

Short Communication

Clinical and Epidemiological Overview of Dysmenorrhea in Ivorian University Campuses of Cocody (Cote d'Ivoire)

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Abstract

Background: Dysmenorrhea is the most common pelvic pain phenomenon during menstruation in women of reproductive age, and is often characterized by social, educational, and economic impact. The objective of the study is to update the epidemiological and clinical characteristics of dysmenorrhea in a university setting, in a low- and middle-income country (LMIC). **Methods:** A prospective longitudinal descriptive study, over 6 months, conducted in three university residences in Cocody, Abidjan, the capital of Côte d'Ivoire. It involved female students of all levels of study, present at the time of the survey, volunteers and suffering from menstrual pain for more than 12 months, with an intensity higher than 3 on the visual analog scale (VAS). Pain intensity was divided into mild (1–3), moderate (4–5), and severe (7–10) on the VAS. Students with unstable psychological status or with a disability were not included. After obtaining administrative approval from the university, the questionnaire was administered. The parameters studied were general data and specific characteristics of dysmenorrhea. Statistical analysis was performed using EPI INFO 3.5.4 software (Center for disease control and prevention (CDC), Atlanta, GA, USA). **Results:** The incidence of dysmenorrhea was 79.7%, with an average age of 23.40 years and a median age of 23 years. These students were aged between 20 and 35 (75%), and participated in undergraduate courses (55.8%). The main form of dysmenorrhea was primary (74.2%), the pain location was pelvic (42.3%) or diffuse (53.1%), protomenial (51.2%), severe pain (56.9%), and torsional pain (44.2%), which affects school activities, with an average duration of 3.49 days. **Conclusions:** Dysmenorrhea is a common disease among women of childbearing age, and due to social and cultural considerations, it may be underdiagnosed in low resources countries. Due to its diverse symptoms, it has a negative impact on the quality of life, leading to a decrease in enrollment rates.

Keywords: dysmenorrhea; prevalence; female students; epidemiology; clinical; impact; LMIC

1. Introduction

Dysmenorrhea refers to pelvic pain during menstruation, and is one of the most common gynecological diseases among adolescent women of childbearing age [1–5]. Generally speaking, two types of dysmenorrhea are described. Primary dysmenorrhea involves many young girls, occurring several months or years after the onset of menstruation, without gynecological anatomical support. Secondary dysmenorrhea on the other hand, was observed in women in their 30s and 40s, and is associated with organic pelvic pathology [2–6].

Reports of school and work absenteeism due to unmet menstrual needs have rapidly increased attention to menstruation in policy and practice [2–5]. The impact on family and social life, friendships, school and work performance has significant social and economic dimensions [4–6]. The estimated prevalence of diseases in developed countries is very high [1,2], and underestimated in low- and middle-income countries (LMICs) [6–10]. In fact, few girls or teenagers in these countries are aware of this, and their views or attitudes toward pain are not well expressed [1,2]. However, in African countries, especially Cote d'Ivoire,

there seems to be few quantitative studies reported in the published literature related to this disease [6–10].

The pathogenesis of dysmenorrhea is based on the excessive production of prostaglandin, accompanied by excessive muscular atrophy, local ischemia and hypoxia [11–13], or organ pathology of menstrual blood flow obstruction [14–16]. In addition, menstrual pain, irritability, insomnia, discomfort, headache, nausea, vomiting, diarrhea, and fatigue are often considered important reasons for school absenteeism.

The management of primary dysmenorrhea is mainly related to two types of therapeutic drugs: anti-inflammatory drugs and estrogen and progestogen pills used alone or in combination, with good results [12].

Some studies have shown that transcutaneous electrical nerve stimulation [11,16], acupuncture, and moxibustion [1,11,16,17] have moderate efficacy, which is not available in our country. Due to social and cultural beliefs, some women do not take medication for a painful crisis [6–11]. The purpose of this study is to update the epidemiological and clinical characteristics of dysmenorrhea in the environment of LMIC's University, in sub-Saharan Africa.



Table 1. General data on students.

Variables	Numbers	(%)
University residence	N = 260	
Campus	137	52.7
City Mermoz	77	29.6
Red city	46	19.7
Age range (years)		
<20	55	21.2
20–25	132	50.8
26–35	63	24.2
>35	10	3.8
Education level		
Bachelor's	145	55.8
Masters	92	35.4
PhD	23	8.8
Ivorian ethnic groups	217	83.5
Southeast	119	45.8
North	38	14.6
Southwest	60	23
Ivorian ethnic groups students	43	17.7

