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Research Article

Primary dysmenorrhea among adolescents in the District of Constantine, Algeria

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Abstract

To determine the frequency of dysmenorrhea, its properties and its impact, behaviour of adolescents in the District of Constantine, and to explore the relationship between dysmenorrhea and several presumed risk factors. A cross-sectional study was employed in 562 adolescent girls. A multiple-choice questionnaire was administered to the adolescents. The severity of dysmenorrhea pain was assessed by visual analogy scale. Data were obtained and analysed using SPSS version 22. In the sample, the frequency of dysmenorrhea was 89.7%. In 55.6% of cases the pains appeared after the 1st year of menstruation. The mean intensity of pain was 5.64 ± 3.02. Of all adolescents experiencing dysmenorrhea, 51.2% reported moderate pain. 58.7% reported the duration of their menstrual pain as 24 hours or less. 47.30% experienced pain most at onset of menses. A variety of signs were reported mostly nervousness (65.6%), headache (45.9%); depressed mood (35.8%) and painful breast (32.4%). 89.7% reported missing. Only 12.4% of the adolescents consulted a doctor for their dysmenorrhea; 44.7% used a medical prescription and self-medication. The most common medications used were Paracetamol, Phloroglucinol and Diclofenac potassium. 74.5% used herbal treatment to manage their dysmenorrhea. The results show that risk factors that showed significant association with pain severity were family history, duration of menstrual period, nature of menstrual flow and the psychological profile. The frequency of dysmenorrhea among the District of Constantine is high, and the pain that these adolescents suffer can be severe, disabling. Our results suggest that family history, duration and nature of menstrual flow and the psychological profile are important risk factors associated with dysmenorrhea.

Keywords: adolescents; Constantine; menstrual pain; primary dysmenorrhea; symptoms

Introduction

Painful menstruation, a common gynecologic problem, significantly affects the routine life of most of the affected girls. Most females experience some degree of pain and discomfort during menstrual period, which can impact on their daily activities, and disturb their productivity at home or at their workplace (Dawood, 2006). Literature reviews of previous studies (De Sanctis *et al*., 2017) suggested that the prevalence of primary dysmenorrhea ranged from 34% or 45 to 95% among menstruating women.

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Dysmenorrhea tends to affect adolescent females more frequently than older women; therefore, results from studies reporting prevalence among adolescent girls cannot be generalized to older women (Latthe *et al*., 2006).

Dysmenorrhea is divided into two namely primary dysmenorrhea and secondary dysmenorrhea. Primary dysmenorrhea is defined as painful menstruation in the absence of pelvic pathology (Kho and Shields, 2020). Primary dysmenorrhea shares characteristics with common recurrent and chronic pain disorders of childhood and adolescence without injury or definable disease (Champion *et al.,* 2021). Some characteristics include spontaneous onset; no clinically indicative biomarkers or pathology; disordered somatosensory processing in the central nervous system; multiple comorbidities or associations with additional disorders, including anxiety and depression; and multiple risk markers (with possible causal associations) (Friedrichsdorf *et al*., 2016). In contrast, secondary dysmenorrhea presentation is a clinical situation where menstrual pain can be due to an underlying disease, disorder, or structural abnormality either within or outside the uterus (Mrugacz *et al*., 2013).

Dysmenorrhea is a complex multifactorial trait and would be expected to have multiple genetic and environmental causal influences, including multiple small gene effects. There is evidence for specific genes which may account for components or mechanisms of genetic risk on primary dysmenorrhea (Aouad *et al*., 2022). Dysmenorrhea is the most common gynecologic complaint and the leading cause of recurrent short-term school or work absenteeism among female adolescents and young adults (Klein *et al*., 1981). In addition, dysmenorrhea hinders the girls' ability to concentrate on their studies, affects their academic performance, and has significant consequences for both the individual and society (Hillen *et al*., 1999).

The present study aimed to determine the property of dysmenorrhea in a sample of adolescent girls, to explore the relationship between dysmenorrhea and several presumed risk factors and to evaluate its personal and social impact, and the treatment-seeking behaviour of these adolescents.

