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The Prevalence of Menstrual Problems amongst Adolescent Girls in Northeastern Iran

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ABSTRACT

Background & Objective: The start of menstruation is an important event in female puberty, but there are several health related problems that may be associated with its occurrence. Our goal was to estimate the frequency of menstrual problems and determine the factors related with them in adolescents.

Materials & Methods: Girls were recruited from the Mashhad and Sabzevar regions in northeastern Iran. Adolescent girls who had attained menarche were administrated to complete a self–reported questionnaire containing items about menstrual pattern and premenstrual symptoms. Descriptive and categorical data were analyzed for statistical significance using t-tests and chi-square tests**.**

Results: Eight hundred and ninety seven girls (mean age 14.0±1.3 years) ranging in age from 10 to 19 years were recruited. The mean age of menarche was 12.57±1.19 years for the girls recruited in Sabzevar *vs* 12.68±1.23 years in group from Mashhad (P <0.05). Dysmenorrhea was observed in 617 (68.8%) of participants and irregular cycle was found in 168 (18.7%) of cases. Also, 47.6% of participants had premenstrual syndrome (PMS) which was significantly associated with dysmenorrhea (P<0.05). Backache (60%) and tendency to cry easily (31.8%) were common premenstrual disorders among participants. 21% had delayed menarche and 2.1% suffered from menorrhagia. The prevalence of primary dysmenorrhea and obesity in girls with early menarche was significantly higher compared to those with delayed menarche (P<0.05).

Conclusion: Menstrual disorders affect a large percentage of Iranian girls. More than half of participants experienced dysmenorrhea that often required medical treatment.

Keywords: Adolescent; menstruation; PMS; dysmenorrhea

Introduction

Menarche is an important milestone in the reproductive health of woman, and is one of the major changes occurring during adolescence. Immaturity of the hypothalamus-pituitary-ovarian cascade and perturbations in menstrual cycle are frequently observed in this phase of life. Menstrual problems are a cause of school absenteeism, disruption of daily and social routine activities and can significantly add concern to adolescents and their families in this difficult and sensitive phase of maturity **(1)**. The age of menarche has fallen in the previous decade. For instance, in China the mean age of menarche fell from 13.4 to 12.5 years at 1985-2010 **(2)**. Identical tendency has been reported in other countries **(3, 4)**. Menstrual complaints are frequent in adolescent girls such as primary dysmenorrhea (PD), oligomenorrhea, precocious or delayed puberty, heavy bleeding, vaginal discharge and acne **(5, 6)**.

Premenstrual syndrome is typified by numerous psychological, somatic symptoms and behavioral changes, occurring pre-menstruation phase of menstrual cycle and decline after the beginning of the menstruation **(7, 8)**. Thus, PMS and PD remarkably reduced the quality of life of adolescent girls within menstruation.

There has been a scarce of well-documented study on menstrual patterns in adolescent girls in Khorasan Province, Iran. The purpose of this work was to evaluate the age of menarche and the prevalence of menstrual pattern disorders among adolescents in this region.

Materials and Methods

This study was conducted among adolescent students living in Mashhad and Sabzevar, Iran in February 2017. Ethical approval was obtained from our University (IR.MUMS.fm.REC.1395.12). Privacy and confidentiality were maintained during the study period.

Study subjects were recruited from various areas in these cities using a stratified random sampling approach. Inclusion criteria included girls who had attained menarche one year before the start of the study, who were unmarried and who were willing to participate. Informed written consent was obtained from the girls and their parents before the study. Of a total of 940 girls who were initially interested in the study, 897 fulfilled the inclusion criteria. 287 girls were recruited from Sabzevar and 610 girls from Mashhad, and completed the study. Each study subject was evaluated for menstrual pattern, and menstrual problems affected during menstruation using a self-administrated questionnaire.

