Original article

Prevalence and predictors of dysmenorrhea among a population of adolescent's schoolgirls (Morocco)

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A B S T R A C T

Dysmenorrhea is the most common gynaecological problem among young females. In Arabic countries, few studies on gynaecological problems of adolescent's girls were published. Objective: the aim of the study was to determine the prevalence of dysmenorrhea and associated factors among adolescents in public schools at Marrakesh. Methods: we conducted a cross-sectional study; our data was collected via a questionnaire and the statistical analysis was done using SPSS version 21. Our random sample counted 364 post-menarcheal girls aged between 12 and 20 years who participated voluntarily in our study. Results: the mean age at menarche was 12.89 ± 1.34 years; the prevalence of dysmenorrhea was 78% and 58.1% of them suffering from severe dysmenorrhea that increased clearly with the chronological age. Dysmenorrhea was cause for missing school among 13% of girls and the most common symptoms associated with it were backache, fatigue, irritability and anxiety. The gynecological age was found to be the only predictive factor of dysmenorrhea among schoolgirls. Conclusion: reproductive health education should be improved enough by including them in the school curriculum to prepare girls for menstruation and inform them about problems related to this phenomenon, especially dysmenorrhea.

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1. Introduction

Dysmenorrhea is one of the most common menstrual disorders among females of reproductive age. It is characterized by pelvic pain beginning shortly before or at the onset of menses and lasting 1–3 days (Durain, 2004). In fact, dysmenorrhea can be categorized into two types: primary and secondary. Dysmenorrhea is classified as primary when there is no evidence of pelvic or hormonal pathology but is secondary when the pain is due to identifiable pathological conditions including endometriosis, ovarian cysts, pelvic inflammatory disease or intrauterine devices (Durain, 2004; Grandi et al., 2012).

Studies in adolescent's girls have reported the prevalence of dysmenorrhea to be between 20% and 90% (Gagua et al., 2013). Recently, a review study reported that there are different prevalence rates among female in different countries and different associated factors with dysmenorrhea or severity of pain (De Sanctis et al., 2016).

Menstruation-associated symptoms are a broad collection of effective and somatic concerns that occur around the time of menses (Cakir et al., 2007). Symptoms, such as headache, vomiting, tiredness, dizziness, and diarrhea are few commonly experienced menstrual symptoms. Symptoms typically start at the onset of menstrual flow or occur within a few hours before or after onset, and last for the first 24–48 h. Furthermore, dysmenorrhea adversely affects mood and consequently affects the individual's attitude, relationships with family and friends, social interactions, sports activities, and academic performance, with adverse effects including school absenteeism, poor concentration, and failure to do homework (Cakir et al., 2007).

Several studies have reported various risk factors associated with dysmenorrhea which include age less than 20 years, higher socioeconomic status, heavy menses, depression, smoking, anxiety, and lack of physical activity (Grandi et al., 2012; Patel et al., 2006). Increased severity of dysmenorrhea has been suggested to relate to age (Messing et al., 1993) earlier age at menarche (Mishra et al., 2000), longer and heavier menstrual flow (Mishra et al., 2000), and family history of dysmenorrhea (Parveen et al., 2009).

In Morocco as in Arab countries, characteristics of the menstrual cycle among adolescents' girls especially are not commonly studied. From our research of literature, only one article that was published in 1999 by Montero (Montero et al., 1999) addressing this problem in Morocco. We found there were also other studies conducted in the Medical College of Casablanca and Marrakesh that were not published. Knowing the prevalence of dysmenorrhea is important because it is a considerable public health problem. In this study, our aim was to determine the prevalence of dysmenorrhea, accompanied symptoms and the major predictors of these phenomena.

2. Methods

It was a descriptive cross-sectional study conducted in Marrakesh city (Morocco). The size of our sample was determined by using:

$$N = t^2.(p.(1 - p))/m^2$$

t = level of confidence fixed at 95% (1,96); p = 69,5% is the proportion of dysmenorrhea found among female girls in Marrakesh (69,5%) (Montero et al., 1999); m = margin of error 5%. Calculated size: 326 majorated at 364 post-menarcheal girls.

