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Primary Dysmenorrhea; Prevalence, Treatment Practices and Impact among High School Students in 2 Secondary Schools in Bafoussam

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Abstract

Background: Primary dysmenorrhea is defined as pelvic pain during menstrual flow in the absence of a pelvic pathology. It is one of the most common gynaecological complaints worldwide and the most common cause of school and work absenteeism among menstruating females. In adolescent students the impact includes reduced attention in class, inability to study at home, school absenteeism among others. Yet these students have to study at the same pace as their peers, raising the concern of whether the problems caused by primary dysmenorrhea have an effect on academic their academic performance. **Aim:** Determine the prevalence, treatment practices and impact of primary dysmenorrhea on the studies of post-pubertal high school students in Bafoussam. **Method:** We conducted a cross-sectional descriptive and analytic study design using a two-stage sampling method; the first stage was by convenience to choose the school, and the second stage was consecutive to recruit the students. Data was collected using a semi-structured pretested self-report and anonymous questionnaire. Analysis was done using software IBM®SPSS statistics version 23 for windows. Categorical variables were summarised in to frequencies and percentages while the comparison of categorical variables was done using a Chi-square test, and a p-value ≤ 0.05 was considered to be statistically significant. **Results:** our sample size was 898 and the mean age of our respondents (±SD) was 17.6 (±1.6) years. The prevalence of primary dysmenorrhea was 71.9%, with 11.6% mild pain, 52.5% moderate pain and 35.9% severe pain on a visual analogue scale. Over 38% did not attempt pain-relieving measures while others took analgesics, traditional preparations, heat packs among others. Among these students, 39% reported school absenteeism due to pain, other impacts were decreased attention in class, inability to study at home during pain and punishment from school authorities for failing to

fulfil certain duties like assignments not done or absenteeism because of pain. Though a greater proportion of students without dysmenorrhea had pass scores than their counterparts, the difference was not statistically significant. **Conclusion:** Given these findings, school officials may benefit from considering dysmenorrhea in the context of improving their school attendance rates and academic performance of their students.

Keywords

Primary Dysmenorrhoea, High School, Students, Impact, Academic Performance

1. Introduction

Background

Primary dysmenorrhea refers to the presence of recurrent, crampy, lower abdominal pain that occurs during menses in the absence of demonstrable disease that could account for these symptoms [1]. It may start within 6 months after menarche because it occurs only during ovulatory cycles, which may not always be evident at menarche. Although it may occur as late as a year after menarche, it is less likely to do so later when it should raise suspicion of secondary dysmenorrhea [2]. The worldwide prevalence varies between 40% to 92% among studies [3]-[11]. The variation in prevalence is likely because the prevalence of primary dysmenorrhea varies with age and parity [12] [13], and the studies were conducted in different age groups. The pain may be limited to mild abdominal discomfort for some women while for others it causes temporal incapacitation, [3] [7] [9] [14] so much that they cannot perform their activities of daily living. The pain starts just a while before menses, at the same time with menses or in the course of menstruation but usually ends before or with menstrual flow and for most people it will last less than 48 hours [3] [8] [14]. In some individuals it is associated with symptoms such as fatigue, vomiting, headache, diarrhoea among others [3] [4] [6] [7] [8] [9]. Some women irrespective of their pain intensity or associated symptom will not seek medical attention or even self-medicate [3] [15] [16]. The reason is that most consider menstrual pain to be a normal aspect of menstrual cycle especially when it runs in the family but for others it is because they don't know any means of treatment. Others attempt a variety of measures to relieve their pain (both pharmacological and non-pharmacological) some of which include bed rest, heat packs, ingestion of analgesics, scarification among others [3] [7] [14] [15] [17] [18]. Studies [5] [7] [15] have consistently shown that less than 15% of women affected by primary dysmenorrhea seek medical attention. Hence they usually get prescription of the treatment (s) they practice from family members (mostly their mothers) and friends [10] [11] [17] [19]. Though some of these treatments prescribed by mothers and friends may be appropriate, they will take them in inappropriate doses and the consequence

will be inappropriate pain relive.

Though much is known on the pathophysiology and management of primary dysmenorrhea, the impact on the life of sufferers is overwhelming for such a manageable condition. The reason for this is mostly lack of knowledge on management and different cultural beliefs on the subject [11] [15] [19].

The reports on characteristics primary dysmenorrhea and its impact on the life of sufferers is similar worldwide the main difference at the level of coping mechanisms in different counties and communities because of the difference in their knowledge on the subject matter and their cultures. For example a study in an Islamic dominant community in Egypt [16], the use of oral contraceptives by unmarried women was culturally unacceptable. Meanwhile in an Australian study [5], over 14% of affected teenagers took oral contraceptives for pain relive. Despite the numerous reports elsewhere on primary dysmenorrhoea there is still none in our setting to the best of our knowledge.

2. Materials and Methods

2.1. Study Design

Our study was an institution based cross-sectional descriptive and analytic study.

2.2. Study Site and Study Population

2.2.1. Study Site

1) Location

The study was conducted in the campus of Government Bilingual Secondary school Bafoussam Cameroon and in Lycée Classique de Bafoussam (GHS Bafoussam). Both schools are found in Bafoussam I municipality in the western region of Cameroon. They are one of the most populated in the region even more so this year with the influx of internally displaced persons from the neighbouring North west Region. The schools are about 2 kilometres apart.

2) Topography

Like many regions of the country the region has a mountainous topography.

3) Population

The city had an urban population of about 347,517 inhabitants (at the 2008 Census) spread on an area of about 402 km^2.

4) Culture and language and Religion

The people in Bafoussam town are a conglomeration of all ethnic troops of the country but the indigenous, generally called the *Bamileke* are the most popular. The most popular official language is the French language followed by English. The indigenous languages (which are very similar) are the most popular of the national languages, these include: the *ngemba*, the *fefe*, and others. However, other national languages are equally spoken here including *houssa*, *foufoude*, *beti*, etc., the main economic activity in the city is trading and agriculture. The people are predominantly Christians and a few are Muslims wile a very small group do not have any religious affiliation.

2.2.2. Study Population

Our study was destined to apply to post pubertal high school girls in Bafoussam Cameroon.

2.3. Study Period

The study took place from February to May 2019, but recruitment of participants took place from the 4th to the 18th of April 2019.

2.4. Eligibility Criteria

2.4.1. Inclusion Criteria

- Any post pubertal female student in the class of lower and upper sixth or premiere and terminale from GBHS Bafoussam or Lycée Classique de Bafoussam present in class on the day of data collection and willing to participate.

2.4.2. Exclusion Criteria

- Decision to withdraw from the study by the participant or her next of kin at any point in time.
- Person with a diagnosed pelvic pathology.
- Improperly filled questionnaires.
- Students with visual disability.
- Premenarchal students.

2.5. Sampling and Sample Size

To select our participants, we did two-stage sampling:

- First stage by convenience sampling. The two schools (GBHS Bafoussam and Lycée Classique de Bafoussam) were chosen by this method because they were Government schools, and had students from all the socio-economic strata of the region and were the most populated.
- The second stage was consecutive. Every female student in the targeted classes present in class on the days of the interview (from the 4th to the 18th of April 2019) and eligible for the study was offered the opportunity to participate.