Data collected included age, history of any medical or surgical problems, and exposure to cigarette smoking. Height and weight was measured by standard protocol. Based on these values, body mass index (BMI) [weight (Kg)/height (m^2)] calculated. Information related to the menstrual history that were collected by questionnaire, including the age of menarche, menstrual history (length of menstrual cycle, duration, and amount of bleeding), and the necessity of medication for alleviating of the pain. Early menarche characterized the age of <12 y, medium menarche between 13 and 14 y and delayed menarche > 14 y **(9)**.

Individuals were also instructed to answer questions related to having any of 15 symptoms recurrently during the premenstrual phase which spontaneously mitigates at the beginning of menstruation. Physical manifestations such as backache, leg pain, diarrhea, nausea, vomiting, along with psychological symptoms of depression and sadness, irritability, palpitation, appetite changes, sleep pattern changes, lack of energy, fatigue, loss of concentration, decrease interest, tendency to cry easily are collected. PD diagnosis was characterized by abdominal pain, cramping related with onset of menstruation. Responders having at least two symptoms, one physical and one psychological symptom were regarded as having PMS, while those with only one symptom or no symptoms considered as not having PMS **(7, 8)**.

Menstrual patterns were categorized as bellows* (10)*:

Primary amenorrhea: no menses by the 16th birthday

Secondary Amenorrhea: no menses for six or more months

Regular menstrual cycles: cycle length: 22-35 days

Irregular menstrual cycles: cycle length: < 22 or > 35 days

Oligomenorrhea: menstrual cycles of 35 – 180 days or infrequent menses

Polymenorrhea: cycle length duration of < 20 days

Menorrhagia (heavy cyclical menstrual bleeding): utilize >4 fully soaked pads per day for protection within the menstrual bleeding

Hypomenorrhea (light cyclical menstrual loss): utilize < 1 fully soaked pad or utilize of panty liner being suffice for shielding

All statistical analyses were performed using SPSS version 17 (SPSS Inc., Chicago, Illinois, USA). All the variables were represented in frequency and percentage. Chi-square test and independent t-test were done for examine statistical significance relationship among variables. The statistical significant was considered when p value below 0.05.

Results

A total of 897 unmarried girls were recruited with the mean age of 14.0 ± 1.3 years (range 10-19 y). The mean ± SD of menarcheal age using a recall method was to be 12.57±1.19 years ranging between 10 and 19 years (12.29±1.02 years in Sabzevar *vs.* 12.68±1.23 years in Mashhad, P value <0.05). The age at menarche was therefore lower in Sabzevar than Mashhad. Mean inter-menstrual interval of the girls was found as 27.95±14.5 days with the maximum being 180 days and minimum 18 days (29.63±20.54 in Sabzevar *vs.* 27.10±11.90 in Mashhad; P<0.05). The average menstrual flow was 6.99±3.35 days ranging from 2 to 12 days (7.47±5.26 in Sabzevar *vs.* 6.83±2.37 in Mashhad (P value <0.05). Backache (60%) and tendency to cry easily (31.8%) were common premenstrual disorders among participants. Prevalence of tight and leg pain and nausea are significantly higher in Mashhad. Menstrual pattern and frequency of menstrual disorder among participants were shown at Table 1.

The regularity of menstrual cycle was shown in Table 2 regarding to age, expose to smoking and BMI. There were no statistically significant value of the regularity of menstrual cycle was observed by these variables (P>0.05).

PD was reported by 617(68.8%) of subjects. Menstruation regularity was not significantly related with the severity of PD (p>0.05). The proportion of girls with a requirement for treatment also significantly increased with the severity of PD symptom (p<0.001; Table 3).

Based on PMS criteria, 47.6% of participants had PMS. PMS was found to be significantly associated with PD (P=0.019). Age and regularity of menstrual cycle were not significantly associated with PMS (Table 4).

