Menstruation among adolescent girls in Malaysia: a cross-sectional school survey

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ABSTRACT

Introduction: The onset of menstruation is part of the maturation process. However, variability in menstrual cycle characteristics and menstrual disorders are common. The purpose of this study was to determine the menstrual characteristics of adolescent females and factors associated with it.

Methods: This is a cross-sectional descriptive study carried out on 2,411 secondary school adolescent females in Negeri Sembilan, Malaysia. Data were collected using a self-administered structured questionnaire on menstruation in Bahasa Malaysia.

Results: Abnormal cycle length (menstrual cycle longer than 35 days or cycle length between 14 to 20 days or irregular pattern) was common and affected 37.2 percent of subjects. The majority (74.6 percent) experienced premenstrual syndrome and 69.4 percent had dysmenorrhoea. About 18 percent reported excessive menstrual loss (use two pads at a time to prevent blood from soaking through or confirmed by doctor to be anaemic due to heavy menstrual flow). Only 11.1 percent of schoolgirls seeked medical consultation for their menstrual disorders. Mothers remained the most important source of information (80 percent). Menstrual disorders were significantly more common in female adolescents who smoke and have suicidal behaviours (p-value is less than 0.05).

Conclusion: Menstrual problems among adolescent female are common. They are influenced by certain modifiable factors.

Keywords: adolescents, dysmenorrhoea, female adolescents, menstruation, premenstrual syndrome

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INTRODUCTION

The onset of menstruation or menarche is a hallmark of female pubertal development. Menstrual disorders are a common presentation. By late adolescence, 75% of girls experience some problem associated with menstruation[1]. Delayed, irregular, painful, and heavy menstrual bleeding are leading reasons for physician office visits by adolescents[1], and dysmenorrhoea is the leading reason for school absenteeism among girls[2]. In Malaysia, the National Population and Family Planning Development Board (NPFDB) initiated a national study in 1994 on adolescent reproductive health[3]. It found that education on physiological processes of the body was lacking, and adolescents were afraid to face menstruation[3]. Menstrual patterns are also influenced by a number of host and environmental factors[4]. However, few studies in Malaysia have described the lifestyle factors associated with various menstrual cycle patterns. This study hopes to provide information on menstruation and factors associated with it among adolescent girls in Negeri Sembilan, Malaysia.

METHODS

This is a cross-sectional descriptive study that was carried out from June to August 2001.The study was conducted in seven districts (Seremban, Port Dickson, Kuala Pilah, Jempol, Jelebu, Tampin and Rembau) in Negeri Sembilan. Prior approval was obtained from the Negeri Sembilan Education Department for conducting the study. A total of 14 out of about 90 national public secondary schools were chosen for this study, using the stratified random sampling method. Stratification of schools was done on the basis of district and locality, i.e. urban or rural. Two classes were then randomly selected from each form/grade in each school. Female students were given a questionnaire to complete. Two researchers and one research assistant were on site to assist the students. Students were briefed on the objective of the study and all of them consented to take part in the study. Anonymity was assured and emphasised.

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The questionnaires were pretested in one of the schools in Negeri Sembilan before they were used in the field. Background information about the respondents include age, education level, ethnic group, height and weight. Questions related to menstruation elucidated variations in menstrual patterns: cyclicity, cycle length, duration of flow, amount of flow, premenstrual syndrome and its severity, and pain with menstruation and its severity. Respondents were also asked whether they had consulted any physician for their menstrual problems and the main source of information regarding menstruation.

Other factors that were possibly related to the adolescents' menstruation, such as substance use (alcohol consumption, cigarette smoking, drug use), physical activity and attempts to lose weight, were also obtained. Questions related to smoking and alcohol included "During the past 30 days, on how many days did you smoke cigarettes?", "During the past 30 days, on how many days have you had at least one drink of alcohol?" Participation in physical activity included vigorous physical activities (activities that made them sweat and breathe hard for ≥20 minutes), and moderate physical activities (activities that did not make them sweat or breathe hard for ≥30 minutes, and strengthening exercises (e.g. push-ups, sit-ups, and weightlifting) in the seven days preceding the survey. Students were asked whether they had exercised or eaten less food to lose weight. Suicidal behaviours, i.e. students who felt sad or hopeless, seriously considered attempting suicide, made a suicide plan and/or attempted suicide in the past 12 months, were also explored.

