Epidemiology of Dysmenorrhea among Adolescent Students in Assiut City, Egypt

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Abstract: Dysmenorrhea is the most common gynecologic complaint among adolescent females. It is the leading cause of recurrent short-term school absenteeism among them. The aim of the present study was to examine the prevalence, determinants, impact and treatment practices of dysmenorrhea among adolescent secondary school girls in Assiut city. A cross-sectional study was conducted in four secondary schools for girls in Assiut city, that were chosen randomly from a listing frame. Data were collected using a self-administered structured questionnaire about the presence, duration, severity, treatment, and impact of dysmenorrhea. To be eligible for study participation, female students must have had a period in the previous three months. A total of 845 adolescent school girls completed the questionnaire. The prevalence of dysmenorrhea was 76.1% (n = 643) (mild 26.6%, moderate 32.0%, and severe 41.4%). Dysmenorrhea was found to be significantly associated with: older age, earlier menarche, irregular or long cycle, and heavy bleeding. No limitation of activities was reported by 43% of participants with dysmenorrhea. About 39% reported missing school days due to dysmenorrhea during the 3 months prior to the survey and 30% reported missing individual classes. Activities affected by dysmenorrhea included class concentration (53.5%), sports participation (50.9%), class participation (49.9%), socializing with friends (45.3%), test-taking skills (35.6%), and homework tasks performance (35.6%). Nine percent consulted a physician and 42% saw a school nurse for help with their symptoms. Dysmenorrhea was significantly associated with school absenteeism and decreased academic performance, sports participation, and socialization with peers. In conclusion, dysmenorrhea is highly prevalent among adolescent secondary school girls and is related to school absenteeism and limitations on social, academic, and sports activities. Given that most adolescents don't seek medical advice for dysmenorrhea, health care providers should screen routinely for dysmenorrhea and offer treatment. As dysmenorrhea reportedly affects school performance, school administrators may have a vested interest in providing health education on this topic to their students.

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Key words: dysmenorrhea, adolescent girls, prevalence, impact, Egypt.

1. Introduction:

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⁽¹⁻⁵⁾. Dysmenorrhea in adolescents is usually primary (or functional), and is associated with normal ovulatory cycles and with no pelvic pathology. While dysmenorrhea is less common during the first 2-3 years after menarche, when most of the menstrual cycles are anovulatory, it becomes more prevalent during mid and late adolescence, with the establishment of ovulatory menstrual cycles^(1,3,6).

While lower abdominal cramping is the most common dysmenorrhea symptom, many adolescents suffer from other menstruation-associated symptoms, such as vomiting, headache, fatigue, back pain, dizziness and diarrhea. Symptoms typically accompany the start of menstrual flow or occur within a few hours before or after onset, and last for the first 24-48 hours^(7,8). In approximately 10% of adolescents with severe dysmenorrheic symptoms, pelvic abnormalities such as endometriosis or uterine anomalies may be found^(3,9).

Several studies among American and Australian adolescents, have shown that adolescents with

dysmenorrhea report that it affects their academic performance and social and sports activities, a distressing finding given the availability of effective medications^(1,4,5). Potent prostaglandins and leukotrienes play an important role in generating the symptoms of dysmenorrhea^(3,9). Numerous studies have shown that non-steroidal anti-inflammatory drugs which inhibit (NSAIDs). the synthesis of prostaglandins, are highly effective in alleviating the symptoms of dysmenorrhea⁽¹⁰⁻¹³⁾.

This study was conducted to examine the prevalence, determinants, impact and treatment practices of dysmenorrhea among adolescent secondary school girl students in Assiut City, as it is the most common gynecologic disorder among female adolescents.

