22.58±3.6(SD) and majority (79.1%) were in the age group 19 to 23 years. The mean age at menarche was 12.15±1.44 with a range of 9 to 17 years.

Table II: Prevalence and History of Dysmenorrhea in Respondents

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Variable	Frequency (110)	Percentage
Do you have a family history of Dysmenorrhea?		
Yes	90	81.8
No	20	18.2
Do you experience Dysmenorrhea?		
Yes	91	82.7
No	19	17.3
How long does it last?		
	Frequency (91)	
Day one	38	41.8
Up to day three	36	39.6
Throughout the menstrual period	17	18.7
Do you experience Dysmenorrhea with every menstrual period?		
Yes	78	85.7
No	13	14.3

There was a family history of dysmenorrhea in over 81% of the participants. The prevalence of dysmenorrhea was 82.7% among the respondents.

Table III: Severity of Dysmenorrhea in Respondents

Variable	Frequency (91)	Percentage
Degree of pain felt on a scale of 1 – 10		
Mild (1 – 3)	13	14.3
Moderate (4 – 6)	29	31.9
Severe (7 – 10)	49	53.8
Ever consulted a doctor for Dysmenorrhea?		
Yes	18	19.8
No	73	80.2
Ever been admitted in a hospital due to Dysmenorrhea?		
Yes	10	11.0
No	81	89.0
In which part of your body do you normally feel the pain?*		
Lower abdomen	83	91.2
Lower back	40	44.0
Generalized body pain	14	15.4
Along the spine	5	5.5
Vagina/Anus	4	4.4
What other symptoms do you experience?*		
Mood swings	39	42.9
Nausea	36	39.6
Vomiting	29	31.9
Headache	38	41.8
Fever	35	38.5
Diarrhoea	22	24.2
Bloating	6	6.6
Anorexia	3	3.3
Hunger/Cravings	3	3.3

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*Multiple responses

Severe pain was reported by 53.8% of respondents, while only 19.8% consulted a doctor on account of dysmenorrhea. Majority (91.2%) of the participants identified the lower abdomen as the commonest location of pain. The respondents identified mood swings (42.9), headache (41.8%), nausea (39.6%), fever (38.5%) as the commonly associated symptoms to dysmenorrhea.

Table IV: Impacts of Dysmenorrhea in Respondents

Variable	Frequency (91)	Percentage
Ever been absent from school & other activities on account of Dysmenorrhea?		
Yes	63	69.2
No	28	30.8
What is the usual duration of absence?		
Day one alone	54	85.7
The whole duration of the period	9	14.3
Do you choose to be absent or the pain compels you?		
I choose to be absent	10	15.9
The pain compels me	53	84.1

Dysmenorrhea accounted for absence in school and other activities in 69.2% of respondents who experience it, with the absence lasting for only one day in majority (85.7) of them.

Table V: Coping Mechanisms for Dysmenorrhea in Respondents

Variable	Frequency (91)	Percentage
Immediate action at the onset of pain		
Consult a doctor	1	1.1
Self-care	89	97.8
Do nothing	1	1.1
What self-care method do you apply?		
Pharmacologic method	10	11.2
Non-Pharmacologic methods	17	19.1
Both methods	62	69.7
Commonly used Drugs for Dysmenorrhea*		
Analgesics (Aspirin, Ibuprofen etc.)	71	80.0
Combined oral contraceptive pills	0	0.0
Herbal concoctions	1	1.1
Other unnamed drugs	1	1.1
Who prescribes the drugs?		
Self	71	97.3
Doctor/Health care provider	2	2.7
Commonly used non-pharmacologic methods for Dysmenorrhea*		
Use of heat packs	30	33.7
Exercise	20	22.5
Lying down	74	83.1
Drinking hot water/fluid	48	54.0
Taking hot bath	30	33.7
Massage	32	36.0
Do you avoid any food		

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during your menstrual periods?		
Yes	67	73.6
No	24	26.4
If yes, which foods do you avoid?	Frequency (67)	
Sugary foods	45	67.2
Spicy foods	9	13.4
Raw/uncooked foods	8	11.9
Salty foods	5	7.5
Does avoiding this food alleviate your symptoms?		
Yes, very well	60	89.6
No, I just avoid it	7	10.4

*Multiple responses

In the 91 students who reported dysmenorrhea, self-care was the usual response to the onset of dysmenorrhea in 97.8%, with 69.7% employing both pharmacologic and non-pharmacologic methods. Analgesics (80%) and lying down (83.1%) were the commonly employed coping mechanism for dysmenorrhea. Most (73.6%) avoid certain foods during their periods especially sugary foods (67.2%), with enhanced alleviation of dysmenorrhea symptoms in 89.6% of respondents.

