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Prevalence, Clinical Characteristics, and Factors Associated with the Severity of Primary Dysmenorrhea among Adolescent Girls in Douala (Cameroon)

Michèle Florence Mendoua[1*], Isabelle Mekone[2], Junie Ngaha[1], Gervais Mounchikpou Ngouhouo[1], Bilkissou Moustapha[1], Charlotte Tchente Nguefack[1], Emile Mboudou[3]

[1]Department of Surgery and Specialties, Faculty of Medicine and Pharmaceutical Sciences, University of Douala, Douala, Cameroon
[2]Department of Pediatrics, Faculty of Medicine and Biomedical Sciences, University of Yaounde I, Yaounde, Cameroon
[3]Department of Obstetrics and Gynecology, Faculty of Medicine and Biomedical Sciences, University of Yaounde I, Yaounde, Cameroon
Email: *mmendoua29@gmail.com

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Abstract

Introduction: Primary dysmenorrhea is the most frequent cause of pelvic pain in adolescent girls and constitutes a major public health problem. In Douala, its clinical characteristics and determinants of severity remain understudied. The objective of this study was to determine the prevalence, describe the clinical characteristics, and identify the factors associated with the severity of primary dysmenorrhea among school-going adolescent girls in Douala. **Methods:** A cross-sectional analytical study was conducted from October 2023 to April 2024 in five secondary schools in Douala. A total of 1,045 adolescent girls aged 13 - 19 years were randomly selected. Data, collected via a self-administered questionnaire, covered socio-demographic, gynecological, and clinical characteristics. Pain intensity was evaluated using a Visual Analog Scale (VAS). Associations between dysmenorrhea severity and menstrual characteristics were explored by logistic regression. **Results:** The prevalence of primary dysmenorrhea was 76.5% (800/1,045). The mean age at menarche was 12.9 ± 1.5 years. Pain most often occurred from the first day of menses (66.5%), lasted more than 24 hours in 56.8% of cases, and was localized to the lower abdomen (71.8%). Associated symptoms included headaches (39.7%), breast pain (35.2%), and nervousness (32.6%). Severe pain was significantly associated with irregular cycles (OR = 1.52; p = 0.017), prolonged menstruation ≥6 days (OR = 2.45; p < 0.001), heavy menstrual flow (OR = 2.31; p <

0.001), and pain occurring every cycle (OR = 2.04; $p < 0.001$). **Conclusion:** Primary dysmenorrhea affects more than three-quarters of adolescent girls in Douala. Its severity is associated with menstrual characteristics (irregularity, longer duration, and heavy flow of menses). These results underscore the need to integrate menstrual health education and psychological support into school programs to reduce its impact on young girls' quality of life and schooling.

Keywords

Primary Dysmenorrhea, Adolescent, Prevalence, Clinical Characteristics, Severity Factors, Cameroon

1. Introduction

Primary dysmenorrhea, defined as recurrent pelvic pain during menstruation in the absence of identifiable pelvic pathology, is the most common gynecological condition in adolescence and early reproductive life [1]. It is mainly due to an excessive production of prostaglandins leading to uterine hypercontractility and transient myometrial ischemia [2]. Its reported frequency varies widely, ranging from 45% to 95% worldwide, with particularly high rates observed among secondary school and university students [3] [4]. In recent years, several surveys have confirmed that more than two out of three adolescent girls suffer from dysmenorrhea, notably in Africa and Asia [5]-[7]. In Cameroon, dysmenorrhea has been reported in over half of female students in Dschang [8] and in over 70% in Yaoundé [9]. However, few studies have focused on Douala, the economic capital of the country, where academic and social pressures are high and the impact of dysmenorrhea on adolescent health remains underexplored. Furthermore, detailed descriptions of clinical characteristics and analyses of severity factors are limited in the local literature. It is in this context that we conducted the present study, with the aim of estimating the prevalence of primary dysmenorrhea among adolescent girls in Douala, describing its clinical manifestations, and identifying the main factors associated with its severity.

