ScieniQ Publishers

Japan Journal of Medical Science

Research Article

Prevalence and Patterns of dysmenorrhea among students of Tertiary Institutions in Delta State

Eniojukan Joshua F.[1], Owonaro Peter A .[1], Arute John E.[2] and Uweru Benedicta C.[2]

[1]Faculty of Pharmacy, Niger Delta University, Wilberforce Island, Bayelsa State, Nigeria
[2]Faculty of Pharmacy, Delta State University, Abraka, Delta State, Nigeria

Corresponding author
Eniojukan, Joshua F, Faculty of Pharmacy, Niger Delta University, Wilberforce Island, Bayelsa State, Nigeria

Received: 05 June 2021
Accepted : 10 June 2021
Published: 25 June 2021

Abstract

Background: Dysmenorrhea, or painful menstruation is a common, and often debilitating, gynecological condition that affects between majority of menstruating women.

Objectives: This study investigated the prevalence and patterns of dysmenorrhea among young women of child-bearing age in three tertiary institutions in Delta State, Nigeria.

Methods: A cross-sectional design was adopted. Self-designed pre-tested questionnaires addressing the study objectives were administered respondents by convenient sampling. Institutional approvals and respondents' consents were obtained. Data were analyzed with SPSS Version 24.

Methods: Most respondents (84.9%) were aged 16-27 years and single (84.3%); 78.1% had never been pregnant. Prevalence of dysmenorrhea was 25%; over 38% always had menstrual pain which was very severe in 28% of respondents. Menstrual flow was regular in 69.5%; once a month in 93%; 46% and 49% menstruated for 3 and 5 days respectively; the flow was moderate in 71% of respondents; 34.7% and 7% of respondents respectively ascribed menstrual irregularities to Nature and Pregnancy. Occurrence of dysmenorrhea was correlated with Age, Number of pregnancies and Age at menarche; history of sexually transmitted infection was not correlated with occurrence of dysmenorrhea. Severity of menstrual pain was correlated with duration of menstrual flow and self-medication usage; but regularity, frequency and volume of menstrual flow were not correlated with severity.

Conclusion: Prevalence of dysmenorrhea was relatively low and patterns of menstrual flow were within normal expectations. However, the is further need to educate this population on the menstrual cycle particularly the associated risk factors.

Keywords: Dysmenorrhea, Patterns, Prevalence, Delta State, South Nigeria

Introduction

Dysmenorrhea is a common chronic pelvic pain syndrome with a major impact on women's quality of life, work productivity, and health-care utilization; it is the leading cause of recurrent short-term school absence in adolescent girls. Dysmenorrhea is a significant symptom for a large proportion of women of reproductive age; however, severe pain limiting daily activities is found to be less common [1-5].

Wide variations in the prevalence of dysmenorrhea from global studies have been reported ranging between 28% and 90% [1, 5-8]. The prevalence of dysmenorrhea varies greatly across different populations and ethnic groups [9].

Adolescent girls are thought to have the tendency of a higher prevalence of primary dysmenorrhea than older women as primary dysmenorrhea improves with age. Further, in developing countries, it has been discovered that 25–50% of adult women and about 75% of adolescents experienced pain with menstruation, with 5–20% reporting severe dysmenorrhea or pain that prevents them from participating in their usual activities [10]. Age <30 years, low BMI, smoking, earlier menarche (<12 years), longer cycles, heavy menstrual flow, nulliparity, premenstrual syndrome, sterilization, clinically suspected pelvic inflammatory disease, sexual abuse, and psychological symptoms were found to be associated with increased risk of dysmenorrhea [2,11,12]. This study investigated the prevalence, patterns and correlates of dysmenorrhea among young women of child-bearing age

in three tertiary institutions in Delta State, South-South Nigeria.

Method

The study was a prospective cross-sectional survey to assess the prevalence and patterns of dysmenorrhea among young women of child-bearing age in three (3) tertiary institutions in Delta –State: College of Education, Agbor (COE), Delta State University, Abraka Campus (DELSU) and Delta-State School of Health Technology Ofuoma (SHT). Well-structured pre-tested questionnaires addressing the study objectives were used; the sample size was determined using the formula by Fisher and colleagues [13]. Institutional approvals and consents of respondents were obtained. Data were analyzed with SPSS version 17.

Results/Data

Demographic Data of Respondents

The respondents in the three institutions were predominantly in the 16 – 27 year- age group (COE, 88.6%; DELSU, 94%; SHT, 72%); the mean ages of respondents from COE, DELSU and SHT were respectively 22.47 ± 12.263, 20.30±3.045 and 24.15 ± 7.616; 84%, 90% and 79% respectively of respondents in COE, DELSU and SHT were single; 80% of the married respondents from COE had been married for 1-5years; all married respondents from DELSU had been married for 1-10 years; 86.7% of married respondents from SHT had been married for 6-15 years; over 70% of all respondents had not experienced pregnancy or miscarriage; majority (over 70%) of all respondents had AA genotype and over 60% had blood group O. See Table 1 for details.