Table VI: Association of some characteristics of respondents with presence of Dysmenorrhea

Variable	Yes (%)	No (%)	X ²	p-value
Family history of Dysmenorrhea				
Yes	80 (88.9)	10 (11.1)	10.887	0.001*
No	11 (55.0)	9 (45.0)		
Age at menarche				
< 11	11 (91.7)	1 (8.3)	4.353	0.077
11 – 14	77 (83.7)	15 (16.3)		
≥ 15	3 (50.0)	3 (50.0)		
Age in years				
≤ 25	82 (82.8)	17 (17.2)	0.000	1.000
>25	9 (81.8)	2 (18.2)		

*Statistically significant

There was a statistically significant association between family history of dysmenorrhea and prevalence of dysmenorrhea.

Table VII: Association of some characteristics of respondents with Severity of Dysmenorrhea

Variable	Mild (%)	Moderate (%)	Severe (%)	X ²	p-value
Family history of Dysmenorrhea					
Yes	12 (15.0)	26 (32.5)	42 (52.5)	0.396	0.909
No	1 (9.1)	3 (27.3)	7 (63.6)		
Ever consulted a doctor					
Yes	0 (0.0)	1 (5.6)	17 (94.4)		

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No	13 (17.8)	28 (38.4)	32 (43.8)	14.951	0.000*
Absent from school					
Yes	3 (4.8)	17 (27.0)	43 (68.3)		
No	10 (35.7)	12 (42.9)	6 (21.4)	21.884	0.000*

*Statistically significant

There was a statistically significant relationship between consulting a doctor and being absent from school and other activities on account of dysmenorrhea and severity of dysmenorrhea.

4. DISCUSSION

This study assessed the prevalence of dysmenorrhea and its associated symptoms, severity and coping mechanisms among female medical students.

This study showed that the prevalence of dysmenorrhea was 82.7% which is comparable to reported values (16% to 91%) in various developed and developing nations of the world [1,2,4,12 – 20, 29]. These variations could be attributed to a lack of uniform standard for the definition and measurement of dysmenorrhea, as well as the sample population for each study. The associated symptoms experienced by the respondents who suffer from dysmenorrhea include mood swings (42.9), headache (41.8%), nausea (39.6%), fever (38.5), vomiting (31.9%), depression (27.5%) among others. This showed some similarities with findings in previous studies [1.2.3.4.5.6].

Dysmenorrhea lasted for just the day one of the menstrual period in 41.8%, which is similar to a previous finding [6]. It, however, lasted up to three days in 39.6% and throughout the period in 18.7%. This implies that the day one or few hours after onset of the menstrual period is critical in the management of dysmenorrhea. Over three quarters (85.7%) of respondents that had dysmenorrhea experience it with every menstrual period. This contrasts with a previous study where 45.6% of women experience dysmenorrhea with each menstruation [6].

The pain intensity reported by participants who had dysmenorrhea were, mild (14.3%), moderate (31.9%) and severe (53.8%). Previous studies revealed that severe intensity of dysmenorrhea pain ranged from 0.9% to 59.8% [2,6,9]. The location of the pain was mainly lower abdomen (91.2%) and lower back (44.0%) in this study which is similar to findings in previous studies [6].

A very small proportion (19.8%) of those that had dysmenorrhea had ever consulted a doctor on account of it. This very low consultation of health care practitioners has been reported by other studies [1,2,10,25,30]. This could be due to perception of the condition as a natural phenomenon that does not necessitate a doctor's consultation or as a result of shyness of the young women.

Approximately 69% of participants that suffer dysmenorrhea reported absence from school and other activities on account of the effect of the dysmenorrhea. School absenteeism linked with dysmenorrhea has been reported in other studies [6,21,31].

Self-care was the initial response in 97.8% of students that have dysmenorrhea with 69.7% of them utilizing a combination of both pharmacologic and non-pharmacologic methods to relieve the symptoms. This finding is comparable to a previous study [6]. The commonest drug used for the management of moderate to severe dysmenorrhea in the respondents was analgesics, mainly non-steroidal anti-inflammatory agents (80%), which is as found in previous studies [1,6]. A large proportion (97.3%) of the participants self-prescribe these medications as majority of them do not seek professional advice as found in previous studies [1,2,10,25,30]. Just 1.1% resorted to herbal concoction which contrasts greatly with a study done in Saudi Arabia where 69.1% sought relief with herbal concoctions [2]. Lying down (83.1%), drinking hot fluids (54%), massage (36%), use of heat packs (33.7) among others were the commonly employed non-pharmacologic coping mechanisms in this study. These have been similarly reported in the literature [6]. This study revealed that 73.6% of respondents who experience dysmenorrhea avoided certain foods during their menstruation. Majority (67.2%) of them avoided foods with high sugar content. This could be attributed to the fact that high sugar consumption worsens menstrual pain as corroborated by previous studies [21]. A great proportion of the respondents (89.6%) affirmed that avoiding the food actually alleviated their symptoms.