There were no statistically significant differences for early, medium and delayed menarche with respect to regularity of menstrual cycle (P>0.05). The prevalence of PD and BMI >30 kg/m^2 in girls with early menarche was significantly higher compared to those with delayed menarche (P=0.016, and P=0.048, respectively; Table 5).

Table 1: Menstrual pattern and menstrual disorder among 897 participants

Variables	Total(n=897) Number (%)	Sabzevar(n=287) Number (%)	Mashhad(n=610) Number (%)
Early menarche	422(47)	164(57.2)	258(42.3) α
Medium menarche	287(32)	99(34.3)	188(30.8)
Delayed menarche	188(21)	24(8.5)	164(26.9) α
Hypomenorrhea (light menstrual bleeding)	214(23.9)	109(38.0)	105(17.2) α
Normal bleeding	664(74.0)	175(60.9)	489(80.1) α
Menorrhagia (heavy menstrual loss)	19(2.1)	3(1.1)	16(2.6)
Regular menstrual cycles	729(81.3)	234(81.5)	495 (81.2)
Irregular menstrual cycles	168(18.7)	43(18.0)	125(20.4)
Oligomenorrhea	140(15.6)	46(16.0)	95(15.5)
Polymenorrhea	28(3.1)	8(2.9)	20(3.2)
Dysmenorrhea	617(68.8)	189(65.8)	425(69.7)
Use of medication for relief pain	335(35.6)	98(35.9)	213(34.9)
Primary amenorrhea	3(0.3)	0 (0)	3 (4.9)
Secondary amenorrhea	3(0.3)	1 (0.3)	2 (3.2)
PMS	427(47.6)	129(45.1)	298(48.8)
Menstruation-associated symptoms			
Tight and leg pain	172(19.2)	42(14.8)	130(21.3) α
Backache	538(60.0)	161(56.5)	377(61.8)
Nausea	73(8.1)	12(4.2)	61(10.0) α
Vomiting	26 (2.9)	4(1.3)	22(3.6)
Diarrhea	28(3.1)	5(1.7)	23(3.7)
Appetite changes	4(0.4)	0(0.0)	4(0.7)
Irritability	57(6.4)	15(5.4)	42(6.5)
Fatigue	86(9.6)	29(10.0)	57(9.3)
Palpitation	84(9.4)	21(7.6)	63(10.3)
Lack of energy	89(9.9)	27(9.4)	62(10.2)
Sleep pattern changes	11(1.2)	0(0.0)	11(1.8)
Depression and sadness	74(8.2)	23(8.1)	51 (8.3)
Decrease interest	111(12.4)	32(11.0)	79(12.9)
Loss of concentration	139(15.5)	44(15.4)	95(15.6)
Tendency to cry easily	285(31.8)	95(33.8)	190(31.1)

-α P value<0.05, Sabzevar versus Mashhad, using Chi-square tests.

Table 2: Factors affecting regularity of menstruation

	Regular (n=729)	Irregular (n=168)	X2	P value
Age (year)				
12-15	65.4%	67.2%	0.19	0.65
15-18	34.6%	32.8%		
Expose to smoking				
Yes	32.6%	29.6%	0.55	0.45
No	67.4%	70.4%		
BMI (Kg/m2)				
Underweight (<19)	38.1%	33.3%	3.38	0.34
Normal (19≤BMI<25)	48.8%	47.7%		
Overweight (25≤BMI<30)	10.1%	14.9%		
Obese (≥30)	3.0%	4.2%		

Data present as percent. P value obtained from Chi-square test

Table 3: Factors associated with presence and severity of primary dysmenorrhea in adolescent girls

	Dysmenorrhea				χ2	P value
	No n=180	Mild n=85	Moderate n=187	Severe n=345		
Age at menarche						
Early menarche	35.1%	47.6%	46.3%	51.4%	10.30	0.11
Medium menarche	36.8%	37.9%	32.4%	28.7%		
Delayed menarche	28.1%	14.5%	21.3%	19.9%		
Regularity						
Regular	81%	62.4%	75.8%	73.3%	6.99	0.072
Irregular	19%	37.6%	24.2%	26.7%		
Treatment needed						
Yes	0	10.6%	27.8%	57.8%	151.5	<0.001
No	100%	89.4%	72.2%	42.2%		

P value obtained from Chi-square test.