2. Materials and Methods

This is a prospective descriptive cross-sectional study, conducted over six months, on female students who suffer from menstrual pain, in three university residences in the city of Cocody, Cote d'Ivoire. We included all volunteers and present students, who reported more than 12 months menstrual pain, with an intensity greater than 4 on the Visual Analogue Scale (VAS). This intensity was chosen because it corresponds to the theoretical threshold of clinical pain tolerance. VAS pain intensity is divided into mild (1 to 3), moderate (4 to 5), and severe (7 to 10) pain. Students with fragile psychological states and people with disabilities (blind, deaf, mute) are not included. For the clinical judgment of dysmenorrhea, we also used a "clinical score" which takes into account the following symptoms: pelvic pain, low back pain, vomiting, nausea, diarrhea, intestinal disorders, irritability, fatigue, myalgia, lipothymia, and absenteeism. Their scores range from 0 to 3, allowing for the definition of mild (1 to 10), moderate (11 to 20), and severe (21 to 30) pain. The anonymous questionnaire was randomly administered in the different university residences by the chief investigator. For the research sampling method, we randomly selected the number of buildings in various university dormitories in Abidjan. The sample size (N) was determined using Fischer's method: $N = \lceil \frac{z^2 \times p \times (1-p)}{m^2} \rceil$. An epidemiological study carried out in one Cote d'Ivoire capital high school, showed a 65.7% prevalence of dysmenorrhea. Due to the lack of university-based dysmenorrhea research in Cote d'Ivoire, we estimated the sample size based on this prevalence rate. Based on these data, the estimated sample size is N = 340 female students. The parameters studied are sociodemographic data, history, and characteristics of dysmenorrhea. The study began af-

Table 2. Characteristics of menstrual pain.

Variables	Students (n = 260)	(%)
Types of dysmenorrhea		
Primary	193	74.2
Secondary	67	25.8
Painful location		
Pelvic	111	42.3
Lumbar region	11	4.2
Abdominal diffuse	138	53.1
Pain duration (day)		
1–2	101	38.8
3–5	123	47.3
5–10	32	12.3
>10	4	1.5
Pain occurrence time		
Premenstrual	125	48.1
Protomenial dysmenorrhea	133	51.1
Telemenial dysmenorrhea	2	0.8
Pain intensity (VAS)		
4 to 5 (minor)	13	5.0
6 to 7 (moderate)	99	38.1
8 to 10 (severe)	148	56.9
Types of painful crisis		
Torsion-like pain	115	44.3
Tingling pain	57	21.9
Spasmodic pain	88	33.8

VAS, visual analog scale.

Table 3. Distribution of other clinical aspects of menstruation.

Data	Students (n = 260)	%
Impact on academic activity		
Yes	167	64.2
No	93	35.8
Supporting signs		
Weakness	128	49.2
Nausea and vomiting	97	37.3
Diarrhea	95	36.5
Irritability	85	32.7
Headaches	73	28.1
Sadness	70	26.9
Vertigo	62	23.8
Insomnia	56	21.5
Joint pain	52	20.0
Palpitation	15	5.8
Types of impact on academic activities	167	64.2
Stop activity	91	35.0
Bedtime	71	27.3
Hospitalization treatment	5	1.9

ter obtaining approval from administrative and academic authorities. Statistical analysis was performed using EPI INFO 3.5.4 software (Center for disease control and preven-

Table 4. Factors determining the impact of dysmenorrhea on academic activities.

Data	Interruption of academic activity (n = 91)	None impact on academic activity (n = 93)	Odds ratio (95% CI)	<i>p</i> value
Supporting signs				
Irritability	54	31	2.91 (1.60–5.32)	<i>p</i> < 0.0005
Insomnia	38	18	2.98 (1.54–5.79)	<i>p</i> < 0.0012
Joint pain	19	33	0.47 (0.24–0.92)	<i>p</i> < 0.0293
Kind of pain				
Torsion	81	34	14.05 (6.43–30.68)	<i>p</i> < 0.0001
Pain intensity (VAS)				
4 to 5 (minor)	2	11	0.16 (0.03–0.77)	<i>p</i> < 0.0226
6 to 7 (moderate)	39	60	0.41 (0.22–0.74)	<i>p</i> < 0.0035
8 to 10 (severe)	80	67	2.88 (1.29–6.13)	<i>p</i> < 0.0088
Location of pain				
Pelvic	45	66	0.51 (0.27–0.95)	<i>p</i> < 0.0359
Abdominal diffuse	88	50	25.22 (7.44–85.51)	<i>p</i> < 0.0001
Pain duration (day)				
1–2	11	90	0.0046 (0.0012–0.017)	<i>p</i> < 0.0001
3–5	33	90	0.019 (0.0056–0.06)	<i>p</i> < 0.0001
5–10	28	4	9.88 (3.30–29.59)	<i>p</i> < 0.0001

CI, confidence interval.

tion (CDC), Atlanta, GA, USA). For categorical variables, we used the calculation of proportions and for quantitative variables, the calculation of means, medians, and standard deviations. To avoid omitting important risk factors, variables with a *p*-value < 0.5 in the univariate analysis were included in the multivariate regression models using a stepwise algorithm. Data were collected using a questionnaire. In addition, odds ratios (OR) and 95% confidence intervals (CI) were calculated. The significance level of the *p*-value was set at 0.05.