The data were analysed using the Statistical Package for Social Sciences (SPSS) version 11.5 (Chicago, IL, USA). Statistical significance of differences between groups was tested using the χ^2 test. Factors related to the adolescents' menstruation were analysed using multiple logistic regression. However, owing to some missing answers to certain survey questions, the denominator used in the percentage computation varies according to the number of responses obtained for each survey question.

RESULTS

A total of 2,411 female students completed the questionnaire. Their ages ranged from 12 to 19 years, with a mean age of 15.4 (±1.8) years. In terms of ethnic distribution, there were 51.9% Malay, 29.8% Chinese, 16.8% Indian, and 1.5% from other ethnic groups (mainly indigenous people), reflecting the ethnic breakdown of the population in Malaysia.

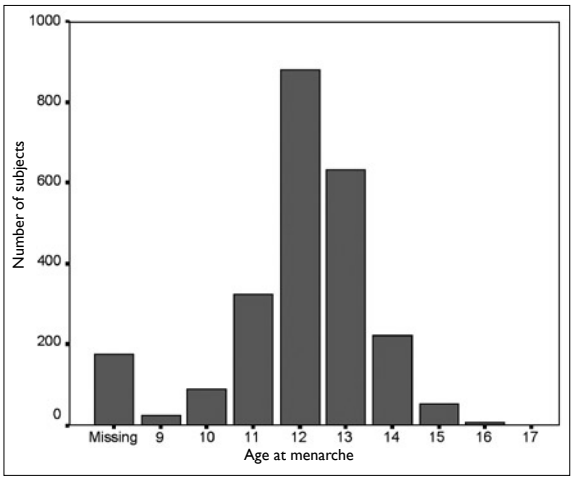

Fig. 1 Bar chart showing the age of menarche of female adolescents in Negeri Sembilan.

Table I. Menstrual characteristics of female adolescents in Negeri Sembilan.

Menstrual characteristics	Number	%
Duration of flow (days)		
2 or less	35	1.6
3-7	1,983	88.2
8-14	207	9.2
More than 14	14	0.6
No response	8	0.4
Total	2,247	100
Amount of flow		
Little (≤4 pads per day)	1,591	70.8
Moderate (5-10 pads per day)	250	11.1
Heavy (2 pads at a time/anaemic)	397	17.6
No response	9	0.4
Total	2,247	100
Cycle length		
≤20 days	479	21.3
21-35 days	1,410	62.8
≥36 days	324	14.4
Irregular pattern	31	1.4
No response	3	0.1
Total	2,247	100
Premenstrual symptoms		
No	561	25.4
Yes	1,678	74.6
Classification of pain		
Mild	1,534	68.2
Moderate to severe	144	6.4
No response	8	0.4
Total	2,247	100.0
Dysmenorrhoea		
No	680	30.3
Yes	1,558	67.7
Classification of pain		
Mild	1,406	62.6
Moderate to severe	152	6.8
No response	9	0.4
Total	2,247	100.0

164 (6.1%) of the female students did not have their first menstruation yet, at the time of interview. Their ages ranged from 12 to 17 years. The mean age of this group of students was 13.2 (±0.7) years. This group of students was not included in the analysis.

The age at menarche ranged from nine to 17 years (Fig. 1). The mean age of menarche was 12.3 (±1.1) years. The characteristics of the menstrual cycle, viz., duration of flow, cycle length, amount of flow, premenstrual syndrome (PMS) and dysmenorrhoea, are reported in Table I. The number of pads used in a day during menstruation was used to estimate the amount of blood loss. 17% of girls had to

Table II. Factors associated with menstrual disorders of female adolescents in Negeri Sembilan, Malaysia, 2001.