2. Methods

2.1. Study Design and Setting

We conducted a cross-sectional analytical study among adolescent schoolgirls in the city of Douala, the economic capital of Cameroon. The survey took place from October 2023 to April 2024 in five secondary schools selected to represent the socio-economic and educational diversity of the city.

2.2. Study Population

The target population consisted of girls aged 13 to 19 years who had already started menstruating. We included students who were present at the time of the

survey and provided informed consent. We excluded those older than 19 years, those who refused to participate, and those with a known gynecological pathology that could explain pelvic pain (such as endometriosis or uterine malformations). Primary dysmenorrhea was defined as menstrual pain occurring in the absence of any identifiable pelvic pathology.

2.3. Sampling and Sample Size

Participants were randomly selected from class rosters. The sample size was calculated assuming an anticipated prevalence of 50%, a 95% confidence level, and a 5% precision. In total, 1045 adolescent girls were recruited.

2.4. Data Collection

Data were collected using an anonymous self-administered questionnaire that was pre-tested prior to the study. The questionnaire covered:

- **Socio-demographic characteristics:** age, marital status, educational level, body mass index (BMI), family history of dysmenorrhea;
- **Gynecological history:** age at menarche, regularity of menstrual cycles, duration and flow of menses;
- **Clinical characteristics of menstrual pain:** intensity, duration, location, associated symptoms;
- **Assessment of menstrual pain severity:** measured using a 0 - 10 Visual Analog Scale (VAS) and categorized into three levels: mild (1 - 3), moderate (4 - 6), and severe (7 - 10).

2.5. Statistical Analysis

Data were entered and analyzed using SPSS software version 25.0. Qualitative variables were expressed as frequencies and percentages, and quantitative variables as means ± standard deviation. Comparisons were made using Pearson's chi-square test. Factors associated with dysmenorrhea severity were explored using binary logistic regression. Statistical significance was set at $p < 0.05$. The co-variables included in the logistic regression model were: age, BMI, age at menarche, cycle regularity, duration of menses, flow volume, frequency of menstrual pain, and family history of dysmenorrhea. Model fit was verified using the Hosmer-Lemeshow test ($p > 0.05$).

2.6. Ethical Considerations

The study was approved by the Institutional Ethics Committee of the University of Douala. Administrative authorization was obtained from the heads of the participating schools. Participation was voluntary, with informed consent obtained from the adolescents and, for minors, from their parents or legal guardians. Anonymity and data confidentiality were ensured.

3. Results

A total of 1200 students were enumerated in the five selected secondary schools.

After applying the exclusion criteria, 155 adolescents were removed from the study: 90 did not provide consent, 40 were older than 19 years, and 25 did not meet the inclusion criteria. Thus, 1045 participants were included in the final analysis. Among them, 800 reported suffering from primary dysmenorrhea, corresponding to a prevalence of 76.5%, while 245 (23.5%) reported no menstrual pain (Figure 1).