Family history of dysmenorrhea was found to be statistically significantly associated with prevalence of dysmenorrhea ($X^2 = 10.887$; p -value = 0.001) in this study, as also observed in previous studies [1,21,32,33]. This could be due to socially learned behaviour from older female relatives or a possible genetic susceptibility. No statistically significant association was observed between age at menarche and prevalence of dysmenorrhea as reported in previous studies [1]. Consulting a doctor and being

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absent from school had a statistically significant association with severity of dysmenorrhea. This is expected as severe intensity of menstrual pain will often require medical attention as well as result in absenteeism from school and other activities.

5. CONCLUSION

Dysmenorrhea is a high burden health problem in adolescents and young women of child bearing age as shown in this study. This leads to school absenteeism and varying degrees of pain and discomfort. It is essential that awareness on this subject is created so as to optimize adequate diagnosis and management of same thereby reducing the impact of dysmenorrhea.

DECLARATION OF CONFLICTING INTERESTS

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REFERENCES

- 1) Fernández-Martínez E, Onieva-Zafra M. D., Fernández-Parra ML. Lifestyle and prevalence of Dysmenorrhea among Spanish Female University students. *PLoS ONE* 2018, 13(8): 1894
- 2) Mohamed A. A. Dysmenorrhea, associated symptoms, and management among students at King Khalid University, Saudi Arabia: An exploratory study. *Journal of Family Medicine and Primary Care*, 2018; 7(4): 769 – 774.
- 3) Dysmenorrhea: Painful Periods [Internet]. www.acog.org. Available from: <https://www.acog.org/womens-health/faqs/dysmenorrhea-painful-periods#:~:text=Pain%20associated%20with%20menstruation%20is>[Accessed 2022 Apr 28]
- 4) Mesela T. T. Ayalew H. G., Syoum A. T. and Antehneh T. A. Impact of Dysmenorrhea on Academic Performance Among Haramaya University Undergraduate Regular Students, Eastern Ethiopia. *Front. Reprod. Health*, 2022, 2022; 4:
- 5) Aziato L, Dedey F, Clegg-Lampsey J. N. The experience of dysmenorrhoea among Ghanaian senior high and university students: Pain characteristics and effects. *Reprod Health* 2014; 11:58
- 6) Sima R-M, Sulea M, Radosa J, C., Findeklee S, Hamoud BH, Popescu M, Gorecki GP, Bobircă A, Bobirca F, Cirstoveanu C, Ples L. The Prevalence, Management and Impact of Dysmenorrhea on Medical Students' Lives—A Multicenter Study. *Healthcare*. 2022; 10(1):157.
- 7) Aktas D. Prevalence and Factors Affecting Dysmenorrhea in Female University Students: Effect on General Comfort Level. *Pain Manag Nurs*. 2015; 16: 534 – 543.
- 8) Potur D. C., Bilgin N. C., Kormurcu N. Prevalence of Dysmenorrhea in University Students in Turkey: Effect on daily activities and evaluation of different pain management and methods. *Pain Manag Nurse*. *American Society for Pain Management Nursing*; 2014; 15: 768 – 777.
- 9) De Sanctis V, Soliman A. T., Elsedfy H, Soliman N. A, Soliman R, El Kholy M. Dysmenorrhea in Adolescents and young Adults: a review in different country. *Acta Biomed*. 2017; 87: 233 – 246.
- 10) Farotimi A. A, Esike J, Nwozichi C. U, Ojadiran T. D, Ojewole F. O. Knowledge, attitude, and healthcare-seeking behavior towards dysmenorrhea among female students of a private university in Ogun State, Nigeria. *J Basic Clin Reprod Sci*. 2015; 4: 33–8.
- 11) Chang S-F, Chuang M. Factors that affect self-care behavior of female high school students with dysmenorrhea: a cluster sampling study. *Int. J Nurs Pract*. 2012; 18: 117 – 24.
- 12) Armour M, Parry K , Manohar N , Holmes K, Ferfolja T, Curry C, et al. The prevalence and academic impact of dysmenorrhea in 21,573 young women: a systematic review and meta-analysis. *J Womens Health* 2019; 28: 1161–71.
- 13) Osayande A. S, Mehulic S. Diagnosis and initial management of dysmenorrhea. *Am Fam Physician* 2014; 89: 341–6
- 14) Azagew AW, Kassie DG, Walle TA. Prevalence of primary dysmenorrhea, its intensity, impact and associated factors among female students' at Gondar town preparatory school, Northwest Ethiopia. *BMC Womens Health*. 2020; 20:5.
- 15) 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.
- 16) Mohammed H, Hassen N, Musa A. Dysmenorrhea and associated factors among secondary school students in East Hararghe zone, Eastern Ethiopia. *East Afr J Health Biomed Sci*. 2019; 3:39–48.
- 17) Subasinghe A. K, Happo L, Jayasinghe Y. L, Garland S. M, Gorelik A, Wark J. D. Prevalence and Severity of Dysmenorrhea, and Management Options reported by young Australian women. *Aust Fam Physician*. 2016; 45: 829 – 834.
- 18) Habibi N, Huang M. S. L, Gan W. Y, Zulida R, Safavi S. M. Prevalence of Primary Dysmenorrhea and Factors Associated with its Intensity Among Undergraduate Students: A Cross-Sectional Study. *Pain Manag Nurs*. 2015; 16: 855 – 861.