2. Subjects and Methods:

The present study was conducted in four secondary schools in Assiut city, that were chosen randomly from a listing frame representing general and technical education schools for girls. The study was a cross-sectional one and conducted during the first term of the academic year 2010-2011. The total sample (885 girl students) was distributed among chosen secondary schools proportionate to the number of students in each. Within the school, classes were chosen randomly from the list representing the three grades of secondary education. The school obtained passive parental consents from all participants. To be eligible for study participation, female students must have had a period in the previous three months. Data were collected using a self-administered structured questionnaire about the presence, duration, severity, treatment and limitations of dysmenorrhea. Participants had 15-20 minutes to voluntarily complete the questionnaire, and they were told that their responses would remain confidential. This was followed by a reproductive health lecture. The investigator discussed simplified physiology of the menstrual cycle and menstrual hygiene, and answered student's inquiries in this regard, as well.

Survey Instrument:

The questionnaire, designed specifically for this study, included information on age, residence, drug use and menstrual history (age at menarche, premenstrual symptoms, cycle length, bleed length, regularity). It also included information concerning the severity of dysmenorrhea and its impact on school attendance, academic performance (self-perceived impact on class concentration, class participation, test-taking skills, homework tasks and grades), sports participation, socializing with peers, and performing daily activities.

Dysmenorrhea was defined as having painful menstruation during the previous 3 months, and the degree of pain was categorized as mild, moderate or severe. A visual analogue scale, dividing pain into mild, moderate and severe, was used to measure menstrual pain; this scale has well-established validity and reliability (Cronbach $\alpha = 0.94$)⁽¹⁴⁾.

School absence was defined as missing a half day to complete days of school and class absence was defined as missing individual classes because of dysmenorrhea during the previous 3 months. In addition, the questionnaire included items about treatment used by participants for dysmenorrhea and consultations sought for relief of symptoms.

Statistical Analysis:

Female students who had not had a period in the previous 3 months (n = 40) were excluded from the data analysis. Data analysis was done using the statistical software package for the social sciences (SPSS), version 11.0. Descriptive statistics (frequency, percentage, mean and standard deviation) were used to determine mean age of participants, age at menarche, cycle length, bleed length, frequency of associated symptoms, prevalence and treatment of dysmenorrhea, and activities affected by this condition. Tests of significance (t-test and χ^2 test) were used to detect different association between variables and dysmenorrhea. A p-value <0.05 was considered statistically significant. Associations between the level

of menstrual pain and activities affected by menstrual pain (school, homework, class participation, class concentration, taking tests, sports participation and going out with friends) were analyzed using odds ratio (OR) with 95% confidence interval (CI). Associations between the level of menstrual pain and the therapeutic options were also examined using OR with 95% CI.

3. Results:

A total of 845 adolescent secondary school girls completed the questionnaire. The mean age of the participants was 16.0 ± 1.5 years, and the mean age at menarche was 13.6 ± 1.3 years.

Prevalence and determinants of dysmenorrhea:

The prevalence of dysmenorrhea was 76.1% (n = 643); of these, 26.6% described their menstrual pain as mild, 32.0% as moderate and 41.4% as severe (figure 1). Among adolescents with dysmenorrhea 92.1% (n = 592) reported the duration of their menstrual cramps as 48 hours or less.

Dysmenorrhea was found to be significantly (P<0.05) associated with older age, earlier menarche, longer cycle length and bleed length, heavy bleeding and irregular cycle. Preparation for menarche, a psychologic variable, was not significantly associated with dysmenorrhea (table 1).

Among participants reporting cramps during menstruation, 70.0% indicated nervousness, 38.9% fatigue, 59.4% back pain, 42.9% headache, 53.8% irritability, 39.3% dizziness, and 38.3% depression. These symptoms were significantly more frequent among adolescents suffering from dysmenorrhea than their counterparts reporting no dysmenorrhea (table 2). **Impact of dysmenorrhea on academic, sports and social activities:**

Among participants with dysmenorrhea, 53.5% indicated that dysmenorrhea limited their class concentration; 50.9% sports participation; 49.9% class participation; 45.3% going out with friends; 35.6% test-taking skills, 35.6% homework tasks performance. About 39% reported missing school days and 30% reported missing individual classes due to menstrual cramps during the previous 3 months (table 3). Among participants reporting school absence, 45% reported missing one half to 1 day of school, 38% reported missing 2 to 3 days, and 17% reported missing more than 4 days. The rate of school absenteeism was 53% among participants reporting severe menstrual pain compared with 22% among those with mild menstrual pain.