Factor	Abnormal duration of menstrual flow		Heavy menstrual flow		Irregular cycle		Premenstrual syndrome		Dysmenorrhoea	
	%	p-value	%	p-value	%	p-value	%	p-value	%	p-value
Age (years)										
≤12	24.2	0.0001	27.3	0.400	54.5	0.0001	69.7	0.0001	0	0.0001
13	16.8		22.7		44.7		62.1		3.9	
14	13.8		23.5		46.1		66.7		5.3	
15	12.7		19.1		39.1		74.3		4.5	
16	10.2		20.4		31.8		81.7		6.4	
17	9.2		18.5		32.1		81.0		12.0	
18	4.1		16.5		31.2		80.6		11.8	
≥19	5.5		18.4		25.8		83.4		7.4	
Menarche										
≤ two years	14.0	0.003	21.7	0.210	45.8	0.0001	65.4	0.0001	59.2	0.0001
> two years	9.9		19.5		31.8		80.8		76.0	
Ethnic group										
Malay	16.2	0.0001	22.8	0.0001	38.0	0.043	75.9	0.0001	69.8	0.165
Chinese	7.4		14.6		38.4		69.3		67.1	
Indian	5.2		24.1		31.4		72.8		73.6	
Others	2.9		8.6		48.6		57.1		65.7	
Body mass index (BMI)*										
Overweight	7.5	0.642	22.6	0.599	49.1	0.057	81.1	0.017	69.8	0.428
Risk of overweight	10.9		24.2		44.2		77.3		64.1	
Underweight	13.2		18.5		37.3		67.0		69.0	
Ideal weight	11.1		20.1		35.6		76.0		70.1	
Smoking										
No	11.1	0.009	19.8	0.0001	36.5	0.0001	74.9	0.821	69.7	0.528
Yes	21.1		35.2		56.9		76.1		66.2	
Alcohol										
No	12.2	0.103	21.6	0.124	37.8	0.123	75.3	0.630	69.7	0.922
Yes	8.7		17.4		32.8		76.7		70.0	
Physical exercise										
No	12.9	0.077	18.2	0.033	36.3	0.526	74.8	0.929	68.9	0.644
Yes	10.4		21.9		37.6		75.0		69.8	
Dieting behaviour										
No	12.1	0.282	18.0	0.006	34.7	0.021	72.6	0.017	67.0	0.014
Yes	10.7		22.7		39.4		77.0		71.8	
Suicidal behaviour										
Feeling sad or hopeless										
No	10.9	0.188	19.3	0.015	34.6	0.0001	73.2	0.0001	67.7	0.0001
Yes	13.1		24.3		45.5		81.1		76.1	
Seriously considered attempting suicide										
No	11.4	0.826	20.0	0.068	36.2	0.007	36.2	0.007	68.9	0.018
Yes	10.8		25.9		46.7		46.7		77.7	
Made suicide plans										
No	11.4	0.903	20.2	0.459	36.1	0.002	74.3	0.021	68.7	0.009
Yes	11.1		22.2		46.6		81.2		76.9	
Attempted suicide										
No	10.8	0.002	20.0	0.036	36.4	0.001	74.9	0.440	69.0	0.025
Yes	20.2		28.1		51.3		78.1		78.9	

* Overweight (BMI >95th percentile), Risk of overweight (BMI 85 to <95th percentile), Underweight (BMI <5th percentile)

Table III. Results of multiple logistic regression for the factors influencing menstruation of female adolescents in Negeri Sembilan, Malaysia, 2001.

Factor	Odds-ratio	p-value	95% confidence interval (odds-ratio)
Smoking	2.68	0.002	1.44-4.99
Suicidal behaviour	1.43	0.001	1.14-1.78
Menarche within two years	1.29	0.048	1.01-1.65
Age (years)	1.12	0.001	1.05-1.20

use two pads at a time to prevent blood from soaking through, and 0.4% of them were confirmed by their doctor to be anaemic from excessive menstrual loss (heavy menstrual flow). PMS was experienced by 74.6% of the girls, where 1.6% of them needed medication for relief of symptoms. Dysmenorrhoea was reported by 67.7% of the girls. Of these, 1.6% had to rely on medicine for relief of symptoms, mirroring those with PMS.