This study conducted in five different public middle and secondary schools of the urban area (Marrakesh city); the choice of the schools was made randomly. Data was collected during the school year 2016–2017 (from February to May 2017) using an anonymous questionnaire. The questionnaire included demographic information (e.g., age, age at menarche, genealogical age) and they asked also about dysmenorrhea during the previous 6 months, bleeding flow, bleeding duration, cycle length, severity, duration of dysmenorrhea and associated symptoms.

Age at menarche was determined by retrospective method and the gynecological age was computed as a difference between age at the survey and the age at menarche.

To measure the participants' severity of dysmenorrhoea, we had utilised a categorical rating scale. The participants were asked to rate the degree of pain by making a mark on line. The scores obtained from the scale were classified into mild dysmenorrhea (I) if it was between 1 and 3 points, moderate (II) between 4 and 7 points and severe (III) between 8 and 10 points (Larroy, 2002).

To determine the symptoms that accompanied dysmenorrhea during the last six months, we had advised a mini questionnaire containing a list of the most common physical-behavioural and psychic symptoms; each participant checked those relevant to them.

To measure the bleeding flow, participants were asked to fill a Pictorial Blood Loss Assessment Chart (PBAC) mini questionnaire for one menstruation then we obtained a Higham score (Higham et al., 1990). Bleeding was classified as normal with a score of less than 100 and heavy bleeding with a score of more than 100.

Data were analysed using SPSS (version 21). We did descriptive analysis (frequencies and percentage); test chi-deux, correlation Pearson were utilised to evaluate associations between variables. Logistic regression analysis was utilised to estimate the predictors of dysmenorrhea.

Ethical permission from high educational institutions was taken; we had obtained also the authorization of school principals. All participants were informed about the procedure and aims of this study and they were assured that all information obtained are confidential and secure. They responded to our study voluntarily, and their anonymity was assured by assessing each of them by a code number useful in analysis process. The Informed consent was obtained from all individual participants included in the study.

3. Results

The means age of the respondent and their age at menarche were respectively 16,65 ± 1.83 years and 12.89 ± 1.34 years. Table 1 shows the distribution of the sample according to the characteristics of the menstrual cycle. Most of the adolescent girls (64.3%) had a duration of bleeding between 4 and 7 days. More than three quarters of participants (78.2%) who knew their cycle duration reported that it lasted between 21 and 35 days. A quantity of bleeding more than 80 ml was observed among most of participants (62.6%). Most respondents (75.8%) observed the presence of clots during bleeding while approximately half of the respondents (52.5%) declared had an overflowing menses. The prevalence of dysmenorrhea was 78% among our population. Regarding knowledge about menstruation, we noted that approximately half of schoolgirls (51.9%) had information about menstrual cycle.

Univariate analysis for presence or absence of dysmenorrhea (Table 2) revealed an association between the presence of dysmenorrhea and chronological age (p < 0.001), gynecological age (p < 0.001), duration of bleeding (p < 0.05), the flow of bleeding (p < 0.05) and the presence of clots (p < 0.05).

Table 3 shows the characteristics related to dysmenorrhea. The intensity of dysmenorrhea was a law among 10.2% of participants while more than half of the participants (58.1%) had qualified their pain as severe. We can notice that 13% of dysmenorrheic participants had missed school days. When we had asked participants to describe the evolution of pain since menarche, the most of them (35.9%) declared having increasing pain or in perpetual change (32.7%). More than half of the participants (62.7%) declared that their pain severity change throughout seasons and the majority of them (79.2%) felt more pain during winter. Medical visit in private or public clinic observed among 10.6% of participants and more than half of participants (57.7%) used treatments for calm their pain.

Table 4 shows the variation of the intensity and duration of dysmenorrhea according to selected variables Regarding the intensity of dysmenorrhea, we can notice there was a positive correlation between the intensity of dysmenorrhea and the chronological age (P < 0.001), the gynecological age (p < 0.001), the duration of

Table 1
Distribution of adolescent girls according the characteristics of menstrual cycle.