A significantly greater proportion of participants with severe menstrual pain reported school absenteeism, decreased academic performance, and limited socialization with friends and sports participation than those with mild menstrual pain (P<0.01) (table 3).

Treatment used to alleviate symptoms of dysmenorrhea:

The participants with dysmenorrhea reported using multiple treatments to relieve their symptoms: medications (56%), rest (49%), hot tea (26.1%), herbal drinks (20.1%), heating pad (14.9%), and exercise (7.0%) (table 4).

A greater proportion of participants reporting severe menstrual pain used medications (OR, 4.9; 95% CI, 2.3–8.1), rest (OR, 3.3; 95% CI, 1.9–5.9), herbal drinks (OR, 3.2; 95% CI, 1.8–5.7), heating pad (OR, 2.9; 95% CI, 1.6–6.4), tea (OR, 2.6; 95% CI, 1.4–4.0), or physician consultation (OR, 2.1; 95% CI, 1.1–4.8) than those reporting mild menstrual pain. Among participants with dysmenorrhea who reported taking medications, 73% indicated that they treated themselves without medical prescription as they knew the medications to alleviate their symptoms of dysmenorrhea.

Sixty-nine percent of participants with dysmenorrhea reported that they either did not think or did not know whether a physician could help them and 31% thought that a physician could help them with their menstrual symptoms. Overall, 42% of the participants with dysmenorrhea consulted the school nurse during the previous 3 months but 81% of those who visited the school nurse reported no relief from this visit. In contrast to the 42% school nurse consultation rate, only 9% consulted a physician for help; this rate increased to 14% among participants reporting severe menstrual pain.

1 able (1). Menstrual history of secondary school girls participating in the study, Assiut city, 2010	T-1.1. (1) Manuature 1	1	1 1		
	Table (1): Menstrual	history of secondary	y school girls pa	articipating in the	e study, Assiut city, 2010.

Variables	Dysmenorrhea $N = 643$	No Dysmenorrhea $n = 202$	P-value
Age in years	16.4 ± 1.15	15.5 ± 1.20	0.001
Age at menarche	13.4 ± 1.12	13.7 ± 1.17	0.01
Cycle length	29.4 ± 3.58	28.1 ± 2.35	0.001
Bleed length	5.2 ± 1.10	4.3 ± 1.14	0.001
Menstrual flow			
Scanty	170 (26.4%)	81 (40.1%)	0.001
Normal	206 (32.0%)	66 (32.7%)	
Heavy	267 (41.5%)	55 (27.2%)	
Regularity			
Regular	269 (41.8%)	116 (57.4%)	0.001
Irregular	283 (44.0%)	52 (25.7%)	
Variable	91 (14.2%)	34 (16.8%)	
Preparation for menarche			
Yes	222 (34.5%)	74 (36.6%)	0.612
No	421 (65.5%)	128 (63.4%)	

Age, cycle length and bleed length are presented as: mean \pm standard deviation.

Committeene	Dysmenorrhea			orrhea	Davalua	
Symptoms	No.	%	No.	%	P-value	
Nervousness	450	(70.0)	75	(37.1)	0.000	
Irritability	346	(53.8)	72	(35.6)	0.000	
Depression	246	(38.3)	51	(25.2)	0.001	
Dizziness	253	(39.3)	49	(24.3)	0.000	
Backaches	382	(59.4)	79	(39.1)	0.000	
Legache	171	(26.6)	74	(36.6)	0.008	
Fatigue	250	(38.9)	55	(27.2)	0.003	
Headache	276	(42.9)	48	(23.8)	0.000	
Sleeplessness	327	(50.9)	90	(44.6)	0.126	
Diarrhea	148	(23.0)	39	(19.3)	0.286	
Nausea / vomiting	100	(15.6)	29	(14.4)	0.737	
Loss of appetite	266	(41.4)	81	(40.1)	0.806	
Acne / flushing	253	(39.3)	76	(37.6)	0.680	
General aching	68	(10.6)	17	(8.4)	0.423	



Fig. (1): Distribution of the studied adolescent students according to the level of menstrual pain (n=463).