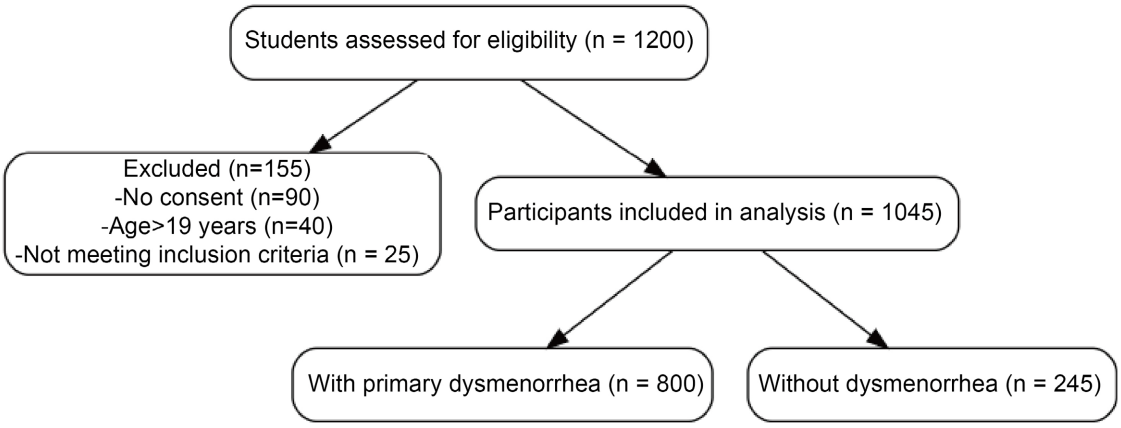

Figure 1. Flow diagram of participant selection.

3.1. Overall Population Characteristics and Dysmenorrhea Prevalence

A total of 1,045 adolescent girls aged 13 to 19 years were included in the study. The mean age was 17 ± 1.2 years. The majority of participants were single and in the second cycle of secondary education (upper secondary school). Of the 1045 girls surveyed, 800 reported experiencing primary dysmenorrhea, yielding a prevalence of 76.5%.

3.2. Clinical Characteristics of Dysmenorrheic Adolescents

3.2.1. Distribution by BMI and Menarche

In our study, 67.0% of dysmenorrheic adolescents had a normal BMI; 11.0% were overweight and 22.0% were obese. The most common age at menarche was 13 years (26.5% of participants). The mean age at menarche was 12.88 ± 1.46 years, with extremes of 9 and 17 years (Figure 2).

3.2.2. Menstrual Characteristics

Among the 800 dysmenorrheic adolescents, menstrual cycles were regular in nearly three-quarters of cases (75.3%), while one-quarter (24.7%) reported irregular cycles. The duration of menses was 4 - 5 days for more than half of the participants (56.5%). Nearly one-third (30.7%) had prolonged menstruation lasting six days or more, whereas 12.8% reported short menses of three days or less. Regarding menstrual flow, the majority of adolescents described a moderate flow (62.6%), versus 22.9% who reported it as heavy and 14.5% who considered it light. Finally, the frequency of menstrual pain was particularly high: more than seven in

ten adolescents (70.5%) suffered dysmenorrhea at each cycle, while one in five (20.8%) experienced it every other cycle and 8.7% only occasionally (Table 1).