Characteristics of menstrual cycle	Frequency	%
Duration of menses (days)		
<4	27	7.4
4–7	234	64.3
>7	103	28.3
Lenght of cycle in days (n = 165)		
<21	13	7.9
21–35	129	78.2
>35	23	13.9
Menstrual bleeding		
>80 ml (>=100 Higham score)	228	62.6
<80 ml (<100 Higham score)	136	37.4
Presence of clots		
Yes	276	75.8
No	88	24.2
Overflowing		
Yes	173	47.5
No	191	52.5
Dysmenorrhea		
Yes	284	78
No	80	22
Information about menstruations		
Yes	189	51.9
No	175	48.1

Table 2
Univariate analysis for independents variables related to dysmenorrhea.

	Dysmenorrhea		P-value
	No (n = 80)	Yes (n = 284)	
	Moyen ± Ecart Type		
Age (Years)	15.39 ± 1.95	16.38 ± 1.8	P*<0.001
Age at menarche (years)	13.17 ± 1.35	12.84 ± 1.34	P = 0.084
Gynecological age (Years)	2.67 ± 2.02	4.03 ± 2.08	P*<0.001
Duration of menses (Days)	5.20 ± 1.78	5.62 ± 1.34	P*<0.05
Menstrual bleeding (Higham score)	122.95 ± 96.82	144.59 ± 80.37	P*<0.05
Presence of clots			
Yes	53(19.2%)	223(80.8%)	P*<0.05
No	27(30.7%)	61(69.3%)	
Overflowing			
Yes	33(19.1%)	140(80.9%)	0.208
No	47(24.6%)	144(75.4%)	
Length of cycle (Days) (n = 165)	31.55 ± 20.13	33.51 ± 17.76	P = 0.581
Physical activity (Sport)			
Yes	32(25.4%)	94(74.6%)	P = 0.287
No	48(20.2%)	190(79.8%)	

Table 3
Distribution of adolescent girls according the characteristics of dysmenorrhea.

Characteristics of dysmenorrhea	Frequency	%
Intensity of dysmenorrhea		
Low	29	10.2
Moderate	90	31.7
Severe	165	58.1
Missing school day due to dysmenorrhea		
Yes	37	13
No	247	87
Evolution of pain since menarche		
Decreasing	29	10.2
Increasing	102	35.9
In perpetual change	93	32.7
No change	60	21.1
Change of pain severity throughout seasons		
Yes	178	62.7
No	106	37.3
During which season you feel more pain (n = 178)		
Winter	141	79.2
Summer	37	20.8
Did dysmenorrhea bring you to the hospital?		
Yes	30	10.6
No	254	89.4
Use traitement for dysmenorrhea		
Yes	164	57.7
No	120	42.3

menses (p < 0.05), the flow of bleeding (p < 0.001) and with the length of the menstrual cycle (p < 0.05). We can observe also that the more dysmenorrhic pain increase the more participants tend to have a medical visit for their dysmenorrhea (p < 0.001) and they more tend to use treatment to calm their pain (p < 0.001).

The duration of dysmenorrhea was positively correlated to the age of menarche (p < 0.05). We can also observe that participants whose pain duration is longer were more likely to have a medical visit for their dysmenorrhea (p < 0.05).

Respondents with dysmenorrhea reported various physical and psychological symptoms (Fig. 1). The most common somatic symptoms (a) were backache (22.2%), fatigue (12.9%) and breast tenderness (12.9%). While the most commons psychic symptoms (b) were irritability (26.4%), anxiety (20.7%) and sudden change of humour (20.5%).

Table 5 reported that girls who had experienced dysmenorrhea had more chances of developing psychic symptoms (X^2 = 13.28; ddl = 1; OR = 0.74; CI at 95%; P < 0.001) and somatic symptoms (X^2 = 35.74; ddl = 1; OR = 0.66; CI at 95%; P < 0.001). There was a significate correlation between dysmenorrhea and the presence of clots (X^2 = 5.127; df = 1; p = 0.019).

Logistic regression analysis of significant variables associated with dysmenorrhea (independent variables) indicate that the only predictive factor of dysmenorrhea was the gynecological age (Table 6).