Table	(3):	Association	between	dysmenorrhea	and lin	mited a	activities	among	adolescent	girl	students.
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	Mild Pain *	Moderate Pain			Severe Pain		
	(n=171)	(n = 2)	.06)		(n = 266)		
	%	%	OR (95% CI)	P-value	%	OR (95% CI)	P-value
School absence	22.2	34.5	1.8 (0.9-3.9)	0.01	53.0	3.9 (2.4-8.1)	0.001
Class participation	33.9	43.7	1.5 (0.8-2.7)	0.06	65.0	3.6 (1.9-6.1)	0.001
Class concentration	31.0	53.9	2.4 (0.9-3.0)	0.001	67.7	4.6 (2.2-6.9)	0.001
Test-taking skills	20.5	31.1	1.7 (0.9-3.7)	0.03	48.9	3.7 (2.1-7.6)	0.001
Sports participation	39.2	47.6	1.4 (0.8-2.5)	0.12	60.9	2.4 (1.4-4.0)	0.001
Homework tasks	21.1	30.6	1.6 (0.9-3.6)	0.045	48.9	3.5 (2.0-6.3)	0.001
Going out with friends	26.9	44.2	2.1 (1.1-3.8)	0.001	57.9	3.7 (2.1-6.5)	0.001

* Reference group

Table (4): Treatment used by adolescent girl students to alleviate symptoms of dysmenorrhea (n=643).

Treatment options	No.	%
Medications	360	56.0
Rest	315	49.0
Tea	168	26.1
Herbal drink	129	20.1
Heating pad	96	14.9
Exercise	45	7.0

Many participants reported using multiple treatments

4. Discussion:

This study revealed a relatively high prevalence of dysmenorrhea (76.1%) among adolescent school girls, which falls within the range reported by Klein and Litt⁽¹⁵⁾ (59.7%) and Campbell and McGrath⁽²⁾ (93%). Comparable figures were reported in similar studies, also falls within the same range, by El-Gilany et al.⁽¹⁶⁾ (75%), Chiou and Wang⁽¹⁷⁾ (73.3%), and Banikarim et al.⁽¹⁾ (85%).

The prevalence of severe dysmenorrhea (41.4%) was markedly higher than previously reported among white (23%) and African American (14%) adolescents^(5,15), but approximately similar to that reported among Hispanic female adolescents $(42\%)^{(1)}$. An Egyptian study in Mansoura reported a lower

prevalence of severe dysmenorrhea (14.8%)⁽¹⁶⁾. These differences could be attributed to different pain perception. Of note, participants rated their menstrual pain during the previous 3 months; the frequency and intensity of pain during each cycle may have varied and was not determined.

There was significant association of dysmenorrhea with older age, irregular or long cycles and heavy bleeding as reported by many studies $^{(7,8,16,17)}$. Dysmenorrhea was significantly associated with early menarche $^{(7,8)}$, as well as postmenarcheal age $^{(18)}$. Preparation for menarche with health education was not a significant variable, in agreement with that reported by Klein and Litt $^{(15)}$, but in contrast with Chiou and Wang $^{(17)}$.

While lower abdominal cramping is the most common dysmenorrhea symptom, many adolescents suffer from other menstruation–associated symptoms. The most commonly reported symptoms were nervousness, irritability, backache, headache, dizziness and fatigue. The commonest associated symptoms reported by El-Gilany et al.⁽¹⁶⁾ were fatigue, headache, backache and dizziness. Symptoms typically accompany the start of menstrual flow or occur within a few hours before or after onset, and last for the first 24-48 hours.