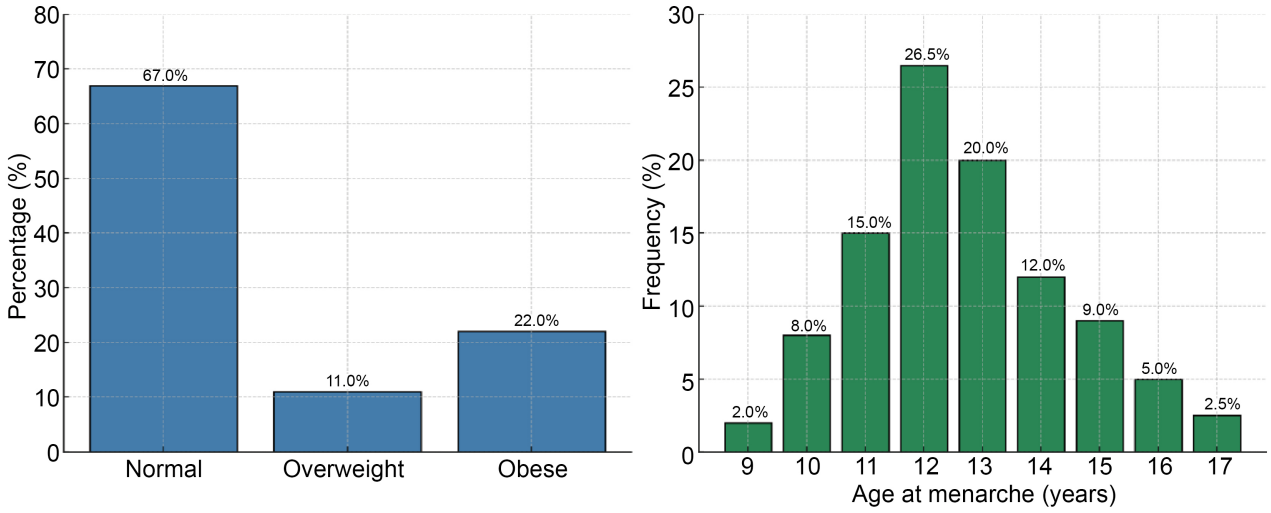

Figure 2. Distribution of dysmenorrheic adolescents according to BMI and age at menarche.

Table 1. Menstrual characteristics among dysmenorrheic adolescents (n = 800).

Variables	Categories	n	%
Cycle regularity	Regular	602	75.3
	Irregular	198	24.7
Duration of menses (days)	≤3	102	12.8
	4 - 5	452	56.5
	≥6	246	30.7
Menstrual flow	Light	116	14.5
	Moderate	501	62.6
	Heavy	183	22.9
Frequency of dysmenorrhea	Every cycle	564	70.5
	Every other cycle	166	20.8
	More rarely	70	8.7

3.2.3. Dysmenorrhea Characteristics

Among the 800 dysmenorrheic adolescents, menstrual pain appeared after the first year of menstruation in nearly seven out of ten cases (68%), while one-third reported an onset during the first year following menarche. The timing of pain onset most often coincided with the beginning of the menstrual flow (66.5%). It occurred less frequently *before* menstruation (10.0%) or *during* menses (7.8%), and only exceptionally at the *end* of menses (1.2%). The pain duration generally exceeded 24 hours: more than half of the adolescents (56.8%) reported prolonged persistence, whereas 17.0% reported a duration limited to one day and 3.8% experienced pain lasting less than 24 hours. The pain location was primarily pelvic,

with a clear predominance in the lower abdomen (71.8%). Some adolescents reported radiation of pain to the lower back (7.3%) or to the lower limbs (2.8%). Regarding intensity, the pain was described as moderate by about two out of five participants (40.5%), severe in 17.2% of cases, and mild in 22.8%. Finally, pain frequency showed that 40.0% of the adolescents experienced it *occasionally*, 13.2% *frequently*, and 31.3% *constantly* with each menstruation (Table 2).

Table 2. Dysmenorrhea characteristics among dysmenorrheic adolescents (n = 800).

Characteristic	Category	n	%
Delay of onset after menarche	Within first year (ref.)	256	32.0
	After the first year	544	68.0
Timing of pain onset	Before menses	80	10.0
	At start of menses	532	66.5
	During menses	62	7.8
	End of menses	10	1.2
Duration of pain	<24 h	30	3.8
	=24 h	136	17.0
	>24 h	454	56.8
Pain location	Lower abdomen	574	71.8
	Lower back	58	7.3
	Radiating to legs	22	2.8
Pain intensity	Mild	182	22.8
	Moderate	324	40.5
	Severe	138	17.2
Pain frequency	Occasional	320	40.0
	Frequent	106	13.2
	Constant	250	31.3

3.3. Associated Symptoms of Dysmenorrhea

Among the 800 adolescents reporting dysmenorrhea, 80.7% indicated at least one associated symptom. Headaches were the most frequent symptom, reported by 39.7% of participants, followed by breast pain (35.2%) and nervousness (32.6%). Psychological symptoms such as depressive mood (27.3%) and insomnia (18.3%) were also reported, reflecting the emotional and behavioral impact of menstrual pain. On the digestive side, abdominal bloating (22.3%), nausea (16.9%), diarrhea (19.8%), and more rarely vomiting (5.0%) accompanied the symptomatology. Fainting, although rare (0.6%), attests to very severe presentations. These results confirm that dysmenorrhea in adolescents is accompanied by a wide range of somatic, psychological, and functional manifestations, which can increase morbidity and impair quality of life both in school and social contexts (Figure 3).