2.6. Target Population

Our target population was high school female students of Bafoussam town, and our sample was high school female students of GBHS Bafoussam and lycée Classique de Bafoussam. From official records, there were 1841 female students in the target classes of the two schools. 1127 in GBHS Bafoussam and 714 in Lycée Classique de Bafoussam, get classes of both schools. This was equally our target sample size because we anticipated a high non response rate as suggested by the pilot study. Gave out questionnaire to 1722 students, succeeded to collect 1056 questionnaires after cleaning the collected questionnaires 898 were fit to be included in the study. Thus, our sample size (N) was 898.

2.7. Research Instruments

- Our main tool was a well-structured pretested questionnaire in English and French language designed for this purpose. The questionnaire had 4 sections: sociodemographic information, menstrual information, knowledge of students affected by primary dysmenorrhea on treatment and impact on studies.
- We also used data collection guide (a sketch map of the school with the location of the targeted classes) to map the target classes in the school so as to recruit in order.
- We used a laptop PBHEV with windows 10 operating system for data entry and analysis.

2.8. Data Collection Method

After following proper administrative channels, we mapped the locations of all the classes of Premiere, Terminale, lower and upper sixth in GBHS Bafoussam and Premieres and Terminale in Lycée Classique. We went in to each class following an order on our sketch map.

In class we gave a briefing to the students on the research, distributed questionnaires and both parent/guardian consent forms and students consent forms. In English speaking classes we gave questionnaires in English and French speaking classes we gave questionnaires in French language. The students were asked to read and sign the consent forms then fill the questionnaire and bring them back the next day. The next day, we passed in to each class in the same order as the day of distribution to collect the questionnaires. Students who had forgotten were reminded to bring it back the next day. We passed in each class 4 times; 1 time to administer questionnaires, and 3 times for collection. On the day of collection, we distributed brochures to students containing essential knowledge on primary dysmenorrhea and its management. We did not give questionnaires to students who were visually impaired or who refused to take. We also collected blank questionnaires without interrogating the individual about her reason for not filling. (Though the only 2 possible reasons were refusal to consent and not yet menstruating.)

After collection of the questionnaire, they were screened for completeness, those that were complete were given a serial number and included in the analysis. Those that had multiple missing information or lacked crucial information such as presence or absence of dysmenorrhea were excluded. Those that were partially filled but lacked few information not including any crucial information such a presence or absence of dysmenorrhea were included and the missing information was coded in the software as such.

2.9. Data Management

The data was entered using Census and Survey Processing system (CSPro) version 7.2 and Analysis was done using Statistical Package for Social Sciences

(IBM®SPSS statistics) version 23 for windows. Categorical variables were presented as frequencies and proportions while Chi-square test was used to compare proportions of categorical variables, and a p-value < 0.05 was considered to be statistically significant. The tables were designed and some graphs plotted using Microsoft Office Excel 2016.

2.10. Quality Control

Quality issues were addressed through the following measures to ensure that the data generated was complete, reliable, accurate and above all reproducible using the same methods.

2.10.1. Pretesting the Data Collection Tools

We conducted a pilot study in Martin Luther King comprehensive college Bafoussam where we interviewed 15 English speaking students and 15 French speaking students. The outcome revealed a very low response rate due to students forgetting the questionnaires at home and some questions were not understandable by many. To avoid this in the study we went for an exhaustive sampling to make sure we end up with reasonable sample size and the difficult question were rephrased.

2.10.2. Checking for Completeness and Accuracy of the Data Collection Forms

This was done at the end of each day data missing such as age and average score for the past trimester was addressed by sending a text message to the contact provided by the participant on the questionnaire, politely asking for the missing information. The information was completed for those who replied and those who did not were excluded.

2.11. Ethical Considerations

At the level of the institutions, the ethical clearance and approval were obtained from the University of Bamenda Institutional Review Board. The administrative authorisation was obtained from the regional delegate of secondary education of the western region. A pass was obtained from the principals of the various schools and the lecturer in the class room at the time.

At individual level, we obtained parental/guardian consent and the consent of the students after reassurance of confidentiality of the information they will provide and their freedom to withdraw at any point in time during the study.

3. Results and Discussion

3.1. Results

Response Rate

From official records, there were 1841 female students in the targeted classes of the schools chosen for the study. 1722 students were present on the days of in-

terview. Questionnaires to the students who were present in class and eligible for the study on the day of interview. We collected 1056 (61%) questionnaires, 666 (38%) students did not return their questionnaire (they forgot at home or did not come to class on the days of collection).

Of the 1056 questionnaires collected, 898 were fit to be included in the analysis, and 158 were rejected due to multiple inappropriate responses. Giving a response rate of 52% and the sample size (N) = 898 as seen on Figure 1.

Every participant did not respond to all the questions thus the questions that were not responded to or not appropriately responded were computed as missing values. This is the reason for difference in sample size for different variables in our study.

Our results are displayed according to our specific objectives as follows.

3.2. Sociodemographic and Menstrual Characteristics of the Study Participants

3.2.1. Sociodemographic Characteristics

1) Age distribution of participants

The mean age (±SD) of our study participants was 17.60 (1.60) year old. The youngest student was 14 years old and the oldest 24 years old. The age distribution was as on Table 1 below.

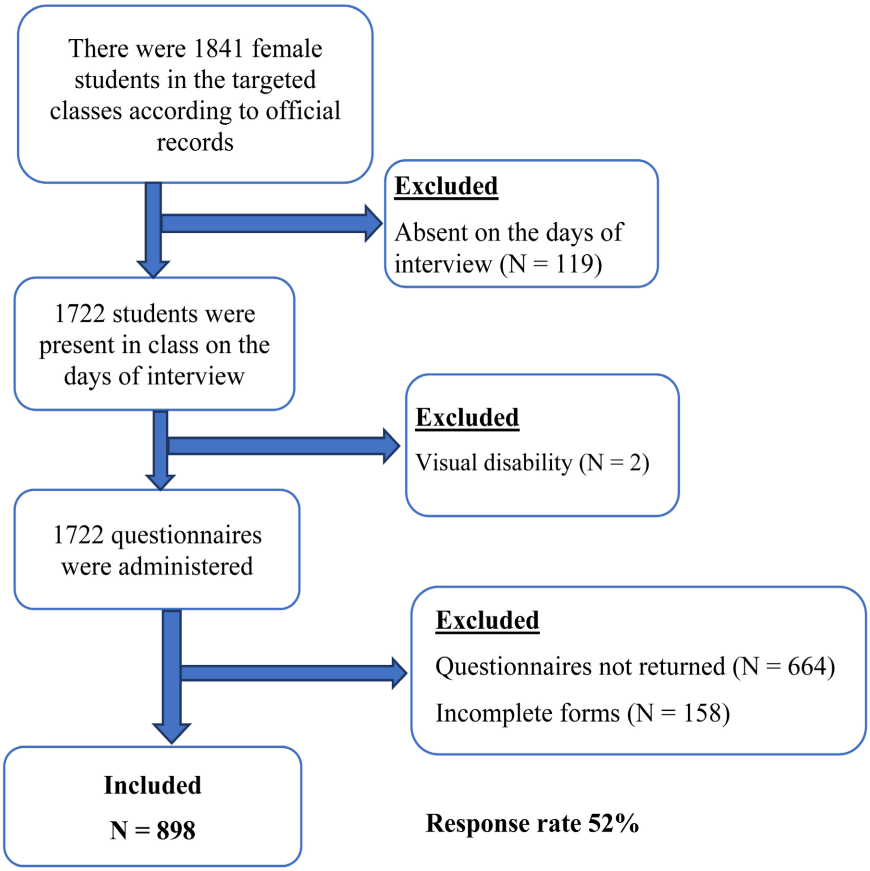

Figure 1. Flow chart of recruitment.