The school absenteeism rate in this study was higher than previously reported by Klein and Litt⁽¹⁵⁾ (23.6% among African Americans and 14% among whites) and lower than that reported by Johnson⁽¹⁸⁾</sup> (45.6% among whites), but in agreement with that reported by Banikarim et al.⁽¹⁾ (38% among Hispanics). The variation in school absenteeism rates among these studies may be related to the existence of different cultural perception and responses to various gradients of pain⁽¹⁹⁾. However, this relationship is difficult to evaluate without studying various ethnic groups simultaneously. Also, comparing school absenteeism rates in these studies is difficult because different time frames were used in determining the former. Not surprisingly, the rate of school absenteeism was higher among adolescent school girls with severe menstrual pain than mild menstrual pain, consistent with previous findings^(1,4,16). Adolescent school girls with severe menstrual pain were nearly four times as likely to miss school, and to have limited academic performance than those with mild menstrual pain. Given these findings, school officials and school health program coordinators may benefit from considering dysmenorrhea in the context of improving their school attendance rates and academic performance of their students.

Despite the high prevalence of dysmenorrhea in adolescents, many girls either do not seek medical advice or are under-treated. The majority of adolescents used non pharmacologic methods such as rest, heat, hot drinks, or sports (mainly for distraction) to treat dysmenorrhea, consistent with previous findings^(1,20). Among participants with dysmenorrhea who reported taking medications, 73% reported selfmedicating with over-the-counter pain medications without medical prescription. This figure was higher than previous study findings (30-70%) from different populations^(7,21,22). A physician consultation rate of 9% is lower than that reported in previous studies, while medication use rate of 56% is higher than previous study findings^(1,4,15,16,17,18). Alternate sources of medical advice included school nurses. A greater proportion of participants with dysmenorrhea sought help from school nurses instead of physicians, which suggests that these participants felt more comfortable seeking help from nurses, despite of the self-perceived ineffectiveness of the care received at the nurse's office. Unfortunately, the lack of knowledge regarding the role of physicians in the treatment of this condition was alarming (69%), which may have contributed to the low physician consultation rate.

Potent prostaglandins and potent leukotrienes play an important role in generating primary Non-steroidal dvsmenorrhea symptoms. antiinflammatory drugs (NSAIDs) are the most common pharmacologic treatment for dysmenorrhea. Adolescents who restrict daily activities because of dysmenorrhea should be offered prophylactic treatment with NSAIDs. A loading dose of NSAIDs (typically twice the regular dose) should be used as initial treatment for dysmenorrhea, followed by a regular dose until symptoms abate⁽⁹⁻¹³⁾. In this study, about 60% of those who took medications for dysmenorrhea still indicated social and academic limitations, which suggests that these medications were an inappropriate choice or dose. The adolescent girls were unable to determine the dosage and type of medications taken for dysmenorrhea or the self-perceived effectiveness of their use. To maximize benefit from NSAIDs, health care providers may consider inquiring about the type and dose of medications that their adolescent patients are taking for their menstrual pain.

There are several limitations to this study. Secondary dysmenorrhea is rare among adolescents but this cause of menstrual pain could not be excluded because the participants were not clinically evaluated for secondary causes of dysmenorrhea. Also, participants were asked to recall menstrual and school absenteeism information for three months ago, which may have led to recall bias. In addition, the information on dysmenorrhea was obtained by self-report and could not be validated.

In conclusion, dysmenorrhea is common among adolescent population in Assiut city and leads to limitations of their social, academic and sports activities. In light of the public health importance of these social and academic limitations associated with dysmenorrhea, school administrators could play a vital role in this regard by incorporating dysmenorrhea and its treatment into health education curricula. More effective school nurse may also help alleviate the discomfort that may students experience from dysmenorrhea while in school. Also, school nurses could intervene through secondary prevention by educating students about appropriate medication use and referring to health care providers in the community or school-based clinics as needed.

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