Table 1: Socio-demographic Characteristics of Respondents

VARIABLES	COE			DELSU			SHT		
	Freq.	%	Mean ± SD	Freq.	%	Mean ± SD	Freq.	%	Mean ± SD
Age (yrs)									
10-15	2	1.3	22.47 ± 12.263	3	2.0	20.30±3.045	3	3.0	24.15 ± 7.616
16-21	74	49.3		81	54.0		33	33.0	
22-27	59	39.3		60	40.0		39	39.0	
28-33	12	8.1		8	4.0		7	7.0	
34-39	3	2.0		0	0		7	7.0	
40-45	0	0		0	0		3	3.0	
>45	0	0		0	0		8	8.0	
Total	150	100		150	100		100	100	
Marital status									
Single	126	84.0		135	90.0		79	79.0	
Married	24	16.0		15	10.0		21	21.0	
Total	150	100		150	100		100	100	
Duration of marriage									
1-5yrs	24	80.0		18	75.0		3	14.3	
6-10	3	10.0		6	25.0		7	33.3	
11-15	3	10.0		0	0		11	53.4	
Total	150	100		150	100		100	100	
No. of pregnancies									
None	119	79.3	2.66 ± 1.340	123	82.0	3.64 ± 0.771	73	73.0	1.63 ± 1.555
1-3	26	17.3		27	18.0		19	19.0	
4-6	3	2.0		0	0		4	4.0	
7-9	2	1.3		0	0		4	4.0	
Total	150	100		150	100		100	100	
No. of miscarriages/ abortions									
None	131	87.3		132	88.0		93	93.0	
1-3	9	6.0		3	2.0		3	3.0	
4-6	8	5.3		3	2.0		4	4.0	

7-9	2	1.3		12	8.0		0	0	
Total	150	100		150	100		100	100	
Genotype									
AA	126	84.0		129	86.0		77	77.0	
AS	15	10.0		15	10.0		20	20.0	
SS	0	0		3	2.0		3	3.0	
No response	9	6.0		3	2.0		0	0	
Total	150	100		150	100		100	100	
Blood group									
O	94	62.7		114	76.0		76	76.0	
A	24	16.0		9	6.0		21	21.0	
AB	6	4.0		15	10.0		3	3.0	
B	14	9.3		9	6.0		0	0	
No response	12	8.0		3	2,0		0	0	
Total	150	100		150	100		100	100	

Prevalence of Dysmenorrhea

The prevalence of dysmenorrhea in COE, DELSU and SHT was 28%, 24% and 22% respectively (mean = 25%). Regarding frequency of pains, 44.7%, 42.9% and 38.5% respectively of respondents from COE, DELSU and SHT Always had pains; over 50% of respondents Sometimes had pains. Table 2

Table 2: Prevalence of Cramps among Respondents

VARIABLES	COE		DELSU		SHT		Mean incidence (%)
	Freq.	%	Freq.	%	Freq.	%	
Occurrence/ incidence of menstrual pain							
Yes	42	28	36	24	22	22	33.33(25.0)
No	108	72	114	76	78	78	100(75.0)
Total	150	100	150	100	100	100	
Frequency of pains							
Always	67	44.7	64	42.9	38	38.5	56.33(42.4)
Sometimes	83	55.3	86	57.1	62	61.5	77.0 (57.6)
Total	150	100	150	100	100	100	

Patterns of Dysmenorrhea among Respondents

In terms of severity of dysmenorrhea, 28%, 32.3% and 41% of all respondents reported to experience Very Severe, Severe and Not Severe pains respectively. See Figure 1 for details.