Table 1. Sociodemographic characteristics of study participants (N = 898).

Variable	Frequency (*f*)	Percentage (%)	Mean (±SD)
Age			17.60 (1.60)
14 - 15 years	64	7.1	
16 - 17 years	401	44.7	
18 - 19 years	332	37	
20 - 21 years	80	8.9	
22 - 23 years	17	1.9	
24 years	4	0.4	
School			N/A
Lycée Classique de Bafoussam	470	52.3	
GBHS[a] Bafoussam	428	47.7	
level of studies			N/A
lower sixth/Premiere	496	55.2	
upper sixth/Terminal	402	44.8	
Religion			N/A
Christian	867	96.5	
Islam	18	2	
Others	13	1.4	

[a] = Government Bilingual High School; N/A = Not Applicable.

2) Population distribution according to schools and class

Lycée Classique de Bafoussam 52.3% of our study participants came from and 47.7% from GBHS Bafoussam. Most of the students were lower sixth/premiere students (55.2%) while 44.8% were upper sixth and terminale students.

3) Religion

The large majority were of Christian denomination (96.5%) while only 2.1% were of Islamic faith the remaining 1.4% belonged to other unspecified denominations. Summary of sociodemographic characteristics on Table 1.

3.2.2. Menstrual Characteristics of Participants

1) Age at menarche

The mean age (±SD) at menarche of the study participants was 13.07 (1.38) years, the youngest being 8 years and the oldest 17 years. The age distribution at menarche is displayed on Table 2 below.

2) Duration of menstrual cycle

The mean duration their menstrual cycle (±SD) was 28.11 (2.89) days. The shortest cycle was 21 days and the longest was 45 days. A great majority (75.4%) had a menstrual cycle lasting between 26 to 30 days more details on duration of menstrual cycle are displayed on Table 2 below.

Table 2. Menstrual characteristics of study participants.

Variable	Frequency (*f*)	Percentage (%)	Mean (±SD)
Age at menarche			13.07 (1.38)
8 - 9 years	8	0.94	
10 - 11 years	83	9.8	
12 - 13 years	432	50.9	
14 - 15 years	293	34.6	
16 - 17 years	32	3.8	
Duration of menstrual cycle			28.11 (2.89)
21 - 25 days	81	13.6	
26 - 30 days	450	75.4	
31 - 35 days	58	9.7	
36 - 40 days	3	0.5	
41 - 45 days	5	0.8	
Duration of menstrual period			4.49 (0.99)
2 days	6	0.7	
3 days	121	13.7	
4 days	340	38.4	
5 days	313	35.4	
6 days	62	7.0	
7 days	43	4.9	
Have a regular cycle			N/A
Yes	506	56.3	
No	392	43.7	

N/A = Not Applicable.

3) Duration of menstrual period

The mean duration of their menstrual period (±SD) was 4.49 (±0.99) days. of the 885 student who responded to this question, 340 (38.4%) had a period lasting 4 days. Only 6 people (0.7%) had a period of 2 days which was the shortest period while 43 people (4.9%) had a period lasting 7 days which was the longest duration of menstrual flow in our study. See Table 2.

4) Regularity of menstrual cycle

As seen on Table 2, 506 (56.31%) of our study participants reported having regular menstrual cycles, meaning they can predict the date of their next period with some degree of certainty. The other 392 (43.7%) reported having irregular cycles.

3.2.3. Prevalence of Primary Dysmenorrhoea and Pain Characteristics

1) Prevalence of primary dysmenorrhea

The number of students who reported having painful periods was 646 (71.9%) out of the 898 who took part in the study. The remaining 252 (28.1%) did not experience menstrual pains. Hence the prevalence of primary dysmenorrhea among our study population was 71.9%.

2) Grading Pain intensity among those affected

Of those who reported having primary dysmenorrhea, 75 (11.6%) characterised their pain to be mild, 339 (52.5%) characterised their pain as moderate and the remaining 232 (35.9%) characterised theirs as severe pain. This is elaborated on Table 3 below.

3) Duration of pain during menstruation

The mean duration (±SD) of pain during their period was 2.27 (±1.04) days. However, the majority of them (64.4%) had pain duration between one and two days. The longest duration of pain was 7 days but only one person (0.2%) experienced pains for this long. This is elaborated on Table 3 below.

4) Duration between menarche and onset of dysmenorrhea

The results were as on Table 4 below and Figure 2. Among the 399 who responded the question appropriately, the mean duration (±SD) between menarche and onset of primary dysmenorrhea was 10.75 (13.02) months but the mode was zero (Thus they began experiencing pain as from their first menstruation). In 58.4% of cases, pain started within the 1st to sixth month post menarche. The longest duration between menarche and onset of dysmenorrhea was 60 months (5 years). The timing between menarche and onset of dysmenorrhea is a negative exponential relationship as seen on Figure 2 below.

Table 3. Prevalence of primary dysmenorrhoea and characteristics of pain.

Variable	Frequency (*f*)	Percentage (%)	Mean (±SD)
Presence of dysmenorrhoea (N = 898)			N/A
Yes	646	71.9	
No	252	28.1	
Pain intensity (N = 646)			N/A
Mild pain	75	11.6	
Moderate pain	339	52.5	
Severe pain	232	35.9	
Duration of pain (534)			2.27 (1.04)
1 - 2 days	344	64.4	
3 - 4 days	173	32.4	
5 - 6 days	16	3	
7 days	1	0.2	

N/A = Not Applicable.