4. Discussion

This study highlights the prevalence of dysmenorrhea and factors related to it among schoolgirls in Marrakesh city. In literature, the prevalence of dysmenorrhea has been reported to be 60%-93% commonly reported for the same age group (Derman et al., 2004; Wong and Khoo, 2010). Our finding, 78%, falls within the range reported in the literature with a varying degree on intensity which is lower than rate find among Iranian adolescent's schoolgirls (82.5%) (Pakniat et al., 2019) and in Omani female adolescents (94%) (Al-Kindi and Al-Bulushi, 2011). It was approximately similar with the rates reported in Saudi Arabian female adolescents (74.4%) (Abd El-Mawgod et al., 2016), Egyptian female adolescents (75%) (Mohamed, 2012) and Italian schoolgirls (76%) (Zannoni et al., 2014). This variation in prevalence may be due to differences in the ranges of age, respondent's socio-cultural status and pain perception. In the present study, we found dysmenorrhea to be severe among 58,1% of respondents which is higher than that reported among Egyptian adolescents' girls (41.4%) (Eman, 2012), Omani schoolgirls (32%) (Al-Kindi and Al-Bulushi, 2011), Saudi schoolgirls (37.5%) (Abd El-Mawgod et al., 2016) and Australian teenagers (21.2%) (Parker et al., 2010), but it was approximately similar to what was reported in Bangladesh (De Sanctis et al., 2016). The feeling of discomfort (physical and emotional) that plague girls at the period of menstruation, may lead them to perceive the pain as severe. On the other hand, some previous studies reported that pain perception and expression of pain is influenced by genetic, psychological, developmental, familial, social and cultural factors (Edwards et al., 2001; Mannion et al., 2007).

Dysmenorrhea is reported to be accompanied by physical, behavioural and psychological symptoms. The most common physical

Table 4
Variation of the intensity and duration of dysmenorrhea according to selected variables.