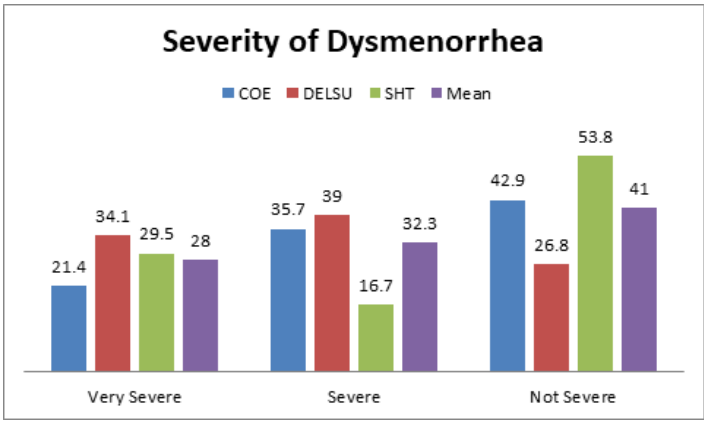

Figure 1. Severity of Dysmenorrhea among Respondents

Pattern and Perception of Menstruation/menstrual cycle among Respondents

Majority (69.5%) of respondents in the three institutions Always had Regular monthly menstrual flow; 93% menstruated once a month; 46% and 49% of respondents respectively menstruated for 3 and 5 days. Regarding volume of menstrual flow, 71% claimed to experience moderate flow. On their perception of causes of irregular menstruation, 34.7% and 7% of respondents respectively ascribed this to Nature and Pregnancy. Table 3

Table 3: Patterns and Perception of Menstruation among Respondents

VARIABLES	COE		DELSU		SHT		Mean (%)
	Freq.	%	Freq	%	Freq	%	
Regularity of menstrual cycle							
Always	99	66.0	114	76.0	65	65.0	92.67(69.5)
Sometimes	42	28.0	33	22.0	26	26.0	33.67(25.0)
Never	3	2.0	3	2.0	9	9.0	5.0(3.7)
No response	6	4.0	0	0	0	0	2.0(1.5)
Total	150	100	150	100	100	100	
How often do you menstruate?							
Once every month	141	94.0	135	90.0	96	96.0	124.0(93.0)
Twice every month	6	4.0	6	4.0	4	4.0	5.33(4.0)
No response	3	2.0	9	6.0	0	0	4.0(3.0)
Total	150	100	150	100	100	100	
Average days of menstruation							
3 days	73	48.7	54	36.0	57	57.0	61.33(46.0)
5 days	60	40.0	96	64.0	40	40.0	65.33(49.0)
7 days	11	7.3	0	0	3	3.0	4.67(3.5)
No response	6	4.0	0	0	0	0	2.0 (1.5)
Total	150	100	150	100	100	100	
Volume of menstrual flow							
Heavy	28	18.7	30	20.0	19	19.0	25.67(19.3)
Moderate	107	71.3	102	68.0	75	75.0	94.67(71.0)
Light	12	8.0	12	8.0	6	6.0	10.0(7.5)
No response	3	2.0	6	4.0	0	0	3.0 (2.3)
Total	150	100	150	100	100	100	
Perception of cause of irregular menstruation.							
Natural	53	35.3	51	34.0	35	35.0	35.0
Pregnancy	9	6.0	6	4.0	13	13.0	13.0
Use of contraceptives	6	4.0	21	14.0	3	3.0	3.0
Infections	18	12.0	9	6.0	0	0	0
No response	64	42.7	63	42.0	49	49.0	49.0
Total	150	100	150	100	100	100	100

Relationships

Socio demographic/ personal factors and occurrence of dysmenorrhea

Chi square analysis showed correlations between Age, Number of pregnancies and Age at menarche and occurrence of dysmenorrhea among all respondents in the three institutions. Age at first sexual intercourse was found to correlate with occurrence of dysmenorrhea among respondents from DELSU and SHT only. Blood group was found to correlate with occurrence of dysmenorrhea among respondents from COE and DELSU only. History of sexual abuse and Genotype were found to correlate with occurrence of dysmenorrhea among respondents from DELSU only. History of sexually transmitted infection was not correlated with occurrence of dysmenorrhea among all respondents. Table 4

Table 4: Relationship between Socio demographic/ personal factors and occurrence of dysmenorrhea

Variables	History of cramps/pains during period		
	COE	DELSU	SHT
	Chi- square/P-Value		
Age (years)	$X^2 = 21.411$ df = 4 P ≤ 0.001	$X^2 = 15.467$ df = 3 P = 0.001	$X^2 = 17.716$ df = 6 P = 0.007
No of pregnancies	$X^2 = 6.784$ df = 3 P = 0.079	$X^2 = 11.041$ df = 2 P = 0.004	$X^2 = 17.642$ df = 3 P = 0.001
Age 1st sex intercourse	$X^2 = 5.373$ df = 3 P = 0.146	$X^2 = 5.972$ df = 2 P = 0.050	$X^2 = 16.909$ df = 3 P = 0.001
History of sexual abuse	$X^2 = 0.011$ df = 1 P = 0.916	$X^2 = 14.754$ df =2 P = 0.001	$X^2 = 2.453$ df = 1 P = 0.117
Age at menarche	$X^2 = 7.020$ df = 3 P = 0.071	$X^2 = 16.647$ df = 3 P = 0.001	$X^2 = 11.734$ df = 3 P = 0.008
History of sexually transmitted infection	$X^2 = 0.004$ df =1 P = 0.950	$X^2 = 2.887$ df =2 P = 0.236	$X^2 = 0.226$ df =1 P = 0.634
Genotype	$X^2 = 0.492$ df =1 P = 0.483	$X^2 = 14.754$ df =2 P = 0.001	$X^2 = 3.101$ df =2 P = 0.212
Blood group	$X^2 = 24.306$ df = 3 P ≤ 0.001	$X^2 = 16.647$ df = 3 P = 0.001	$X^2 = 1.414$ df = 2 P =0.493