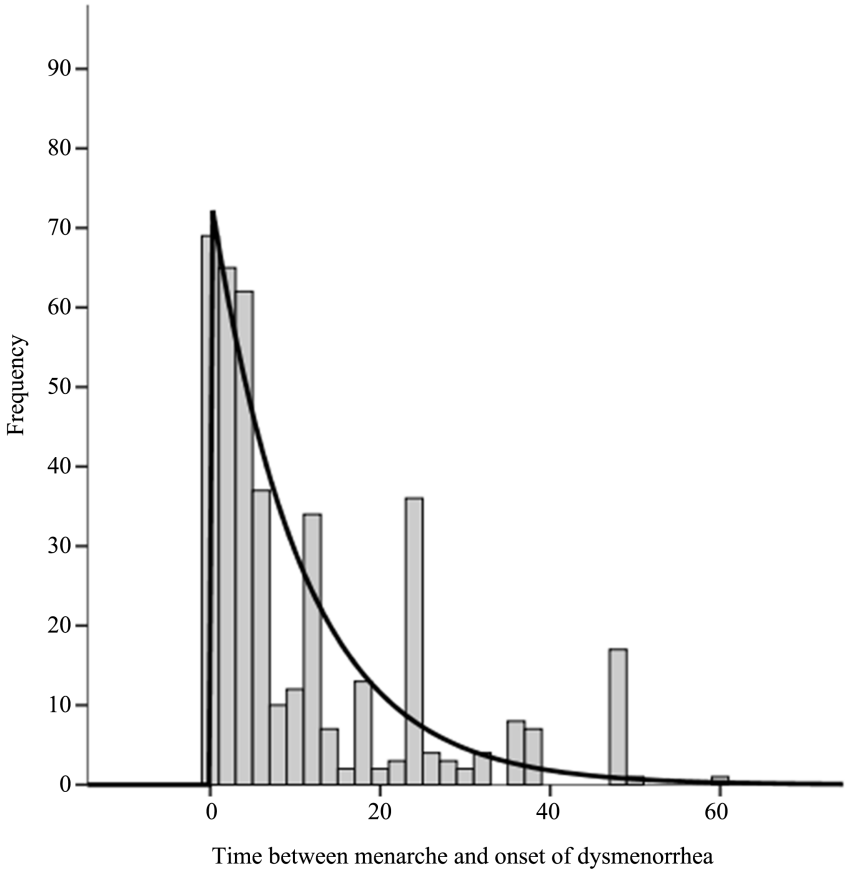

Figure 2. Time in months between menarche and onet of primary dysmenorrhea.

Table 4. Duration between menarche and onset of primary dysmenorrhea. (N = 399).

Duration	Frequency (*f*)	Percentage (%)	Cumulative percentage	Mean (±SD)
				10.75 (13.02)
0 - 6 months	233	58.4	58.4	
7 - 12 months	56	14	72.4	
13 - 18 months	22	5.5	77.9	
19 - 24 months	41	10.3	88.2	
> 24 months	47	11.8	100	

Associated symptoms of primary dysmenorrhea: A few common symptoms associated to primary dysmenorrhea was asked to participants affected and they had to answer by yes or no, an open-ended question was asked for those who experience any other symptom not mentioned. The results revealed that abdominal pain was the most common symptom reported by 333 (56%) person, followed by loss of appetite 286 (48%) reported. Mood swings was the least reported symptom (0.2%) only one person reported the latter. The symptoms are classified in order of decreasing frequency of Table 5 below.

Table 5. Symptoms associated to primary dysmenorrhea among the study population (N = 646).

Associated symptoms	Frequency (*f*)	Percentage (%)
Abdominal pain	333	56.7
Loss of appetite	286	48.7
lower back ache	227	38.7
Nausea	206	35.1
Headache	202	34.4
Diarrhea	157	26.7
Vomiting	84	14.3
Fatigue	39	6.6
breast ache	16	2.7
Dizziness	16	2.7
facial pimples	10	1.7
heat sensation	3	0.5
pain in the thigh	1	0.2
mood wings	1	0.2

3.2.4. Knowledge of Affected Students on the Management of Primary Dysmenorrhea

The method of management known to most of the students was drugs of the NSAIDs family followed by paracetamol. Oral contraceptive pill was the least known method of management. This is elaborated on below and **Figure 3**.

3.2.5. Attitude of Affected Students towards Primary Dysmenorrhea

1) Method chosen by the students to manage pain

Of the 646 persons who reported having dysmenorrhea, 247 (38.24%) ignored their pain while 399 (61.76%) practiced at least one method of treatment. Bed rest was practiced by most (57.12%) of the participants, followed by medical treatment methods (NSAIDs derivatives, other forms of analgesics such as paracetamol and antispasmodics). Meanwhile there were rare methods of pain relieve practiced by some student such as Yoga (only one person), massage (one person) and intense sexual intercourse (1 person). The different methods of pain relieve carried out by the students are elaborated on **Table 6** below.

2) Effect of treatment on pain relive

The effect of individual treatment methods on pain relief could not be accessed by this study because many students reported using more than one method during the same menstrual period or interchanged methods between periods. Nevertheless, we accessed the general effect of treatment on pain relief using a 4-point Likert scale ranging from no effect on pain through total relieve of pain of those who used at least one method of treatment, the effect of treatment

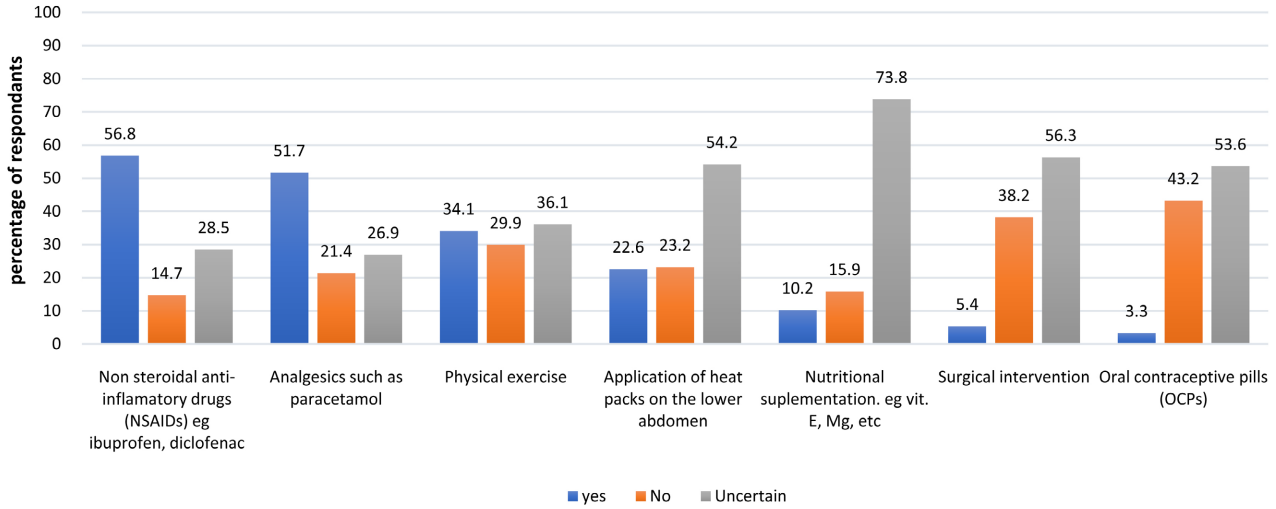

Figure 3. Knowledge of affected students on methods of management of primary dysmenorrheal (N = 646).

Table 6. Attitude of students affected by primary dysmenorrhea towards their pain (N = 646).