Materials and Methods

The cross-sectional study was carried out in the District of Constantine, situated in eastern Algeria. The study population comprised 562 healthy unmarried adolescent girls, aged 15 to 18 years, who had already experienced menstruation but had not given birth. Data collection was conducted through surveys employing a questionnaire that captured sociodemographic and gynaecological/menstruation-related variables. The questionnaire encompassed the subsequent information: Description of pain and symptoms linked to dysmenorrhea; Utilized medications for managing dysmenorrhea; Correlation between the severity of pain and factors such as menarche, family history, and duration of the menstrual period; Severity of pain, attributes of menstrual flow, and classification of pain severity based on psychological profile.

The adolescents were queried about experiencing symptoms commonly linked with dysmenorrhea. Dysmenorrhea was characterized as 'experiencing painful menstruation in the last three months,' and the intensity of pain was evaluated through a visual analogue scale (VAS) (Bruera, 1991). VAS scores were classified on a scale of 1 to 10. The collected data underwent analysis using the Statistical Package for the Social Sciences (SPSS) software, specifically the IBM version 20. The significance threshold was established at $p < 0.05$.

Results

The mean age of the adolescents within our study group was 16.36±1.05 years. The average age of menarche was 12.6±1.24 years. A significant portion of respondents (77.6%) reported experiencing menarche between the ages of 10 and 13. The occurrence rate of dysmenorrhea was 89.7%. The average intensity score

for the pain was 5.64±3.02. In 55.6% of cases, the pain manifested after the first year of menstruation. Additionally, 79.2% had a familial history of dysmenorrhea. About 58.7% of participants reported that the duration of their menstrual pain lasted 24 hours or less. Among all adolescents encountering dysmenorrhea, 51.2% reported experiencing moderate pain, while 34.6% reported severe pain.

Around 39.90% of the participants experienced the pain a few days prior to the initiation of menstrual flow, while 47.30% experienced the pain primarily at the onset of menses. Within our study, 39.5% of the adolescents indicated that pain concerns the lower abdomen and back, often radiating to the lower limbs. The participants reported a range of symptoms. The most prevalent physical symptom noted was nervousness (65.6%), with 45.9% of individuals reporting headaches, 35.8% experiencing a depressed mood, and 32.4% reporting painful breasts (Table 1).

Table 1. Description of pain and symptoms associated with dysmenorrhea

Characteristics		%
Distribution of pain severity	Severe	34.6
	Moderate	51.2
	Mild	14.2
Localization of pain	Lower part of the abdomen	38.10
	Lower part of the abdomen and back and irradiation to the lower limbs	39.50
	Lower part of the back	16.40
	Irradiation to the lower limbs	6.10
Symptoms associated with dysmenorrhea	Nervousness	65.6
	Headache	45.9
	Depressed mood	35.8
	Painful breast	32.4
	Nausea	29
	Abdominal loading	27.9
	Diarrhea	23.8
	Vomiting	28.3
	Insomnia	28.1
	Syncope	15.7

Over half of the participants indicated that the duration of their menstrual flow fell within the range of 4 to 6 days. A substantial majority of the participants (69.6%) reported having regular menstrual cycles. In terms of the length of the menstrual cycle, 23.1% of respondents reported cycles lasting less than 28 days. The majority of adolescents described their menstrual flow as moderate. Furthermore, a significant portion of respondents (89.7%) reported missing 1 to 2 days of menstruation in the past year.

Approximately 52.7% of the adolescents experiencing dysmenorrhea noted that their painful menstruation had an impact on their concentration in the classroom. Only 12.40% of the adolescents sought consultation with a doctor for their dysmenorrhea, while 44.7% resorted to medical prescriptions and self-medication. Of these, 41.6% reported effectiveness. The most frequently used medications were Paracetamol, Phloroglucinol, and Diclofenac potassium (Table 2). A majority of adolescents with dysmenorrhea (74.5%) turned to herbal treatments for managing their symptoms, with 58.5% of them reporting effectiveness.

Table 2. Drugs used to treat dysmenorrhea

Drugs	%
Paracetamol	40.2
Phloroglucinol	24.4
Diclofenac potassium	22.4
Diclofenac sodium	5.5
Ibuprofen	3.5
Contraceptive Pill	1.6
Flurbiprofene	1.2

Risk factors demonstrating a significant association ($p < 0.05$) with pain severity included family history, duration of menstrual period, nature of menstrual flow, and psychological profile.