Factors influencing severity of menstrual pain

Chi square analysis revealed correlations between severity of menstrual pain and duration of menstrual flow and self-medication usage among all respondents. Regularity and frequency of menstrual and volume of menstrual flow were not correlated with severity among respondents from two institutions. See Table 5

Table 5: Factors influencing severity of menstrual pain

Variable	Severity of cramps/pains during period		
	COE	DELSU	SHT
	Chi- square/P-Value		
Regularity of periods	$X^2 = 7.328$ df = 4 P = 0.120	$X^2 = 7.328$ df = 4 P = 0.120	$X^2 = 14.245$ df = 4 P = 0.007

How often do you menstruate	$X^2 = 22.770$ df = 4 $P \leq 0.001$	$X^2 = 10.660$ df = 4 P = 0.031	$X^2 = 11.848$ df = 4 P = 0.019
Volume of menstrual flow	$X^2 = 8.122$ df = 4 P = 0.087	$X^2 = 38.603$ df = 8 $P \leq 0.001$	$X^2 = 8.845$ df = 4 P = 0.065
Self-medication usage	$X^2 = 23.380$ df = 10 P = 0.009	$X^2 = 16.491$ df = 8 P = 0.036	$X^2 = 16.491$ df = 8 P = 0.036

Discussion

Demographics

Of all the respondents, over 70% were adolescents aged between 16 and 27 years (mean = 20 – 24 years), a sexually-active age bracket. It is reported that adolescent girls tended to have higher prevalence of primary dysmenorrhea than older women. Indeed, age <30 years was found to correlate with increased risk of dysmenorrhea [12]. A study reported maximum prevalence at 20 to 24 years [14]. Their age bracket and extent of sexual activities are expected to impact on dysmenorrhea prevalence and patterns in this population. In developing countries, it was found that 25–50% of adult women and about 75% of adolescents experienced pain with menstruation, with 5–20% reporting severe dysmenorrhea that often prevented them from participating in their usual activities [10]. Dysmenorrhea is an important health problem that adversely affects the daily activities and quality of life of adolescent women. In adolescents the prevalence of primary dysmenorrhea varies between 16% and 93%, with severe pain perceived in 2% to 29% of the studied girls. [2].

The majority (Average = 84.33%) of respondents in this study were still single whilst majority (Average = 88.9%) of the married respondents had been married for 1 – 15 years. Over 70% of all respondents had never been pregnant. These characteristics are also expected to impact on the prevalence and patterns of dysmenorrhea in this population. Sexual activity and nulliparity have been reported to be associated with increased risk of dysmenorrhea [12]. The prevalence and severity of dysmenorrhea have been demonstrated to decrease in parous women in both Western and Asian population [14-17]. This phenomenon has been explained in terms of the destruction of adrenergic sensory nerve endings during parturition which no longer regenerate back to their pre-pregnancy levels, hence the lesser intensity or complete disappearance of the pain of dysmenorrhea [16,18]. It is also significant to note that over 70% of all respondents had never experienced miscarriage. It is reported that the network of adrenergic nerves and noradrenalin concentrations remain unchanged in patients where the pregnancy had terminated in miscarriage or abortion [16].

In this study, the majority of respondents had AA genotype and blood group O; about a fifth had blood group A. Various reports abound in literature on impact of blood grouping on endometriosis in particular which is a major cause of secondary dysmenorrhea [19]. In a study among Caucasian women in France, it was found that Rh-negative women were twice as likely to develop endometriosis but there was no significant difference in ABO group distribution between patients and controls [19]. A Turkish study, on the other hand reported a higher proportion of Rh-positive women among women with endometriosis, as compared to healthy women [20]. Further, studies conducted in Yale and Korea showed a highly increased risk of endometriosis in women with blood group A [21,22]. which was not corroborated by studies conducted among Turkish women [20]. These discrepancies are thought to be probably related to variations in the frequencies of blood groups among subpopulations or ethnic groups [23]. The relationships between blood groups and dysmenorrhea among Nigerian women need to be investigated.