Variable*	Frequency (*f*)	Percentage (%)
Ignore the pain	247	38.24
Bed rest	369	57.12
Medical treatment	324	50.15
Traditional treatment	107	16.56
Apply heat packs on lower abdomen	59	9.13
Drink warm water	14	2.17
Physical exercise	14	2.17
Drink warm salty water	4	0.62
Enema	3	0.46
Drink warm milk	2	0.31
Drink much water	1	0.15
Intense sexual intercourse	1	0.15
Massage abdomen with sugar	1	0.15
Massage the feet	1	0.15
Practice yoga	1	0.15

* = multiple response.

on pain relive was as on Table 6. 16.6% had total relieve of their pain, 57.7% had significant but not complete relive, to 24.3% of them it barely relived the pain and 1.5% said the treatment had no effect on their pain.

3) Source of knowledge on method of pain relieve

Among those who treated their pain, their main source of knowledge about

the method (s) of pain relieve they practice was from family relatives (parent, sibling, aunt, …) (74.4%), 30.6% learned from friends, 29.4% learned from a health personnel (doctor, nurse, pharmacist, etc), 21.6% learned through personal research from books and or media and the least informative source was the school. See Table 7.

3.2.6. Impact of Primary Dysmenorrhea on the Academic Activities of Affected Students

1) School absenteeism

Among the 646 students who experienced primary dysmenorrhea, 252 (39%) report to have absent classes at least once since they began experiencing painful periods. For the current academic year, 188 students (29.1%) report to have absented classes between one to five times, while 29 students (4.5%) report absenting classes between six to ten times and 16 students (2.5%) say they have absent classes more than 10 times. This is illustrated on Table 8 below.

2) Effect of pain on home studies

This was accessed using a three-point Likert score ranging from cannot study at all through has no effect on studies. Out of the 646 students affected by primary dysmenorrhea, 29.4% (190 students) says they cannot study at all when experiencing menstrual pain while 9.4% (61 students) say the pain has no effect on their studies at home. See Table 8.

3) Effect of pain on attention in class

This as equally accessed using a three-point Likert score ranging from no effect on attention to totally distracted, just present to avoid absences. Results

Table 7. Effect of treatment on pain relieve among those who treated their pain and source (s) of knowledge on treatment method (s) used (N = 404).

Variables	Frequency (*f*)	Percentage (%)
Effect of treatment		
Total relieve	67	16.6
Significant but not total relieve	233	57.7
Barely relieves	98	24.3
No effect on pain	6	1.5
Source (s) of knowledge on method (s) used to treat dysmenorrhea*		
From relative (parents, siblings, etc)	299	74.40
From friends	123	30.60
From health personnel	118	29.40
From personal research/media	87	21.60
From school	78	19.40

* = multiple reponse.

Table 8. Impact of primary dysmenorrhea on the daily academic activities of affected students (N = 646).

Variable	Frequency (*f*)	Percentage (%)
Ever absent a class because of primary dysmenorrhea		
Yes	252	39
No	394	61
Number of classes absent since the beginning of the current academic year because of menstrual pain		
Never absented a class	413	63.9
Absented 1 - 5 times	188	29.1
Absented 6 - 10 times	29	4.5
Absented > 10 times	16	2.5
Effect of pain on home studies		
Cannot study at all when experiencing menstrual pain	190	29.4
Can study, though not as focused as pain free days	395	61.1
Can study with the same level of focus and understanding as pain-free days	61	9.4
Effect of pain on attention in class		
Not focused at all, just present to avoid being marked absent	189	29.3
A little focused, though not as well as pain-free days	426	65.9
Focused and clear minded as my pain-free days	31	4.8
Ever punished for something done under the influence of menstrual pain example: not taking notes…		
Yes	95	14.7
No	551	85.3

showed that 189 (23.9%) students are only present in class in class during their period just to avoid absences in their records while 31 (4.8%) students say that pain do not affect their attention. See Table 8.

4) Punishment because of something done under the influence of menstrual cramps

Out of the 646 students affected by primary dysmenorrhea, 95 (14.7%) said to have been punished at least once for something they did under the influence of pains. See Table 9 below. An open-ended question was asked to these students who said to have been punished. The question was on the type of punishment they were given and the reason for this punishment. The responses were grouped for simplification of analysis as on Table 9 below.

Table 9. Punishements given to students for actions done under the influence of menstrual pain and reasons for the punishements (N = 95).

Type of punishment	Reason for punishment							
	Lying on the desk & not taking notes	Absent classes	Non participation in class sanitation	Absent for evaluation	Assignment not done	Moaning pain in class	Not attentive during roll call	Total
Expelled from class	24	1			5	2		31
Absences in permanent records		16					1	17
Manual labour	14	16	6		2			38
Copy the same thing several times					1			1
Kneel down	3	1			2			6
No score given for evaluation				1				1
Total	41	34	6	1	10	2	1	95

The most common thing done by the student was not taking note and or were lying on the desk during lectures and for this the most common punishment was expulsion from class. Their action and the punishments received are cross tabulated on Table 10 below.

3.2.7. Comparison of Academic Performance between Student with and without Dysmenorrhea

A greater proportion of students not affected by primary dysmenorrhea had a pass average (for the past 4 trimesters) than those with dysmenorrhea. Among the students who had dysmenorrhoea, 75.6% had an average ≥ 10, while 24.4% had an average < 10. Meanwhile among those who did not have dysmenorrhea, 81.7% had an average ≥ 10 and only 18.3 had averages < 10 (Figure 4).

A Pearson chi-square goodness of fit test was conducted to determine if the difference in these proportions is statistically significant, results were as on Table 10.

3.3. Discussion

3.3.1. Introduction

Our literature search did not find any study on the relationship between menstrual problem and school activities or school performance in Cameroon. The fact that menstrual discomfort or disorder is not seen as any serious gynaecological problem could be responsible for the non-existence of such study. However, it should be noted that the burden of menstrual discomfort and disorderliness might be greater than any other gynaecological complaint among this population as observed in this study and others in the sub region; Nigeria and Ghana [3] [4] [20] [21].

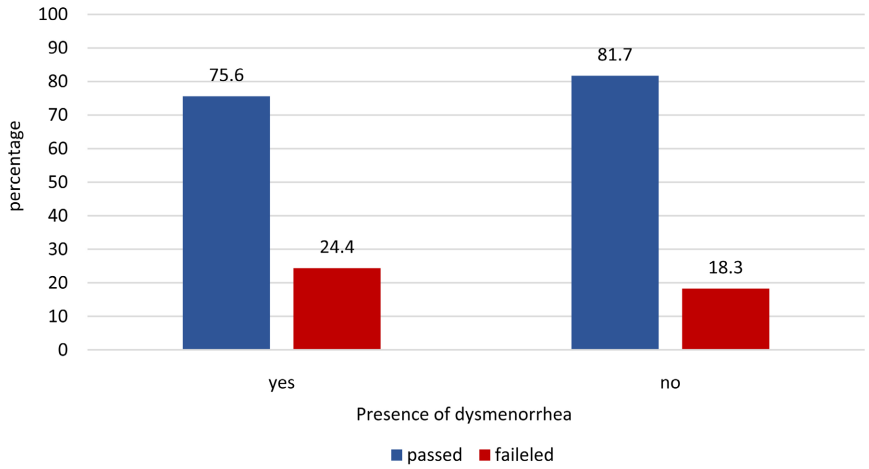

Figure 4. comparisson of pass and fails among students with and without primary dysmenorrheal.