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- 19) Yesuf T. A, Eshete N. A, Sisay E. A. Dysmenorrhea among university health science students, Northern Ethiopia: impact and associated factors. *Int J Reprod Med* 2018; 2018: 1–5.
- 20) Zebitay A. G, Verit F. F, Sakar M. N, Keskin S, Cetin O, Ulusoy A. I. Importance of cervical length in dysmenorrhoea aetiology. *J. Obstet. Gynaecol.* 2016; 36: 540–543.
- 21) Tadese M, Kassa A, Muluneh A. A, et al. Prevalence of dysmenorrhoea, associated risk factors and its relationship with academic performance among graduating female university students in Ethiopia: a cross-sectional study. *BMJ Open.* 2021;11(3): 043814.
- 22) Sanctis D, Soliman A, Bernasconi S. Definition and self-reported pain intensity in adolescents with dysmenorrhea: a debate report. *J Pediatr & Child Health Care.* 2016; 1: 1006.
- 23) Sidi I, Hounkpatin B, Obossou A. Primary dysmenorrhea in the schools of Parakou: prevalence, impact and therapeutic approach. *Gynecol Obstet.* 2016; 6: 376.
- 24) Schoep M. E, Nieboer T. E, Zanden M. V. D, Braat D. D. M, Nap A. W. The impact of menstrual symptoms on everyday life: A survey among 42,879 women. *Am. J. Obstet. Gynecol.* 2019; 220.
- 25) Omidvar S, Bakouei F, Amiri F. N, Begum K. Primary dysmenorrhea and menstrual symptoms in Indian female students: Prevalence, impact and management. *Glob J Health Sci.* 2016; 8: 53632.
- 26) Beal S. J, Dorn L. D, Sucharew H. J, Sontag-Padilla L, Pabst S, Hillman J. Characterizing the Longitudinal Relations Between Depressive and Menstrual Symptoms in Adolescent Girls. *Psychosomatic Medicine.* 2014 Sep; 76(7): 547–54.
- 27) Sekoni O, Femi-Agboola D, Goodman O. Dysmenorrhea and its effects on school absenteeism and school activities among adolescents in selected secondary schools in Ibadan, Nigeria. *Nigerian Medical Journal.* 2017; 58(4):143.
- 28) Glen, S, Sample Size in Statistics (How to find it): Excel, Cochran's Formula, General tips, 2021. Retrieved June 18, 2021, from https://www.statisticshowto.com/probability-and-statistics/find-sample-size/#google_vignette
- 29) Ezebialu I, Ezenyeaku C, Umeobika J. Prevalence of dysmenorrhea and its contribution to school Absenteeism among Nigerian undergraduate students. *Ann Health Res.* 2021; 7 :59–66.
- 30) De Sanctis V, Soliman A, Belasconi S, Bianchin L, Bona G, Bozzola M, et al. Primary Dysmenorrhea in Adolescents: Prevalence, Impact and Recent Knowledge. *Pediatr Endocrinol Rev.* 2015; 13: 512 – 20.
- 31) Fernández-Martínez E, Onieva-Zafra MD, Abreu-Sánchez A, et al. Absenteeism during menstruation among nursing students in Spain. *Int J Environ Res Public Health.* 2020; 17: 53.
- 32) Farahmand M, Rahmezani T. F, Khalili D, Amin G, Negarandeh R. Factors associated with the severity of premenstrual syndrome among Iranian college students. *J Obstet Gynecol Res.* 2017; 43: 1726 – 1731.
- 33) Gebeyehu M. B, Mekuria A. B, Tefera Y. G, 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; 2017: 1–8.