Prevalence of Dysmenorrhea

In this study, the prevalence of dysmenorrhea among women in the three institutions ranged from 22% to 28% with a mean value of 25%. This value is unexpectedly low when vied against the backdrop of the socio-demographic data of the respondents; most were aged below 30 years and nulliparous, factors that pre-dispose to dysmenorrhea. A study however reported an insignificant negative relationship between parity and dysmenorrhea when age, smoking and premenstrual symptomatology were taken into account [14]. Therefore, other predisposing factors as well as the possible effects of many modifiable risk factors need to be further investigated in this population.

The prevalence rate reported in this study is very low compared to reported values in other studies conducted in Nigeria such as 62% in Oyo State [24], 58% in Osun State [25], 60–64% in Ile-Ife [26], and 69.8% in Maiduguri [27]. Differences in socio-demographic characteristics and prevalence of risk factors among the populations studied may account for these variations. In similar studies from Turkey, the prevalence of dysmenorrhea was reported to be between 58.2% and 89.5% [6,8].

Globally, wide variations in prevalence of dysmenorrhea have been reported with estimates ranging from 28% to 90% [1, 5-9]. A recent study among students in reported that in adolescents the prevalence of primary dysmenorrhea varied between 16% and 93% [2]. with severe pain perceived in 2% to 29% of the studied girls.

It is now believed that the prevalence of dysmenorrhea varies greatly across different populations and ethnic groups [2,9].
Regarding the frequency of the pains, 42.4% of respondents always had the pains with others sometimes experiencing the pains. Studies globally have reported that dysmenorrhea is a common chronic pelvic pain syndrome affecting women of childbearing potential [28-30].

Severity of Dysmenorrhea among Respondents

Regarding severity of dysmenorrhea, 28% and 32.3% of respondents reported the experienced pains to be very severe and severe respectively. This is higher than the 5 – 20% reported as having severe dysmenorrhea or pain that prevented them from participating in their usual activities [10]. In an earlier study, however, sixty percent of the women studied reported at least one episode of severe pain [11]. In a large population survey in New Zealand, 12% reported discomfort severe enough to necessitate time off work or school and 47% had significant period pain [14] similar to a study that reported 10–12% of respondents having severe dysmenorrhea with incapacitation for 1–3 days each month [31-33].

These variable reports can be explained on the basis that many risk factors are associated with increased severity of dysmenorrhea. These include early age at menarche, long menstrual periods, heavy menstrual flow, smok-

ing, genetics and positive family history [2,3, 11]. The influence of risk factors on severity of dysmenorrhea in this population needs to be further investigated. Most of the respondents in this population reported that the dysmenorrhea was not severe. The limitation here is that symptoms of dysmenorrhea are highly subjective. Thus, the severity might have been under-reported.

Pattern and Perception of Menstruation/menstrual cycle among Respondents

Majority (69.5%) of respondents always had regular monthly menstrual flow occurring once a month (93%) of 3 days duration in 46%- and 5-days duration in 49% of respondents.

Regularity of menstrual cycle is personalized. Generally, the menstrual cycle is counted from the first day of one period to the first day of the next; this is not the same for every woman. It is found that the menstrual flow might occur every 21 to 35 days and last two to seven days. Earlier in life after menstruation begins, long cycles are common but tend to shorten and become more regular with age. Broadly speaking, "normal" is what is normal for the woman [34-36].

Thus, the patterns of menstrual flow reported in this study population may be classified as normal. Regarding the volume of menstrual flow, majority always experienced moderate flow. About a third of respondents ascribed irregularity of menstrual flow to natural occurrence whilst about a tenth ascribed it to pregnancy. A missed period can be an early sign of pregnancy; further, eating and endocrine system disorders, pelvic inflammatory disease, infections, diseases, trauma, certain medications and uterine fibroids have been implicated in irregular menstrual flow [34, 36-40].

Correlations

In this study, Age, Number of pregnancies, Age at first sexual intercourse, Blood group, Age at menarche, and Genotype were correlated with occurrence of dysmenorrhea among respondents. Age, nulliparity, age at menarche, has been correlated with dysmenorrhea [41,11,12,2,30, 42], blood group A has been correlated with occurrence of endometriosis [21,22], age <30 years, low BMI, smoking, earlier menarche (<12 years), longer cycles, heavy menstrual flow, nulliparity, premenstrual syndrome, sterilization, clinically suspected pelvic inflammatory disease, sexual abuse, and psychological symptoms were associated with increased risk of dysmenorrhea [12].