A majority of adolescents who experienced early menarche encountered severe pain, constituting 47% of the cases. Among adolescents with a family history of dysmenorrhea, 44.7% endured severe pain. We observed a progressive rise in pain severity corresponding to longer menstrual durations. Specifically, the majority of individuals with a menstrual bleeding duration exceeding 6 days (58.9%) reported experiencing severe pain (Table 3)

Table 3. Pain severity and the menarche, the family history and the duration of menstrual period

Pain severity	Age at menarche			Family history of dysmenorrhea		Duration of menstrual period		
	10-11	12-13	14-16	Yes	No	<4 day	4-6 day	>6 day
No pain (0) %	12.0	10.1	5.6	8.8	12	12.1	10.3	6.0
Mild (1-3) %	8.4	13.5	22.6	13.5	19.7	17.2	17.6	7.3
Moderate (4-6) %	32.5	33.0	38.7	33	38.5	38.4	35.9	27.8
Severe (7-10) %	47.0	43.4	33.1	44.7	29.9	32.3	36.2	58.9
p	0.631			0.157		0.000*		

p value: Analysis done using Chi-square test for trend.

A correlation between pain intensity and menstrual flow was evident, with pain intensity rising in tandem with increased menstrual flow. Notably, 65.9% of individuals experiencing a heavy flow reported severe pain. Among those enduring severe pain, the intensity of dysmenorrhea exhibited an inverse relationship with cycle length. Specifically, 44.6% of girls with menstrual cycles shorter than 28 days experienced severe pain. Furthermore, menstrual cycle irregularity appeared to be linked with moderate and severe pain (Table 4).

Table 4. Pain severity and characteristics of menstrual flow

Pain severity	Nature of menstrual flow			Length of cycle			Regularity of cycle	
	Light	Moderate	Heavy	< 28 days	28 days	> 28 days	Regular	Irregular
No pain (0) %	15.3	9.5	4.4	6.9	9.6	10.9	8.7	11.1
Mild (1-3) %	20.8	15.5	6.6	14.6	15.3	14.2	15.9	12.3
Moderate (4-6) %	3.3	36.8	23.1	33.8	32.9	36.1	35.3	31.6
Severe (7-10) %	30.6	38.1	65.9	44.6	42.2	38.8	40.2	45
p	0.001*			0.229			0.097	

p value: Analysis done using Chi-square test for trend.

Within our study cohort, 69.6% of adolescent girls disclosed experiencing severe pain during examination periods. Emotional shocks, stress, and academic setbacks likewise displayed an apparent connection with severe pain among the majority of adolescents. Furthermore, pain severity was notably correlated with the psychological profiles of the adolescents. (Table 5).

Table 5. Distribution of pain severity according to the psychological profile

Pain severity	No psychological problem	Family conflict	School failure	Emotional shock	Exam period	Stress
No pain (%)	25.3	3.1	0	0	0	0
Mild (%)	15.8	24.4	11.4	1.9	4.2	5.4
Moderate (%)	31.1	42.5	31.6	32.1	29.2	25
Severe (%)	26.8	30	57	66	66.7	69.6
P	0.077	0.000*	0.001*	0.000*	0.001*	0.015*

p value: Analysis done using Chi-square test for trend.

Discussion

Limited data exists concerning dysmenorrhea and its related factors in Algeria. To the best of our knowledge, our study stands as the pioneering investigation that focuses on the distinct attributes of primary dysmenorrhea within the adolescent population residing in the Constantine district. The prevalence of dysmenorrhea within our study cohort was 89.7%. This discovery aligns with rates reported in other regions, such as Ethiopia (85%), Iraq (89.4%), and Turkey (85.7%) as indicated by Shiferaw *et al.* (2014), Al Asadi *et al.* (2013), and Potur *et al.* (2014). However, it surpasses the figures observed in Egypt, Bangladesh, and China, where the respective prevalence rates were 65.4%, 59.8%, and 56.4% (Nooh, 2015; Haque *et al*., 2014; Zhou *et al.,* 2010).

The incidence of dysmenorrhea identified in this study was comparatively lower than that observed in other investigations, which reported rates of 93% (Parker *et al.,* 2010) and 90.7% (Khamdan *et al.,* 2014). This divergence in prevalence could potentially stem from dissimilarities in age brackets, socio-cultural backgrounds of respondents, and variations in pain perception. Adolescents often encounter discomfort—both physical and emotional—during menstruation, which can lead them to perceive the pain as highly intense. Conversely, previous studies have highlighted that genetic, psychological, developmental, familial, social, and cultural factors collectively influence the perception and expression of pain (Lghoul *et al.,* 2020).