3. Results

We interviewed 326 female students, of which 260 experienced painful periods, with a prevalence rate of 79.7%. The average age was 23.40 years with a standard deviation of 5.13 years. Most people were between the ages of 20 and 35 (75%) and graduated with a bachelor's degree (55.8%). Table 1 present student's general data and Table 2 summarizes the clinical characteristics of dysmenorrhea.

Dysmenorrhea was primary (74.2%), with pelvic pain (42.3%), or diffuse abdominal pain location (53.1%) (Table 2). The average duration is 3.49 days, with a minimum of 1 day and a maximum of 11 days. The pain occurrence is protomenial (51.1%), with an intensity of 8 to 10 (56.9%) and involves torsion (44.2%), which has an impact on school activities (Table 2). In Table 3, we saw that the dysmenorrhea had a definite impact on academic activity in more than half of the (64.2%). The main symptoms described are, weakness (49.2%), nausea associated with vomiting (37.3%), occurrence of diarrhea (36.5%) and emotional irritability (32.7%). This symptomatology was at the origin of a cessation of schooling (35.0%) or even a bed

rest (27.3%). Symptoms such as irritability (*p* < 0.0005) and insomnia (*p* < 1.0012), pain crisis, abdominal torsion (*p* < 2.0001), moderate (*p* < 3.0035) and severe pain intensity (*p* < 3.0088), pelvic (*p* < 3.0359), and diffuse abdominal pain (*p* < 4.0088) are associated with cessation of academic activity. Table 4 summarizes the relevant risk factors for the adverse effects of dysmenorrhea on academic activities. The main risk factors before bedtime include the location of pain (*p* < 0.0001), type of pain (*p* < 1.0001), duration of pain (*p* < 2.0001), intensity of pain (VAS) (*p* < 0.0536), and persistent symptoms. The main risk factors before bedtime include the location of pain (*p* < 0.0001), type of pain (*p* < 1.0001), duration of pain (*p* < 2.0001), intensity of pain (VAS) (*p* < 0.0536), and persistent symptoms. The Table 5 describes the factors related to bedtime.

4. Discussion

Dysmenorrhea is one of the most common and significant health problems, especially among adolescent girls. It results in some negative effects on their daily activities. As described in the West Africa literature, our findings support the claim that menses is the root cause of work and school absenteeism [8–10]. It is reported that absenteeism presents such high rate, that should rise our vigilance. Therefore, we should pay more attention to this missing part in the life of women's lives of childbearing age.

We reported a study that was located in university dormitories in a sub-Saharan country Capital, revealing a significant incidence of dysmenorrhea. However, this prevalence rate only reflects a small portion of the general population, and does not allow predictions of national prevalence rates. In literature, similar discoveries have been made

Table 5. Factors that determine bed rest.

Data	Bed rest (n = 71)	No Bed rest (n = 96)	Odds ratio (95% CI)	<i>p</i> value
Symptoms related to pain				
Weakness	37	91	0.059 (0.02–0.16)	<i>p</i> < 0.0001
Nausea and vomiting	25	72	0.12 (0.065–0.24)	<i>p</i> < 0.0001
Diarrhea	65	30	8.66 (4.32–17.41)	<i>p</i> < 0.0001
Sadness	8	37	0.20 (0.08–0.47)	<i>p</i> < 0.0002
Vertigo	18	44	0.25 (0.13–0.49)	<i>p</i> < 0.0001
Insomnia	18	38	0.31 (0.16–0.61)	<i>p</i> < 0.0006
Types of pain				
Torsion	68	47	24.63 (6.95–80.33)	<i>p</i> < 0.0001
Spasmodic	19	59	0.22 (0.11–0.44)	<i>p</i> < 0.0001
Pain intensity (VAS)				
8 to 10 (severe)	67	81	3.10 (0.98–9.79)	<i>p</i> < 0.0536
Location of pain				
Pelvic	55	56	2.45 (1.23–4.88)	<i>p</i> < 0.0106
Diffuse abdominal pain	68	70	8.41 (2.43–29.11)	<i>p</i> < 0.0008
Pain duration (day)				
1–2	11	90	0.01 (0.22–0.14)	<i>p</i> < 0.0001
3–5	33	90	0.05 (0.0056–0.06)	<i>p</i> < 0.0001
5–10	28	4	14.97 (4.94–45.37)	<i>p</i> < 0.0001

VAS, visual analog scale.