Most (88.9%) of the secondary school girls had not consulted a medical doctor for problems relating to menstruation. However, it is interesting to note that of the 11.1% of those who had sought help for problems related to menstruation, 29.4% went for alternative or complementary medicine. Mothers were the most important persons the girls turned to for answers regarding menstruation (80.0%), followed by friends (39.7%), sisters (30.4%), the mass media (30.0%), teachers (25.2%) and health providers (14.4%). The factors associated with menstrual disorders are shown in Table II. Menstrual disorders (except for heavy menstrual flow) were significantly more common in female adolescents within two years of menarche compared to those with more than two years, and in younger female adolescents compared to older female adolescents. Abnormal duration of menstrual flow was reported by 16.2% of Malay female adolescents, significantly higher compared to other ethnic groups.

PMS was significantly more common among female adolescents who were overweight (BMI > 95th percentile of the gender and age group) than those who were underweight (BMI < 5th percentile of the gender and age group) ($p<0.05$). The cut-off point for being overweight and underweight is based on recommendations by the World Health Organisation (WHO) Expert Committee on Physical Status[5]. Menstrual abnormalities (except for abnormal duration of menstrual flow) were also significantly more common among adolescents who ate less to lose weight (dieting behaviour) and among those who did not perform physical exercise ($p<0.05$). Abnormal duration of menstrual flow, heavy menstrual flow and irregular cycles were significantly more common in female adolescents who smoked than those who did not smoke ($p<0.05$). Certain menstrual disorders were noted to be significantly more common in those having suicidal behaviours. The suicidal behaviour of the secondary school students was analysed and elaborated in another paper[6]. The results of multiple logistic regressions are shown in Table III. Absenteeism was more common in those with increasing severity of dysmenorrhoea. The mean number of days of absence from school for those with moderate to severe dysmenorrhoea was 3.15 days.

DISCUSSION

Age of menarche in this country did not vary much from that of other countries[7-10]. However, in this study, reporting of age of menarche was only to the nearest year (month was not reported). A "long cycle" (longer than 35 days) was a common menstrual disorder among the adolescents in this study. In the WHO study on menstrual and ovulatory patterns in adolescent girls, the mean menstrual cycle length was 50.7 days in the first cycle after menarche, and bleeding lasted for an average of 4.7 days[11]. The female reproductive system usually requires approximately two years to mature before adolescent girls will have consistently-regular ovulatory cycles[11]. In this study, most of those with abnormal cycle length were within two years of achieving menarche, suggestive of anovulatory cycles. However, other causes needed to be ruled out, as anovulation may result from a pathological condition such as polycystic ovary syndrome. Heavy menstrual bleeding was also a common problem among the adolescents in this study. The most common cause of heavy menstrual bleeding in adolescents is dysfunctional uterine bleeding related to anovulation[12]. Other causes of excessive uterine bleeding, e.g. bleeding disorder and complications of pregnancy, were not ruled out.

About 75% of the adolescent female students had PMS. For some, it was severe enough for them

to be absent from school. The aetiology of PMS is unknown, and it is a relatively uncommon disorder during adolescence[12]. Adolescent girls commonly complain of PMS when they are actually experiencing dysmenorrhoea or psychosocial problems[12]. It is important in this respect that adolescent girls are given counselling and managed appropriately to avoid absenteeism from school. It is also important to investigate any underlying psychosocial disorder that may exist in girls complaining of PMS. Dysmenorrhoea was relatively common, with almost two-thirds of the adolescents having this problem. The reported prevalence of dysmenorrhoea in other studies ranges from 51% to 80%[13-17]. Other studies noted that older women are more likely to report decreasing severity of primary dysmenorrhoea[13,18]. However, another study found that the severity of dysmenorrhoea was not associated with age as an isolated factor[19].