Dysmenorrhea manifests as intermittent, spasmodic menstrual cramps, sometimes likened to "labor-like" pains, which typically initiate only a few hours prior to or coinciding with the onset of menstrual flow. The symptoms of primary dysmenorrhea are typically confined to a span of 2-3 days. The intensity of pain peaks during the initial one or two days of menstrual flow, specifically within the first 24 to 36 hours. This temporal pattern aligns with the peak release of prostaglandins into the menstrual fluid. These cramps are centered in the suprapubic region, often radiating to the inner aspects of the thighs. Backache, nausea, vomiting, and diarrhea frequently accompany these cramps, observed in a substantial proportion of cases (Ylikorkala *et al.*, 1978). Pain is inherently subjective and proves challenging to quantify objectively. Dysmenorrhea bears significance as a health concern for adolescents as it can significantly disrupt daily activities and undermine their overall quality of life (De Sanctis *et al.,* 2015). Pain is defined as an undesirable amalgamation of sensory and emotional sensations that stems from actual or potential tissue damage or is described in terms of such damage (Loeser *et al.,* 2008). Menstrual distress engenders discomfort and perturbing pain (Patel *et al.,* 2006).

Numerous investigations have highlighted the substantial repercussions of dysmenorrhea. Notably, dysmenorrheic pain can bear a comparable burden to surgical pain or other forms of chronic or acute pain (Loeser *et al.,* 2008). Within our study, the average intensity score for pain stood at 5.64±3.02, with 34.6% of

the students characterizing their dysmenorrheic pain as severe. In various countries, severe pain has been reported by 6.3% to 42% of adolescent girls grappling with dysmenorrhea (Baidya *et al.,* 2014). The release of prostaglandins and other inflammatory agents within the uterus is widely implicated as a pivotal contributor to dysmenorrhea. Specifically, levels of prostaglandins have been found to be markedly elevated in individuals experiencing severe menstrual pain compared to those with mild or negligible pain (Proctor *et al.,* 2006).

Primary dysmenorrhea in adolescents was confirmed as having characteristics typical of a primary pain disorder, including heritability and selected associations (Aouad *et al.,* 2022). Beyond pain, which stands as the primary symptom, dysmenorrhea engenders discomfort due to its subsequent clinical manifestations. Within our current study, a range of associated symptoms have been identified. Notably, the most prevalent symptoms reported by students grappling with dysmenorrhea were nervousness, headaches, and a depressed mood. These symptoms align with those previously documented in the literature (De Sanctis *et al.,* 2016). However, another study documented a higher frequency of the most common symptoms, which included stomach cramps (78%), backaches (58.9%), and mood changes (56.9%) (Ahuja *et al.,* 2016).

Merely 12.4% of adolescents experiencing dysmenorrhea sought consultation with a doctor for this issue. This proportion was comparatively higher when contrasted with rates reported in other studies conducted in Egypt (9%) (Mohamed, 2012), Oman (3%) (Anandha *et al.,* 2011), and Tamil Nadu (9.7%) (Anandha *et al.,* 2011). However, it falls below the figures recorded in studies from Mexico (28%) (Ortiz *et al.,* 2009) and the USA (14%) (Banikarim *et al.,* 2000). This phenomenon can potentially be attributed to the perception that adolescents might view pain as a routine accompaniment to the menstrual cycle, leading them to forego seeking medical guidance even when their symptoms are notably severe and debilitating.

The fundamental options for pain relief primarily revolve around a limited selection of medications, namely Paracetamol, Nonsteroidal anti-inflammatory drugs (NSAIDs), and opioids. Generally, opioids are prescribed for moderate pain that remains unresponsive to NSAIDs and for severe pain (WHO, 1996). Our findings highlight that the most prevalent treatments utilized by adolescents dealing with dysmenorrhea included Paracetamol, antispasmodics, and Diclofenac potassium. However, a notably low percentage of adolescents resorted to using NSAIDs. This underscores the necessity for educating both girls and their parents about effective approaches for treating dysmenorrhea, with a focus on the use of NSAIDs, appropriate dosage, including the possibility of prophylactic administration and the correct dosing frequency.