In this study, history of sexual abuse was correlated with occurrence of dysmenorrhea which is at variance with a study conducted in the US which reported that women with versus without any history of sexual had a null or trend towards reduced risk of endometriosis and ovarian cysts, after adjusting for age, marital status, education, race/ethnicity, smoking, gravidity and study site. Conversely, women with any history of sexual were more likely to have fibroids and more notably adhesions compared with women without any abuse history [28]. While sexual and physical abuse are linked with several gynecologic disorders including recurrent vaginal and urinary tract infections as well as sexually transmitted infections (STIs) [43-46]. little is known regarding the effects that abuse has on other common gynecologic disorders [43,47]. Enduring abuse has been hypothesized to suppress the immune system as a result of chronic psychological stress [43], thereby increasing a woman's risk for endometriosis and uterine fibroids [47-49]. Specifically, high percentages of neutrophils as well as low relative numbers of monocytes, activated lymphocytes and natural killer cells have been implicated in the development and/or the progression of endometriosis [48], while various growth factors, cytokines and matrix metalloproteinases are thought to lead to increased uterine fibroid growth [43]. Additionally, stress-induced alterations in reproductive hormones have been posited to increase risk for gynecologic disorders [43].

History of sexually transmitted infection was not correlated with occurrence of dysmenorrhea among all respondents. This contradicts a literature report that Pelvic scarring due to sexually transmitted infections, such as Chlamydia or Gonorrhea predispose to dysmenorrhea [12,50].

Factors influencing severity of menstrual pain

This study showed that duration of menstrual flow and self-medication usage among respondents were correlated with severity of menstrual pain. Duration of menstrual periods has been correlated with severe episodes of dysmenorrhea [2,11]. Medication use has been correlated with dysmenorrhea [42]. However, regularity, frequency and volume of menstrual flow were not correlated with severity of menstrual pain among respondents from two institutions. This contradicts a study that reported a correlation between volume of menstrual flow and length of cycles with increased risk of dysmenorrhea [2,12,14,42, 52].

Conclusion

The following potential risk factors for dysmenorrhea were present in the population studied: Adolescence, Nulliparity, Age at menarche. The prevalence of dysmenorrhea was 25% which is at the lower side of global estimates; about half of the respondents always had the pains which were severe in about a third of the respondents; most of the respondents reported that the dysmenorrhea was not severe. The prevalent pattern is regular moderate monthly flow of 3-5 days duration; their knowledge of causes of menstrual irregularity is shallow. Age, Number of pregnancies, Age at first sexual intercourse, history of sexual abuse, Blood group, Age at menarche, and Genotype were correlated with occurrence of dysmenorrhea among respondents; History of sexually transmitted infection was not correlated with occurrence of dysmenorrhea among all respondents. This study showed that duration of menstrual flow and self-medication usage among respondents were correlated with severity of menstrual pain; however, regularity, frequency and volume of menstrual flow were not correlated with severity of menstrual pain.

This population needs to be further educated on the menstrual cycle, risk factors for dysmenorrhea and the causes of irregular menstrual flow. Further, the confounding factors for dysmenorrhea and irregular menstrual flow among this population are wide open for detailed investigation.

Limitations to the Study

Subjective nature of data

References

1. Jamieson DJ and Steege JF (1996). The prevalence of dysmenorrhea, dyspareunia, pelvic pain, and irritable bowel syndrome in primary care practices. Obstet Gynecol.; 87: 55–58
2. De Sanctis V, Soliman A, Bernasconi S, Bianchin L, Bona G, Bozzola M, Buzi F, De Sanctis C, Tonini G, Rigon F, Perissinotto E (2015). Primary Dysmenorrhea in Adolescents: Prevalence, Impact and Recent Knowledge. Pediatr Endocrinol Rev.; 13: 512-20.
3. Jones AV, Hockley JR, Hyde C, Gorman D, Sredic-Rhodes A, Bilsland J, McMurray G, Furlotte NA, Hu Y, Hinds DA, Cox PJ, Scollen S (2016). Genome-wide association analysis of pain severity in dysmenorrhea identifies association at chromosome 1p13.2, near the nerve growth factor locus. Pain.; 157: 2571-2581.
4. Chen CX, Ofner S, Bakoyannis G, Kwekkeboom KL, Carpenter JS (2017). Symptoms-Based Phenotypes Among Women with Dysmenorrhea: A Latent Class Analysis. West J Nurs Res.: 193945917731778. doi: 10.1177/0193945917731778.
5. Burnett MA, Antao V, Black A, Feldman K, Grenville A, Lea R, et al. (2005). Prevalence of primary dysmenorrhea in Canada. J Obstet