by African [3,8–10,17–22] and Western authors [1,2,6,14–16,19,20]. Dysmenorrhea was reported by majority of respondents aged between 20 and 25, as widely described in Western literature [1,2,6,12–16,19], Asia or Africa [3,5–10]. In fact, dysmenorrhea is widely observed in girls aged 12 to 17 years [1–3,12,19–23]. The main gynecological complaint of adolescents is dysmenorrhea. In some adolescent series, girls are quite young, with an average age of 14.37 years [1,3,8,11,19]. However, in this study, this age group was also affected, with a relatively small proportion (21.2%). Primary dysmenorrhea is defined as pain during the menstrual cycle in the absence of an identifiable cause. This form dominated in this study as widely reported in literature [2–4,8–10,20,21], where it was considered one of the most common causes of pelvic pain in women. The prevalence of dysmenorrhea is difficult to determine as it is usually considered a normal condition [1,2], although in this study, more than half of the students experienced severe pain on VAS (56.92%). Dysmenorrhea was moderate, and pain severity stayed relatively constant with age [12–16,19]. Nonsynclical pelvic pain at least once a month was reported by more than a half of participants [16,19]. Other studies have confirmed this, indicating that the assessment of pain severity and intensity may be subjective due to sociocultural considerations or dysmenorrhea age [1,5,8–10,19].

The report on menstrual abnormalities leading to absenteeism quickly increased attention to menstruation in policy and practice. However, there seem to be few quantitative studies reported in the published literature that capture the prevalence of this hypothetical absenteeism level caused by menstruation [4,14,17]. In most LMICs, the high cost of medical services and insufficient medical insurance limit the use of healthcare (appointment and treatment). This tends to reinforce negative perceptions of health problems, including minimizing the extent of dysmenorrhea-related disorders [3,5–10,21–23]. However, when these pains are associated with disabling symptoms such as weakness, diarrhea, and irritability, medical consultation should be systematic [4,13,14]. Women described the negative effects of these symptoms on social, occupational, and relational activities [4,6,13–15], as this type of dysmenorrhea is a cause of diseases such as absenteeism, intellectual decline, and decreased school performance [4,6,13–15]. Studies assessed the socio-professional, and economic impacts of dysmenorrhea management, including significant money losses [13–18]. The low financial losses observed in African countries are believed to be related to the low attendance rates of health facilities. In this study, due to limited income, few female students consulted doctors (19.23%). In addition, menstrual torsion like painful crisis (*p* < 0.0001), regardless of intensity or location, fatigue is often considered an important cause of dropout as described in the literature [4,17,18]. However, in this study, the suspension of school attendance rate of patients with diffuse abdominal pain was more significant (*p* < 0.0088). According to the description, some quantitative studies have been

published in the literature, reporting on the degree of absenteeism caused by menstruation, especially in African countries [19–25]. The impact of menstruation on reproductive women's lives has not received much attention, unless the consequences are serious, which may lead to absenteeism in formal or informal employment and challenge women at home [26–28]. Regarding this study, many other symptoms such as irritability ($p < 0.0005$) and insomnia ($p < 1.0012$) were significantly associated with school activity suspension. The main risk factors for bedtime include the location of pain ($p < 0.0001$), type of pain ($p < 1.0001$), duration of pain ($p < 2.0001$), and intensity of pain (VAS) ($p < 0.0536$). The literature reports on other factors of school absenteeism in our African context, as menstruation is often seen as “dirty” or “unclean”, and women and adolescent girls hope to hide evidence of menstruation, or limit activities such as cooking during menstruation [27–30].

5. Conclusions

Dysmenorrhea is a common disease among women of childbearing age, especially young girls. Due to social, cultural, and financial considerations, even in a university environment, poor countries may have insufficient diagnosis or poor treatment. The negative impact on quality of life, work and school attendance, physical and psychological emotions is undeniable. Effective management is mainly based on pain relief, through pharmacological means or the use of alternative procedures.

Availability of Data and Materials

Data supporting the results of this study are available from the corresponding author, but restrictions apply to their availability. The data were used under license for the current study, and are therefore not publicly available. However, the data are available from the authors upon reasonable request and with permission from Dehi Boston Mian.

Author Contributions

PN'G, DBM, VA, KN'G and SB made substantial contributions to conception, acquisition, or interpretation of data. PN'G, DBM, VA, KN'G, SB, have been involved in drafting the manuscript or reviewing it critically for important intellectual content. PN'G, DBM, VA, KN'G, SB, given final approval of the manuscript to be published, have participated in the work to take public responsibility for appropriate portions of the content, and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Ethics Approval and Consent to Participate

We have obtained the approval of the National Committee of Ethics of Health and Life (N 322666-CI/2020) of

the Felix Houphouët Boigny University for the publication of this manuscript. All subjects gave their informed consent for inclusion before they participated in the study.

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Conflict of Interest

The authors declare no conflict of interest.

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