	Intensity of dysmenorrhea			p-value	Duration of dysmenorrhea		p-value
	Low	Moderate	Severe		<48H	≥48H	
Age (Years)	16.36 ± 1.85	16.56 ± 1.99	17.15 ± 1.54	P* < 0.001	16.92 ± 1.77	16.85 ± 1.74	P = 0.760
Gynecological age (Years)	2.99 ± 1.61	3.69 ± 2.13	4.44 ± 1.99	P* < 0.001	3.86 ± 1.99	4.16 ± 2.08	P = 0.226
Age at menarche (Years)	13.36 ± 1.46	12.87 ± 1.34	12.72 ± 1.31	P = 0.081	13.06 ± 1.32	12.69 ± 1.33	P* < 0.05
Duration of menses (Days)	5 ± 1	5 ± 1	6 ± 1	P* < 0.05	5.31 ± 1.30	5.80 ± 1.34	P* < 0.05
Bleeding flow (Higham score)	124 ± 56	118 ± 68	163 ± 86	P* < 0.001	137.88 ± 73.75	148.71 ± 84.1	P = 0.271
Cycle lenght (Days) (n = 165)	44 ± 28	33 ± 13	32 ± 18	P* < 0.05	33.62 ± 18.88	33.44 ± 17.15	P = 0.955
Medical visit							
Yes	0(0%)	1(3.3%)	29(96.7%)	P* < 0.001	6(20%)	24(80%)	P* < 0.05
No	29(11.4%) (100%)	89(35%) (98,4%)	136(53.5%) (80,9%)		102(40.2%)	152(59.8%)	
Treatment use							
Yes	7(4.3%)	38(23.2%) (42,7%)	119(72.6%)	P* < 0,001	58(35.4%)	106(64.6%)	P = 0.322
No	22(18.3%)	52(43.3%) (57,3%)	46(38.3%)		50(41.7%)	70(58.3%)	
Physical activity (Sport)							
Yes	11(11.7%) (35,9%)	21(22.3%)	62(66%)	P = 0.059	41(43.6%)	53(56.4%)	P = 0.195
No	18(9.5%) (35,9%)	69(36.3%)	103(54.2%)		67(35.3%)	123(64.7%)	
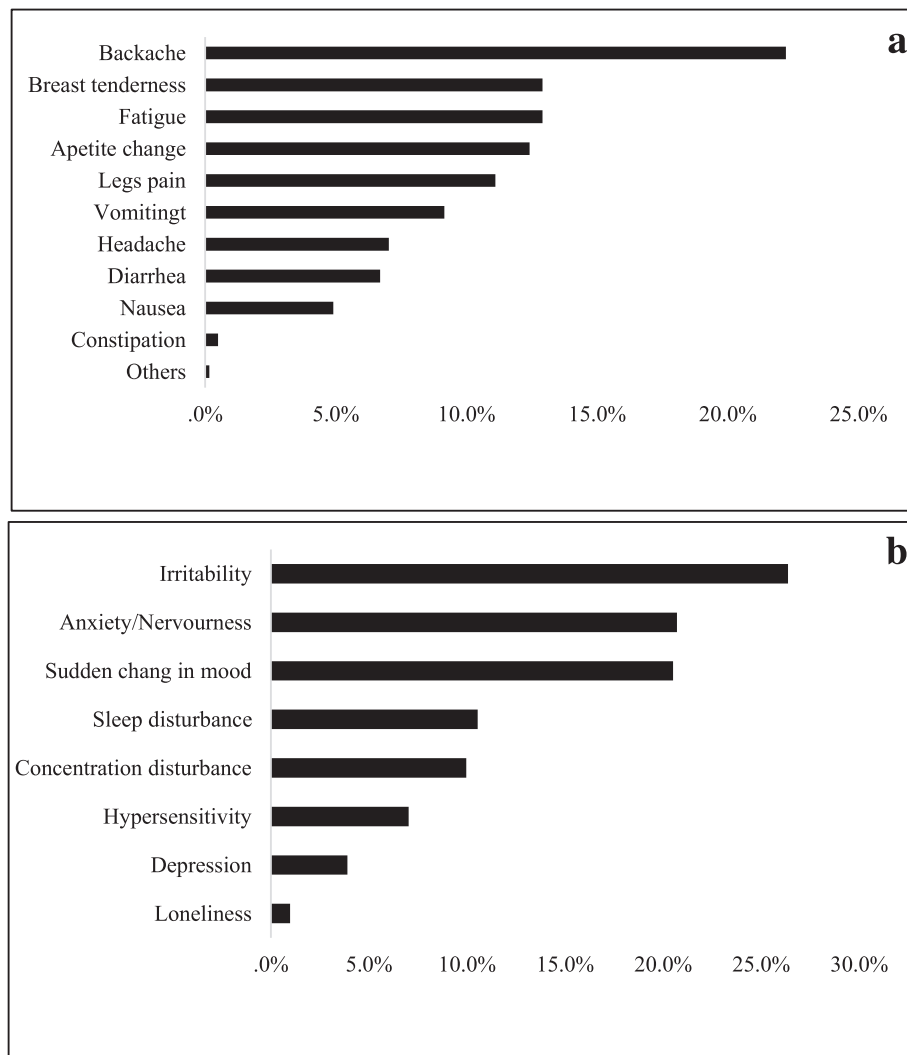
Fig. 1. Prevalence of physical-behaviour symptoms (a) and psychic symptoms (b) accompanying dysmenorrhea.

and behavioural symptoms associated with dysmenorrhea were backache, fatigue, appetite change, breast tenderness and legs pain. Furthermore, dysmenorrhea was reported to be in association with mood disorders (Gagua et al., 2012). Our study corroborates this as

more than third (78.9%) of girls that have dysmenorrhea surfing of menstrual psychic symptoms. In fact, irritability, anxiety and sudden change in mood were the most commons symptoms. A study conducted in Egypt by El-Gilany (El-Gilany et al., 2005) reported

Table 5
Association between selected variables and dysmenorrhea.