Gynaecol Can.; 27: 765–70.
6. Nur N and Sümer H (2008). Prevalence of dysmenorrhea and related risk factors in adolescents. Surekli Tip Egitimi Dergisi; 7: 27–30.
7. Pitts MK, Ferris JA, Smith AM, Shelley JM, Richters J (2008). Prevalence and correlates of three types of pelvic pain in a nationally representative sample of Australian women. Med J Aust.; 189:138–43.
8. Polat A, CelikH, GuratesB, KayaD, NalbantM, Kavak E, et al. (2009). Prevalence of primary dysmenorrhea in young adult female university students. Arch Gynecol Obstet.; 279: 527–32.
9. Pembe AB and Ndolele NT (2011). Dysmenorrhoea and coping strategies among secondary school adolescents in Ilala District, Tanzania. East Afr J Public Health; 8: 232-6.
10. Harlow SD and Campbell OM (2004). Epidemiology of menstrual disorders in developing countries: a systematic review. BJOG.2004;111: 6–16
11. Harlow SD and Park M (1996). A longitudinal study of risk factors for the occurrence, duration and severity of menstrual cramps in a cohort of college women. Br J Obstet Gynaecol 103: 1134.
12. French L. (2005). Dysmenorrhea. American Family Physician, 71: 285–291.
13. Fisher A.A., Laing J. E., Stoeckel J.E and Townsend J.W (1991). Handbook for Family Planning Operations Research Design 2nd ed. p43. Population Council. New York, USA Available on: www.popcouncil.org
14. Pullon S, Reinken J and Sparrow M (1988). Prevalence of dysmenorrhoea in Wellington women. N Z Med J.; 101: 52-4.
15. Andersch B and Milsom I (1982). An epidemiologic study of young women with dysmenorrhea. Am J Obstet Gynecol, 144: 655-660.
16. Sundell G, Milson I, Andersch B (1990). Factors influencing the prevalence and severity of dysmenorrhea in young women. Br J Obstet Gynaecol. 97: 588–94.
17. Ng TP, Tan NC and Wansaicheong GK (1992). A prevalence study of dysmenorrhoea in female residents aged 15-54 years in Clementi Town, Singapore. Ann Acad Med Singapore; 21: 323-327
18. Golomb LM, Solidum AA, Warren MP (1998). Primary dysmenorrhea and physical activity. . Med Sci Sports Exerc.; 30: 906-9.
19. Borghese Bruno, Mélanie Chartier, Carlos Souza, Pietro Santulli, Marie-Christine Lafay-Pillet, Dominique de Ziegler, and Charles Chapron (2014). ABO and Rhesus Blood Groups and Risk of Endometriosis in a French Caucasian Population of 633 Patients Living in the Same Geographic Area. BioMed Research International, Volume 2014 (2014), Article ID 618964, 6 pages. http://dx.doi.org/10.1155/2014/618964
20. Demir, B. Dilbaz, and Zahran M (2010). "ABO and Rh blood groups distribution in patients with endometriosis. Archives of Gynecology and Obstetrics, 281:373–374.
21. Matalliotakis H, Cakmak A, Goumenou S, Sifakis E, Ziogos, and Arici A, (2009). "ABO and Rh blood groups distribution in patients with endometriosis," Archives of Gynecology and Obstetrics, 280: 917–919.
22. Kim D and Kim T (2010). "Associations of ABO blood groups with various gynecologic diseases," Archives of Gynecology and Obstetrics, 282: 229–230.
23. Tabei SMB, Daliri K and Amini A (2012). "The investigation of ABO and Rh blood groups distribution in patients with endometriosis needs new project design," Archives of Gynecology and Obstetrics, 285: 1487–1488.
24. Busari, AO (2012). Menstrual knowledge and health care behaviour among adolescent girls in rural Nigeria. Int J Appl Sci Technol; 2:149-54.
25. Ogunfowokan AA and Babatunde OA (2010). Management of primary dysmenorrhea by school adolescents in Ile-Ife, Nigeria. J School Nurs; 26: 131-6.
26. Esimai O and Esan GO, (2010). Awareness of menstrual abnormality amongst college students in urban area of Ile-Ife, Osun state, Nigeria. Indian J Community Med 2010; 35: 63-6.
27. Amaza DS, Sambo N, Ziraha JV, Dalori MB, Japhet H, Toyin H (2012). Menstrual pattern among female medical students in University of Maiduguri Nigeria. Br J Med Medical Res; 2: 327-37.
28. Schliep KC, Sunni L. Mumford, Erica B. Johnstone, C. Matthew Peterson, Howard T. Sharp, JosephB. Stanford, ZhenChen, Uba Backonja, Maeve E. Wallace, and Germaine M. Buck Louis (2016). Sexual and physical abuse and gynecologic disorders. Human Reproduction, 31: 1904–1912.
29. Harel Z (2012). Dysmenorrhea in adolescents and young adults: an update on pharmacological treatments and management strategies. Expert Opin Pharmacother. 13: 2157-70. doi: 10.1517/14656566.2012.725045.
30. Bernardi M, Lazzeri L, Perelli F, Reis FM, Petraglia F (2017). Dysmenorrhea and related disorders. F1000Res. 5: 6-1645. doi: 0.12688/f1000research.11682.1. e Collection.
31. Dawood MY (1984). Dysmenorrhea and ibuprofen. Am J Med 77: 87.
32. Dawood MY (1985). Dysmenorrhea. J Reprod Med 30: 154.
33. Dawood MY (1988). Nonsteroidal anti-inflammatory drugs and changing attitudes toward dysmenorrhea. Am J Med 84: 23.
34. American College of Obstetricians and Gynecologists (ACOG). (2017). FAQ: Abnormal uterine bleeding. from http://www.acog.org/Patients/FAQs/Abnormal-Uterine-Bleeding
35. Welt CK (2016). Physiology of the normal menstrual cycle. http://www.uptodate.com/home. Accessed Oct. 6, 2017.
36. Mayo Clinic (2016). Menstrual cycle: What's normal, what's not. http://www.mayoclinic.org/healthy-lifestyle/womens- health/in-depth/menstrual-cycle/art-20047186?pg=1. Accessed Oct 6, 2017.
37. Sweet, MG, Schmidt-Dalton, T A, Weiss PM and Madsen KP (2012). Evaluation and management of abnormal uterine bleeding in premenopausal women. American Family Physician, 85: 35–43.
38. Munro MG, Critchley HO, and Fraser IS (2012). The FIGO systems for nomenclature and classification of causes of abnormal uterine bleeding in the reproductive years: Who needs them? American Journal of Obstetrics and Gynecology, 207: 259–265.
39. Godfrey E M, Folger SG, Jeng G, Jamieson D J, and Curtis KM (2013). Treatment of bleeding irregularities in women with copper-containing IUDs: A systematic review. Contraception, 87: 549–566. Retrieved Oct. 6, 2017, from http://www.contraceptionjournal.org/article/S0010-7824(12)00816-5
40. NIH (2016). What causes menstrual irregularities? National Institute of Child Health & Human Development. http://www.nichd.nih.gov/health/topics/menstruation/conditioninfo/ Pages/causes.aspx.. Accessed Oct 6, 2017.
41. Dawood MY (1987). Dysmenorrhea and prostaglandins. In Gold JJ, Josimovich JB (eds): Gynecologic Endocrinology 405: 4. New York: Plenum Press, 1987.
42. Patel V, Tanksale V, Sahasrabhojanee M, Gupte S, Nevrekar P (2006). The burden and determinants of dysmenorrhoea: a population-based survey of 2262 women in Goa, India. BJOG; 113: 453-63.
43. Campbell JC, (2002). Health consequences of intimate partner violence. Lancet; 359: 1331–1336.
44. Bonomi AE, Anderson ML, Rivara FP, Thompson RS (2007). Health outcomes in women with physical and sexual intimate partner violence exposure. J Womens Health (Larchmt); 16: 987–997.
45. Black MC, Basile KC, Breiding MJ, Smith SG, Walters ML, Merrick MT, Chen J, Stevens MR (2010). The National Intimate Partner and Sexual Violence Survey (NISVS): 2010 Summary Report. Atlanta, GA: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention. http://www.cdc.gov/violenceprevention/pdf/nisvs_report2010-a.pdf
46. Kiely M, El-Mohandes AA, El-Khorazaty MN, Blake SM, Gantz MG (2010). An integrated intervention to reduce intimate partner vio-