Table 10. Chi-square test to compare the proportion of averages among students with and wihout dysmenorrheal.

	Presence of dysmenorrhea (%)		chi-square	*df*	p-value	Cramer's V
	yes	no				
Average ≥ 10 (passed)	456 (75.6)	197 (81.7)	2.78	1	0.096	0.076 (small)
Average < 10 (failed)	147 (24.6)	44 (18.3)				

3.3.2. Sociodemographic Characteristics

The mean age (±SD) of our respondents was 17.60 (1.60) years, with a range of 14 to 24 years. The majority was within the age range 16 to 17. A large majority were of Christian denomination 867 (96.5%), while only 18 (2%) were Muslims and 13 (1.4%) had other faiths.

3.3.3. Menstrual Characteristics

The mean age (±SD) at menarche was 13.07 (±1.38) years. Pasquet *et al.* [22] found 13.18 (±1.08) years among students in Yaoundé, 13.98 (±1.58) among student in Mfu and 14.27 (±1.65) in Campo. Our respondents being city dwellers like the ones in Yaoundé have figures similar to the latter. However this study date from 1998 but with the shift toward lowering menarcheal age at the rate of 1.1 month per decade [22] [23] [24], it is understandable that our value is slightly lower than theirs. Our value was also similar to results of studies in other countries 12.7 years in Nigeria [25], 13.0 years in Egypt [26], 13.3 years in Indonesia [27]. However it was smaller than that found by Derseh *et al.* [28] in Etheopia (15.1 years) and that of Amaede *et al.* [3] in egypt (13.7 years) but higher than that found by Banikarim *et al.* [14] among Hispanic females in the USA (12 years). Other countries reported 12.49 in Spain [6], 12.75 years in Australia [5]. This differences can be explained by the fact that menarche I influenced by both genetic an environmental factors [22] including nutrition, light exposure,

growth status which vary in the different environments.

The mean (±D) duration of the menstrual cycle was 28.11 (±2.89) days with a range of 21 to 45 days with over 75% of respondents having a cycle lasting between 26 and 30 days concurring with the value of 28.4 (±5.9) found by Shehata *et al.* [11] in Egypt as well as studies in other countries round the world [5] [7] [8] [9] [10] [17]. 56.3% reported their cycle as being regular while 43.7% said theirs were irregular. In the study of Ameade *et al.* [3] in Ghana, 75% of their respondents reported a regular cycle while the rest said theirs were irregular. This difference is most likely due to difference in the understanding of the concept of regular cycle by the respondents. The mean (±SD) duration of menstrual flow was 4.49 (±0.99) days with a range of 2 to 8 days, comparable to 4.16 (±1.42) days found in Ethiopia [20] and 4.9 days in Ghana [10]. However, a little low compared 5.2 (±1.58) days, 5.93 days and 5.2 (±1.4) days described in Nigeria, Australia and Egypt respectively [5] [9] [11].

3.3.4. Prevalence and Associated Symptoms

The prevalence of primary dysmenorrhea was 71.9% in our study. In the absence of comparable study in our country, this was similar to results obtained from related studies in the sub region; 78.1% in Ogun state Nigeria [15], 72% among university students in Kano Nigeria [9], 74.4% among adolescent girls in Accra Ghana [10]. But other studies reported lower values for example Titilayo and colleagues reported 64% among under graduate female students in Osum state Nigeria [4] while Darseh *et al.* reported 66.8% among undergraduate university students in Ethiopia [28]. On the other hand, Ameade *et al.* [3] in Ghana reported 83.4%, Shehata *et al.* [11] reported 92.1% among university students in Egypt. Other values reported across the world were 84.2% in Thailand [7], 93% in Australia [5], 74.8% in Spain [6], 53.6% in Turkey [8] and 85% in the USA [14]. The extreme variation in these estimates may be attributed to the use of selected groups of subjects and the absence of a universally accepted method of defining dysmenorrhea. Pain associated with dysmenorrhea is difficult to measure because it is usually accompanied by other unpleasant sensation and partly because the reaction component affects the judgement of pain [7]. 11.6% of our respondents scored their pain on the visual analogue scale as mild, 52.5% scored theirs as moderate while 35.9% reported severe pain. This was similar to a Ghanaian study [3] which using the same method of pain scoring obtained 21.2% mild pain, 56.3% moderate and 22.4% severe. There was a great variation of pain scoring among respondents in different studies [5] [7] [9] [14] [23]. The most likely explanation to this variation is that, perception and expression of pain is influenced by genetics, psychological, developmental, familial, social and cultural factors [3]. Therefore, the aforementioned factors as well as variability of pain threshold of the different categories of respondents who participated in all these studies could account for the differences in the description of their pains. The mean duration of pain was 2.27 (±1.04) days, most people had painting less than 48 hours (64%) similar to findings from other studies [3] [8] [14].

3.3.5. Duration between Menrche Ande Onset of Primary Dysmenorrhea

Primary dysmenorrhea presents with or shortly after menarche. It may start within 6 months after menarche because it occurs only during ovulatory cycles, which may not always be evident at menarche. Although it may occur as late as a year after menarche, it is less likely to do so later when it should raise suspicion of secondary dysmenorrhea [2]. We found the mean (±SD) duration between menarche and onset of dysmenorrhea to be 10.75 (±13.02) months. 17.3% of our respondents began experiencing pain from menarche, 58.4% started within the first six months, 72.4% started within 12 months and 88.2% within 24 months. The timing between menarche and the onset of primary dysmenorrhea is an inverse exponential relation. From this result we can assume that the students who reported dysmenorrhea starting beyond 24 months could be due to a memory decay or their dysmenorrhea was due to a secondary cause.

3.3.6. Associated Symptoms

The symptoms associated with primary dysmenorrhea were: Abdominal pain, loss of appetite, lower back ache, nausea, headache, vomiting, facial pimples (acne), breast ache, fatigue, dizziness, mood swings, heat sensation and pain in the thigh. This was consistent with findings from other studies [3]-[9] [11] [14] [16]. Some of these studies however described other symptoms that we did not find such as irritability, lower limb oedema, sweating, frequent micturition and pain when emptying bowel. These symptoms can sometimes be more debilitating than the pain itself, hence health care workers should consider enquiring about these symptoms in conjunction with pain as this can also be the clue for determining whether the pain is primary or secondary dysmenorrhea.

3.3.7. Knowledge of Affected Students on Treatment of Dysmenorrhea

Among the common conventional methods of treatment of primary dysmenorrhea, drugs of the NSAIDs family was the most known to our participants thou only 56.8% of them did. 51.7% knew of Paracetamol, but oral contraceptive pills were the least known only 3.3% knew it and probably used it as a method of managing menstrual pain. Few of them knew of non-pharmacological means such as physical exercise and heat packs. Tangchai *et al.* [7] in Thailand found that paracetamol was the drug most known as pain reliever to primary dysmenorrhea sufferers followed by NSAIDs then oral contraceptive pills. Up to 55.4% of affected subjects knew of OCPs and used them in contrary to our study and that of EL-Gilany *et al.* in Egypt where no one knew of oral contraceptives talk less of using. Egypt being an Islamic country this method is not an option for them reason why no one knew about it. In our setting, the low knowledge and use is most likely due to the myths and rumours spread on medias concerning oral contraceptives thus the person informing the people about treatment options for dysmenorrhea do not think about this as an option.