Behavioural risk factors, such as smoking, alcohol consumption, attempts to lose weight and physical activity, are of interest because of the potential for intervention. Smoking seemed to increase the prevalence of menstrual disorders (abnormal duration of menstrual flow, heavy bleeding and irregular cycles) in this study. Some studies reported an association between smoking, short cycle length and irregular cycles[6,20]. In this study, there was no significant association between dysmenorrhoea and smoking. Previous studies found that smoking increases the severity of dysmenorrhoea[13,19] and duration of dysmenorrhoea[20]. However, not all studies support the association between smoking and dysmenorrhoea[15,16]. Other behaviours, such as alcohol consumption, have not been associated consistently with dysmenorrhoea[15,21]. We did not find any association between menstrual disorders and alcohol consumption.

Other factors associated with menstrual disorders (heavy bleeding, irregular cycles, PMS and dysmenorrhoea) include attempts to lose weight. In women between 14 and 20 years of age, attempts to lose weight are associated with increased menstrual irregularity and menstrual pain independent of BMI[22]. Our data support an association between PMS and increasing BMI. However, the evidence of an association between being overweight and menstrual dysfunction is inconsistent[4,15,16,19,23]. Other behaviours such as physical activity have not been associated consistently with menstrual dysfunction[15,21,23]. There was no association between menstrual disorders and physical activity in our study.

Mental health problems are another potentially modifiable risk factor. Depression, anxiety, and disruption of social support networks have been associated with menstrual pain[4]. In this study, female adolescents who have abnormal menstrual cycles were noted to have significantly higher tendency for suicidal behaviour as compared to those who have normal menstrual cycles. These associations might be attributable to increased stress among depressed adolescents. This again shows that it is important to rule out other causes of abnormal cycles such as underlying psychosocial disorders. In this study, only about 10% of the students consulted a doctor for their menstrual problems. In other studies, rates of consultation ranged from 6% to 14%[17,24]. Pain is often disregarded by many women who consider pain to be a normal part of the menstrual cycle. Thus, many women fail to report their pain to physicians. Given that most adolescents do not seek medical advice for dysmenorrhoea, healthcare providers should routinely screen for dysmenorrhoea and offer treatment in their school health programmes.

The problem of absenteeism from school or work was also under-appreciated. This study reported that about 7% of the adolescents had symptoms which were severe enough for them to be absent from school. In several studies of young women, rates of absenteeism ranged from 34% to 50%[16,19,24]. Other studies showed that up to 52% of female adolescents in their study reported that their ability to perform work was affected[14,17,19]. Surveys among female high school adolescents showed that the majority of the female adolescents identified dysmenorrhoea and PMS as problems that significantly affected their academic performance and were responsible for school absenteeism[24,25]. As dysmenorrhoea reportedly affects school performance and attendance, school administrators may have a vested interest in providing health education on this topic to students. With adequate support from parents, schools and healthcare personnel, the problem of loss of invaluable school time can be prevented. As mothers were the main source of information and knowledge in this study, health professionals should involve mothers in general discussions about menstrual problems and how to deal with them. Mothers were unprepared or unable to give sufficient advice and reassurance to their daughters[3]. By involving mothers in discussion and providing accurate information, mothers will be better prepared.

One of the limitations of the study was that the results were based on adolescents' self-reports

of their behaviours, such as smoking and alcohol consumption. Although every effort was made to assure the students that their responses would be kept confidential, the possibility remains that some students may have under-reported smoking and alcohol consumption to avoid punishment or over-reported to present a rebellious image. Another limitation of the study was that some of the students, especially those in the poorer academic classes, may not have been able to understand the questions. Although assisted by our interviewer, some of the answers received were not valid. These answers were omitted from the analysis. Another shortcoming of this study was that data were only collected in schools. School-age female adolescents who had left school or dropped out of school at various ages could not be reached, so the results cannot be generalised to all female adolescents nationwide.

In addition, an important limitation of all cross-sectional studies is that they can suggest associations, but not prove causality. In conclusion, menstrual disorders among female adolescents are common. Health education on menstrual problems targeting female adolescents and their parents, and routine screening for menstrual problems by healthcare providers, can help prevent the loss of invaluable school time.

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