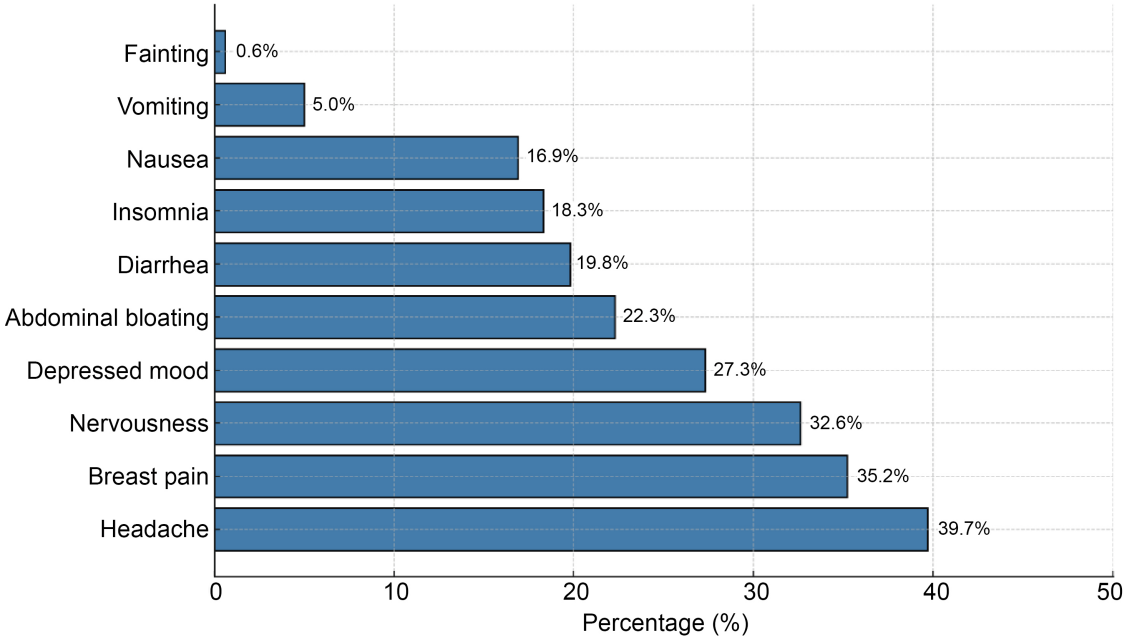

Figure 3. Symptoms associated with dysmenorrhea.

3.4. Factors Associated with Dysmenorrhea Severity

The analysis of pain intensity relative to menstrual characteristics revealed several significant associations. Adolescents with irregular cycles reported severe pain more often than those with regular cycles (22.0% vs 15.0%; OR = 1.52; 95% CI: 1.10-2.12; p = 0.017). Similarly, longer menstrual duration increased pain intensity: severe pain was markedly more frequent when menses lasted six days or more (28.0%), compared to short menses (12.0%; OR = 2.45; 95% CI: 1.68 - 3.58; p < 0.001). Heavy menstrual flow was also a determining factor: 27.0% of adolescents with heavy flow suffered severe pain versus 13.0% of those with light flow (OR = 2.31; 95% CI: 1.62 - 3.30; p < 0.001). Finally, the frequency of dysmenorrhea correlated with pain severity: the proportion of severe pain rose from 11.0% in those with occasional dysmenorrhea to 25.0% in those affected at every cycle (OR = 2.04; 95% CI: 1.48 - 2.83; p < 0.001). These findings suggest that dysmenorrhea severity is heightened by irregular, prolonged, heavy, and very frequent menses, confirming the role of menstrual characteristics as predictive factors for intense pain in adolescent girls (Table 3).

Table 3. Association between pain intensity and menstrual characteristics (n = 800).