3.3.8. Treatment Practiced by Affected Individuals

38% of the respondents ignored their pain, while others tried one or more me-

thods of pain relive. Among these methods, bed rest was the most common followed by medical treatment including paracetamol and NSAIDs. Others took traditional preparations, application of heat packs, and physical exercise this was similar to findings from a Nigerian study [17]. The only practice done by their cohort which was not reported in our study was ingestion of holy water. However, we had other reports not found in literature such as enema and intense sexual intercourse (reported by 1 person). Sexual intercourse is an uncommon practice during menses because of the blood involved however endorphins released during orgasm has pain relieving properties which may explain this choice of management. The methods of treatment were basically the same across the globe, but there was a great difference in choice of management in the various studies. In Thailand [7], 92% did bed rest, 34% used heating pad, only 35% used analgesics while 12% used herbal medicine; in the Spain [6], 92% of affected persons took analgesics, 61% took oral contraceptives; in Egypt [16], nearly half of respondents (49.5%) ignored their pain, 42.6% did bed rest, 36.7% took herbal preparations and 34.7% took analgesics. Oral contraceptive pill was not an option in their country. These findings suggest that the choice of treatment is highly dependent upon the socio-cultural background of the individual. Hence health care providers should customise treatment in consideration of individual socio-cultural origins to promote compliance to treatment.

3.3.9. Effect of Treatment on Pain Relive

Most of the respondents (72%) reported significant to total relieve of pain after practicing their method (s) of pain reliever, for 23.4% it just took the edge off while 1.5% said treatment has no effect on pain. Individuals practiced more than one method of pain relieve so the efficacy of individual method of management could not be accessed. A study in Ghana [3], 82% of people who self-medicated agreed to strongly agreed to total pain relieve while 8.6% were uncertain and for 5.2% treatment had no effect. In both studies it can be seen that the majority of those who attempted therapy had significant pain relive, the few that did not get any relieve might have been due to inappropriate administration since most of them get the treatment over the counter by self-prescription and will take in inappropriate doses [3]. The medications are the standard and most effective treatment while the non-pharmacological treatments such as exercise of heat packs are often used as adjuvant therapy as reported by some participants in a Ghanaian study [18]. Most people got their knowledge on management of dysmenorrhea from their relatives (74.4%), while 30.60% learned from friends, 29.4% learned from a health personnel, 21% from personal research and media while the school was the least informative source on menstrual pain and its management. These findings were consistent with other studies [10] [11] [17] [19]. But in all these studies less than 10% of participants learned from health care providers compared to the 29% in our study. This is most likely because we grouped all nurses, doctors, pharmacist as he personnel more over some people do consider owners of drug stores as health personnel.

3.3.10. Impact of Primary Dysmenorrhea on the Academic Activities of the Affected Students

Among dysmenorrhea sufferers, 39% had absent at least a class in the past six months. 21.1% had absent between one to five time, 4.5% between six to ten time while 2.5% (16 person) had absent more than 10 times. Similarly, a Nigerian study found a school absenteeism rate of 37% among adolescent school girls. Absenteeism due to primary dysmenorrhea was reported by many other studies [5] [8] [9] [14] [15] [19] [21] and it ranged between 10% to 46% but was up to 87% among students with severe pain in some of the studies. Some student absent classes occasionally while others absent at least one day during every menstrual period. This was the case in the study of Iliyasu *et al.* [9] where 7% of students reported missing classes every menstrual period. This absenteeism might not be very noticeable in schools because some students cope by having catch up classes and planning their activities in anticipation of pain but the scenario would be different if they were working in a factory where they are paid per hour, this will represent a significant economic lost to both the factory and themselves.

3.3.11. Attention during Lectures, Home Studies and Academic Performance

For those who managed to attend classes, 95% reported that their attention in class was affected by pain during menses and 29% said they were only present in class to avoid being marked absent. Likewise, 91% said their home studies were affected by dysmenorrhea among which 29% said not being able to study at all when experiencing painful periods. Other studies [3] [8] [14] [15] also found decreased attention in class, inability to do assignments, inability to do home chores, inability to participate in sport activities, social withdrawal and depression. Sometimes when students will fail to perform some of the academic obligations such as failure to do assignment, not taking notes during lectures or absenting classes, they will be sanctioned. 14% (95 students) reported been punished at least once for such. The most common of all was students not taking notes and or lying on the desk during lectures. As punishment they were expelled from class and recorded absent. Other forms of sanctions were manual labour, absences in records among others. This highlights the disparity in the study conditions of students affected by primary dysmenorrhea and students who do not. For this reason, we decided to investigate whether there was a difference in academic performance of students having primary dysmenorrhea and students who did not. The results showed that students who did not have primary dysmenorrhea had more pass marks than students with dysmenorrhea but was not statistically significant. Our finding was similar to that of Alam *et al.* [24] in Indonesia who found no significant difference in academic performance of students with and without dysmenorrhea though their cut off mark for good and poor average was 7.5/20. We did not find a correlation between pain intensity and performance in contrast to findings from other studies [25] [28] who found a decrease in academic performance with increase dysmenorrhea severity.

But their results were based on subjective report of the impact of pain on their performance by the students hence students were likely to express great impact on performance as a means of expressing the distress brought in to their academics by the pain.

4. Conclusions

There is a high prevalence of primary dysmenorrhea among high school students in Bafoussam (71.9%).

Over 38% of affected person do not take any pain-relieving measures while the rest do a one or more thing to relieve their pain including both pharmacological and non-pharmacological. Some of these measures are: Bed rest, analgesic intake, traditional herbal preparations.

Primary dysmenorrhoea has a variety of effects on the studies of affected students including: class absenteeism, decreased attention, inability to study at home and do assignments and students are sometimes sanctioned by school authorities for failing to fulfil these academic obligations.

There was no statistically significant difference in academic performance between students having primary dysmenorrhea and students who did not.

5. Limitations of the Study

- The diagnosis of primary dysmenorrhea was made without proper history and physical examination, the data obtained was based on participants' responses.
- Hence some might have had secondary dysmenorrhea especially those who reported their pain started more than two years after menarche.
- Our study was not spared from recall bias since participants had to report past events such as age at menarche among others.
- We only studied two conveniently chosen classes in the two secondary schools hence our results may not reflect that of the entire schools or all secondary schools in the region.
- Our internal validity was threatened by the high non response rate.
- Our study was done among adolescents going to school and the result might not be applicable to their peers not going to school.
- Our study was equally limited to the age range of 14 to 24 and given the variation of dysmenorrhea findings with age, our results may not be applicable to all women in the region.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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Appendix: Questionnaires

- English version

Questionnaire

Date……/……../2019

Serial number (do not fill this space) ……

Instructions: Tick like this (√) in the box in front of the correct answer or otherwise as instructed by the bracket in front of the question. Answer the questions in order. Use a pen to answer.