lence in pregnancy: a randomized controlled trial. Obstet Gynecol; 115: 273–283.
47. Wise LA, Palmer JR, Rosenberg L (2013). Lifetime abuse victimization and risk of uterine leiomyomata in black women. Am J Obstet Gynecol; 208: 272.e1–272.e13.
48. Tariverdian N, Siedentopf F, Rücke M, Blois SM, Klapp BF, Kentenich H, Arck PC (2009) Intraperitoneal immune cell status in infertile women with and without endometriosis. J Reprod Immunol 2009: 80:80–90.
49. Boynton-Jarrett R, Rich-Edwards JW, Jun HJ, Hibert EN, Wright RJ (2011). Abuse in childhood and risk of uterine leiomyoma: the role of emotional support in biologic resilience. Epidemiology 22: 6–14.
50. American College of Obstetricians and Gynecologists (ACOG). (2016). FAQ: Gonorrhea, chlamydia, and syphilis. Retrieved on Oct 6, 2017, from http://www.acog.org/Patients/FAQs/Gonorrhea-Chlamydia-and-Syphilis
51. Harel Z (2008). Dysmenorrhea in adolescents. Ann N Y Acad Sci. 1135: 185-95. doi: 10.1196/annals.1429.007

Cite this article: Eniojukan Joshua F., Owonaro Peter A ., Arute John E. and Uweru Benedicta C. (2021) Prevalence and Patterns of dysmenorrhea among students of Tertiary Institutions in Delta State. Japan Journal of Medical Science 2: 66-74.