Menstrual characteristic	Category	Mild %	Moderate %	Severe %	OR (95% CI)	p-value
Cycle regularity	Regular (ref.)	24.0	41.0	15.0	1.00	–
	Irregular	20.0	38.0	22.0	1.52 (1.10 - 2.12)	0.017
Duration of menses	≤3 days (ref.)	28.0	35.0	12.0	1.00	–
	4 - 5 days	24.0	42.0	17.0	1.38 (0.96 - 1.98)	0.074
	≥6 days	18.0	36.0	28.0	2.45 (1.68 - 3.58)	<0.001

Continued

Menstrual flow	Light (ref.)	27.0	39.0	13.0	1.00	–
	Moderate	23.0	41.0	16.0	1.26 (0.91 - 1.74)	0.15
	Heavy	18.0	34.0	27.0	2.31 (1.62 - 3.30)	<0.001
Dysmenorrhea frequency	Occasional (ref.)	28.0	39.0	11.0	1.00	–
	Every other cycle	22.0	40.0	18.0	1.52 (1.05 - 2.22)	0.028
	Every cycle	19.0	38.0	25.0	2.04 (1.48 - 2.83)	<0.001

4. Discussion

The present study shows a high prevalence of primary dysmenorrhea (76.5%) among school-going adolescent girls in Douala. Our results are in line with those reported in other sub-Saharan African countries, where prevalence reaches around 70% on average [3]-[5]. For instance, a prevalence of 72% was described in Yaoundé [9], while in Dschang it was 55% [8]. In Ethiopia, Mammo *et al.* reported 72% of adolescents affected [5], and Gindaba *et al.* found similar rates [6]. These contextual differences may be explained by the diversity of socio-cultural determinants, the level of academic stress, and access to healthcare [8] [9].

Clinically, the mean age at menarche observed (12.9 years) is consistent with recent data from Africa [3] [6] [7] and Asia [10]. The menstrual characteristics identified (irregular cycles, prolonged and heavy periods) emerged as significant factors associated with severity. These results corroborate findings from Ethiopia and Palestine, which show that long durations of bleeding and heavy flow double the risk of severe pain [5]-[7]. The most widely accepted pathophysiological explanation is an excessive production of prostaglandins, which is elevated in cases of heavy and prolonged periods, leading to increased uterine hypercontractility and myometrial ischemia [2] [11].

Associated symptoms were frequent (80.7%), dominated by headaches, digestive disturbances, and nervousness. This polymorphic symptom profile has been reported in other recent studies, notably in Brazil [12] and in Palestine [7]. The psychological impact merits particular attention: nearly one-third of our participants reported depressive mood or insomnia, confirming the results of Liu *et al.* who established a direct link between chronic stress, anxiety, and dysmenorrhea intensity [13].

The magnitude of the problem among adolescents calls for a public health response. Approaches focused solely on self-medication have proven insufficient and potentially deleterious [7] [14]. Schools thus appear to be strategic settings for screening and management. In the Cameroonian context, the integration of menstrual health modules into school curricula would be a pragmatic and realistic advance [15].

5. Strengths and Limitations of the Study

We did not include analgesic use, physical activity, or caffeine consumption in our

analysis, as these factors are considered therapeutic interventions or coping methods used by the adolescents rather than intrinsic determinants of dysmenorrhea severity. Nonetheless, their role deserves to be explored in future studies.

Our study has several strengths, notably the large sample size and the representativeness of the Douala secondary schools, which confer robust validity to the results. However, certain limitations exist, including the self-reported nature of the data (a potential source of recall bias) and the absence of ultrasound evaluation, which means some secondary causes of pelvic pain could not be entirely ruled out. Despite these limitations, this work adds to the local literature on adolescent dysmenorrhea.

6. Conclusion

Primary dysmenorrhea affects more than three-quarters of adolescent girls in Douala, with severity correlated to long, heavy, and irregular menstrual periods. Management should go beyond symptomatic treatment, including education, psychological support, and the integration of menstrual health initiatives in schools.

Authors' Contributions

All authors participated in the conception and writing of this work.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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