Dysmenorrhea has been linked to various risk factors. Our study findings indicated that pain severity displayed a notable association with risk factors such as family history, duration of the menstrual period, nature of menstrual flow, and the psychological profile. However, earlier research has suggested that early menarche is correlated with a heightened occurrence of primary dysmenorrhea (Al-Matouq *et al.,* 2019).

The presence of a family history of dysmenorrhea has been observed to exhibit a robust connection with the reporting of menstrual pain (Wang *et al.,* 2004). Some researchers have suggested that this link might stem from learned behaviours from mothers and sisters (Potur *et al.,* 2014). Nonetheless, maternal transmission of primary dysmenorrhoea in adolescents and young women was demonstrated (Aouad *et al.,* 2022).

In various investigations, the relationship between dysmenorrhea and the regularity of menstrual periods has yielded inconsistent findings. Some studies have shown no significant association (Al-Kindi *et al.,* 2011), while others have highlighted a positive correlation between irregular periods and dysmenorrhea (Latthe *et al.,* 2006; Patel *et al.,* 2006). Within our study, it is conceivable that females experiencing dysmenorrhea were more inclined to describe their menstrual periods as regular due to their anticipation of the monthly occurrence of their pain.

In accordance with our findings, both the duration and nature of menstrual flow exhibited a significant association with dysmenorrhea, a trend that aligns with several other studies (Habibi *et al.,* 2015). The relationship between menstruation flow and dysmenorrhea is attributed to the shared influence of prostaglandins. When blood flow is elevated, prostaglandins can perturb the endometrial homeostasis,

potentially leading to increased blood flow. Furthermore, prostaglandins can impact platelet aggregation and coagulation factors, thereby contributing to elevated menstrual blood flow (Jensen *et al.,* 1987).

However, it's plausible that the connection between menstrual flow and dysmenorrhea might not be straightforward. There's a possibility that females who experienced pain were more inclined to perceive and report their period as being heavy due to recall bias (Al-Matouq *et al.,* 2019). This highlights the importance of considering potential biases and confounding factors when interpreting such associations.

A mere ten years ago, dysmenorrhea was often attributed to being a psychophysiological disorder stemming from emotional stress. However, our current understanding points to the primary influence of prostaglandins, released by the uterus during menstruation, as the underlying cause of adolescent dysmenorrhea (Cerin *et al.,* 1993). In our study, we noted a significant association between the psychological profile of adolescents and dysmenorrhea. Furthermore, stress and depression have been consistently linked to dysmenorrhea in various investigations. Instances of increased stress or depressive states have been correlated with higher reports of pain during menstruation (László *et al.,* 2008). In another study, dysmenorrhea was found to be connected with depressive moods, a propensity for aggressive behaviour, and sleep disturbances among adolescent girls (Bahrami *et al.,* 2017).

While the exact mechanism underpinning the relationship between dysmenorrhea and psychological issues remains partially unclear, the association of anxiety and depression with dysmenorrhea can be interpreted as an adverse consequence of chronic pain on mental well-being. It is established that psychiatric conditions, particularly depression, are more prevalent in individuals with chronic pain (Sahin *et al.,* 2018).

The connection between neuroticism and menstrual pain is likely attributable to the influence of the neuroticism trait on pain perception. Neuroticism acts as a vulnerability factor that reduces the pain perception threshold, thereby contributing to the experience of dysmenorrhea (Goubert *et al.,* 2004).

Conclusions

In conclusion, the notable prevalence of dysmenorrhea among adolescents in the District of Constantine underscores the substantial public health concern this condition poses, warranting attention. A significant portion of adolescents contend with moderate to severe pain linked to menstruation, which often hampers their activities and leads to considerable time loss from their studies. Our findings emphasize the significance of family history, menstrual duration and flow, as well as the psychological profile, as pertinent risk factors associated with dysmenorrhea. Given the scale of this issue, it seems reasonable to consider training school nurses in the management of primary dysmenorrhea and the identification of potential cases of secondary dysmenorrhea. This proactive approach can contribute towards addressing the magnitude of the problem effectively.

Authors' Contributions

All authors read and approved the final manuscript.

Ethical approval (for researches involving animals or humans)

Informed consent was obtained from all parents of participants to complete the questionnaire.

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Conflict of Interests

The authors declare that there are no conflicts of interest related to this article.

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