	Dysmenorrhea		X^2	Odds Ratio	P
	Yes	No			
Presence of clots					
Yes	223	53	5.127	0.844	P < 0.05
No	61	27		1.571	
Psychic symptoms					
Yes	224	47	13.288	0.745	P < 0.001
No	60	33		1.953	
Somatic symptoms					
Yes	248	46	35.74	0.66	P < 0.001
No	36	34		3.35	
Cycle regularity					
Regular	112	31	0.12	–	NS
Irregular	172	49		–	
Treatment use					
Yes	164	16	35.57	0.346	P < 0.001
No	120	34		1.893	

CI at 95%; ddl = 1.

Table 6
Logistic regression of independent variables related to the presence of dysmenorrhea.

Variable	B	Ecart standard	p-value
Gynecological age	0.246	0.105	0.019*
Chronological age	0.077	0.113	0.460
Duration of menses	0.07	0.108	0.422
Flow Abundance	0.001	0.002	0.333
Constant	−1.332	1.675	0.426

* Statistically significant result.

that the most commons symptoms associated with dysmenorrhea were fatigue, headache, backache and dizziness. Another study conducted in KSA (Abd El-Mawgod et al., 2016), reported that the most common symptoms of dysmenorrhea were fatigue followed by nervousness, backache, myalgia, stomach cramps, abdominal bloating, dizziness, headache, breast tenderness, nausea-vomiting and diarrhea.

Dysmenorrhea is positively correlating with early menarche, irregular cycle, as well as increased duration and amount of menstrual flow (De Sanctis et al., 2019). This is like the finding of this study. In fact, we had found a significant a positive correlation between the presence of dysmenorrhea and the age of girls, gynecological age, duration of flow, the presence of clots and the bleeding flow. In the same line a recent study conducted in Italy among secondary schoolgirls, found that gynaecological age was associated with dysmenorrhea, excessive bleeding and cycle irregularity (De Sanctis et al., 2019).

A study conducted by Sundell et al did not a significant relationship between dysmenorrhea and cycle length (Sundell et al., 1990), which is in according with our result.

Approximately 11% of the participants with dysmenorrhea visited public or private clinic because of their pain, which is lower than that reported amongst Kuwaiti schoolgirls (26%) (Al-Matouq et al., 2019). In fact, most of the participants in this study had mentioned a negative reaction towards their menarche, and they were ashamed to speak about their menstruations in public (Lghoul et al., 2019). This may explain the limited rate of participants who make medical visit.

In our study, the predictor of dysmenorrhea was the gynaecological age. This finding is like the outcome from Mohamed's study (Mohamed, 2012) and Karout's (Karout et al., 2012) study both of which also reported an association between earlier menarche and dysmenorrhea. Lee LK's explain this association stating that

as the gynecological age increase, the frequency of the anovulatory cycle decreases, so dysmenorrhea is seen more frequently in older adolescents (Lee et al., 2006). However, other studies reported that prevalence of dysmenorrhea decreases with increasing age (Burnett et al., 2005; Ameade et al., 2018).

In our study the absenteeism school rate was 13%, this rate was approximately similar to the rate found in Italy (12%) (Zannoni et al., 2014). Therefore, our result was lower than those observed in other studies around the world: Abd el mawgod's study (59,4%) (Abd El-Mawgod et al., 2016), Mohamed's study (53%) (Mohamed, 2012) and Ortiz's study (24.1%) (Ortiz et al., 2009).

No significant association was found between dysmenorrhea and physical activity in our study. This finding is similar to other studies (Al-Matouq et al., 2019; Blakey et al., 2010). In contradict; a Japanese study reported a negative association between physical activity and dysmenorrhea (Kazama et al., 2015).

5. Conclusion

Our study revealed that the prevalence of dysmenorrhea is high among schoolgirls (78%) in Marrakesh. A significant association exists between the gynecological age and girls experiencing dysmenorrhea. The rate of absenteeism found in our study was not negligible, that provides evidence to attach more importance to dysmenorrhea considering it as a public health problem especially for adolescent girls. Dysmenorrhea affects not only girls but also their families and social life so its management must be improved by incorporating them in educational programs.

Declaration of Competing Interest

The authors declare that they have no conflicts of interest.

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