Section 1: Socio-demographic data

1. School:

1) GBHS Bafoussam ☐

2) Lycee Classique de Bafoussam ☐

2. Class:

1) Lower sixth-arts ☐

2) Lower sixth science ☐

3) Upper sixth arts ☐

4) Upper sixth science ☐

5) Premiere A ☐

6) Première scientifique ☐

7) Terminale A ☐

8) Terminale scientifique ☐

3. Age in years as per your last birth day (write your age in the box) ☐

4. Religion:

1) Christian ☐

2) Muslim ☐

3) Others ☐

5. Write your average score for the past 4 trimesters in the boxes below:

1) First trimester last academic year ☐

2) Second trimester last academic year ☐

3) Third trimester last academic year ☐

4) First trimester this academic year ☐

Section 2: Menstrual history

6. How old were you when you saw your menses for the first time (write your age at the time in years) ☐

7. Do you have regular monthly menstrual cycle?

1) Yes ☐

2) No ☐

8. For how many days does your menses flow? (Write the number of days in the box and if it varies, specify the range on the dotted line)… ☐

9. What is the average duration of your menstrual cycle in days? (Write the average in the box) ☐

10. Have you ever given birth? (Abortions does not count)

1) Yes ☐

2) No ☐

11. Do you have painful periods (menstrual cramps)?

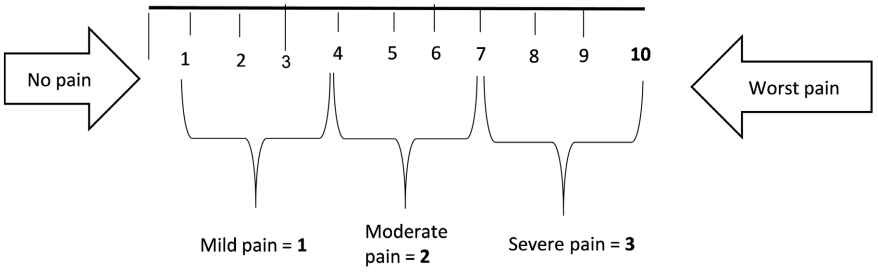
1) Yes ☐

2) No ☐

NOTE: If you do not experience menstrual cramps, you have completed answering, leave the remaining questions unanswered and hand over the questionnaire. The following questions only apply to those who experience menstrual cramps.

12. How long did it take from your first menses to the time you started experiencing menstrual pains? (Write an approximate duration in moths) ☐

13. How severe is your menstrual pain? (Use the 10 cm line below to core your pain) 0/10 is no pain at all while 10/10 is the worst non-emotional pain you have ever had.



1) My pain is between 0 to 3/10 (mild pain) ☐

2) My pain is between 3 to 6/10 (moderate pains) ☐

3) My pain is between 6 to 10/10 (severe pain) ☐

14. How many days do you feel pain during your period? (Write the average number of days in the box) ☐

When you are experiencing the painful periods, do u have any other symptom in addition to the lower abdominal pain?

1) Headache

a) Yes ☐

b) No ☐

2) Stomach ache

a) Yes ☐

b) No ☐

3) Diarrhea

a) Yes ☐

b) No ☐

4) Vomiting

a) Yes ☐

b) No ☐

5) Nausea

a) Yes ☐

b) No ☐

6) Lower back ache

a) Yes ☐

b) No ☐

7) Loss of appetite

a) Yes ☐

b) No ☐

8) Others

a) Yes ☐

b) No ☐

If yes specify on the dotted line…

Section 3: Knowledge on treatment and treatment practices

15. Below is a list of probable methods of treatment of menstrual cramps; select "yes" if you know it to be a means of treatment, "No" if u are certain it is not a means of treatment and "I don't know" if you don't know or you are not sure.

1) Oral contraceptive pills

a) Yes ☐

b) No ☐

c) I don't know ☐

2) Non-steroidal anti-inflammatory drugs eg diclofenac, ibuprofen

a) Yes ☐

b) No ☐

c) I don't know ☐

3) Nutritional supplementation eg vitamin E, magnesium

a) Yes ☐

b) No ☐

c) I don't know ☐

4) Physical exercise

a) Yes ☐

b) No ☐

c) I don't know ☐

5) Surgical interventions

a) Yes ☐

b) No ☐

c) I don't know ☐

6) Application of warm water on the on the abdomen.

a) Yes ☐

b) No ☐

c) I don't know ☐

7) Pain relievers such as paracetamol

a) Yes ☐

b) No ☐

c) I don't know ☐

16. How do u treat your menstrual pains?

1) I do nothing do nothing about it

a) Yes ☐

b) No ☐

2) I do something about it

a) Yes ☐

b) No ☐

If yes, which of the following?

1) I take a drug from the drug store or pharmacy

a) Yes ☐

b) No ☐

2) I take a traditional medicine

a) Yes ☐

b) No ☐

3) Bed rest

a) Yes ☐

b) No ☐

4) Apply heat packs on the lower abdomen

a) Yes ☐

b) No ☐

5) I do other things not mentioned above

a) Yes ☐

b) No ☐

If yes please specify on the dotted line…

17. When you take the treatment above, what is the effect on the pain?

1) It relieves the pain totally ☐

2) It reduces the pain significantly but not totally ☐

3) It barely reduces the pain (just a little bit but not significantly) ☐

4) It has no effect on the pain ☐

18. How did you get to know about the drug or method of treatment above?

1) A heath personnel e.g. Doctor, nurse

a) Yes ☐

b) No ☐

2) Parents, siblings or other relatives

a) Yes ☐

b) No ☐

3) Friend (s)

a) Yes ☐

b) No ☐

4) School

a) Yes ☐

b) No ☐

5) Learned on my own from text books/magazine/tv or radio program, social media

a) Yes ☐

b) No ☐

If any other source not mentioned, specify…

Section 4: Impact of primary dysmenorrhea

19. Since you started experiencing painful periods, have you ever absent classes because of this?

1) Yes ☐

2) No ☐

20. How many times have you absent a class because of menstrual pains/cramps since the beginning of this academic year? (Write the number of times in the box, 0 means never absent a class) ☐

21. How are your home studies affected by menstrual pains?

1) I cannot study at all when am having menstrual cramps ☐

2) I can study though am not as focused as my pain free days. ☐

3) I can study with the same level of focus and understanding as my non-menstruating days ☐

22. How is your attention in class when you are experiencing menstrual pains?

1) I am not focused at all; I am only present to avoid being marked absent. ☐

2) I am a little focused though not as well as my pain free days. ☐

3) I am as focused and clear minded as my pain free days. (It has no effect on my attention) ☐

23. Have you ever been punished or marked absent due to something you did (e.g. not attentive in class, absent a class, not done an assignment…) because you were experiencing menstrual cramps?

1) Yes ☐

2) No ☐

If yes, state the type of punishment (s) you were given and the reason for this punishment? …

The end.

Thanks for your participation and honesty.