Table 4: Factors associated with Presence of PMS in adolescent girls

	PMS		X2	P value
	Yes (n=427)	No (n=470)		
Age (year)				
12-15	65.1%	66.0%	0.037	0.847
15-18	34.9%	34.0%		
Regularity				
Regular	79.4%	83.0%	0.282	0.59
Irregular	20.6%	17.0%		
Primary dysmenorrhea				
Yes	74.4%	63.4%	5.46	0.019
No	25.6%	36.6%		

Data present as percent. P value obtained from Chi-square test.

Table 5: Factors associated with age at menarche in adolescent girls

	Age at menarche			X2	P value
	Early menarche	Medium menarche	Delayed menarche		
Regularity					
Regular	27.2%	25.3%	27.9%	0.33	0.84
Irregular	72.8%	74.7%	72.1%		
BMI (Kg/m2)					
Underweight (<19)	23.3%	35.8%	32.8%	15.64	0.016
Normal (19≤BMI<25)	56.6%	50.4%	51.4%		
Overweight (25≤BMI<30)	16.0%	10.6%	12.0%		
Obese (BMI ≥30)	4.1%	3.2%	3.8%		
Primary dysmenorrhea					
Yes	74.3%	69.8%	65.7%	4.68	0.048
No	25.7%	30.2%	34.3%		

Data present as percent. P value obtained from Chi-square test.

Discussion

To the best of our knowledge, this is the first study to report the prevalence of menstrual complications in adolescent girls in Iran. The age of menarche in the current study was 12.57±1.19 years. The mean age of onset of the menarche in various regions of Iran has been reported as follows: Isfahan, in central of Iran (12.65 years), Zanjan (12.6 years)(11), Qom (12.3 years)(12), Qazvin (12.52 years) **(13),** Shiraz, southern Iran (12.27±0.73 years) **(14)** and of Qaen, Eastern Iran (12.78±1.23 years) **(15)**. Age at menarche does not vary greatly across regions in Iran. Razzaghi-Azar et al. reported the median age of menarche was 12.68 years among school girls in Tehran, Iran **(16)**. In one past study at 1997 in Shiraz, Iran on 1862 secondary school girls age at menarche was 12.91±1.23 years **(3)**. Other studies done in India and Nepal indicate a mean age at menarche to be 13.5 and 14.5 years, respectively **(17, 18)**.

Age at menarche is an important indicator of puberty in girls and reflects the health of the female population. There are many factors affect the onset menstruation and its progression including individual gene-specific, geographical location, general health conditions, ethnicity, nutrition and socio-economic status. Most of the differences in pubertal timing is not due to any clinical diseases. Therefore, the data collection procedures of studies were different and these affect their findings, interpretation and comparison among them, require some caution. Generally, delayed age at menarche is more prevalent in the areas situated in lower or higher latitudes, whereas early age at menarche is more frequent in temperate climates and regions closer to the beach. However, they find menarche age had decreasing trend in throughout the last 20 years, in some Asian countries **(3, 4)**. It may be as a result of improvement in socioeconomic status leading to over-nutrition and obesity or environmental endocrine disruptors.

Age at menarche was lower in Sabzevar than Mashhad. This difference may be due to social cultural and genetic factors, nutritional habits, attitude, family structure and beliefs. Distribution of individuals by onset of menarche presents that, the big proportion of girls 422 (47%) had early menarche followed by 287 (32%) had medium menarche and only 188 (21%) had delayed menarche. Controversially, Ali *et al.* in their study announced that 76.4% had late menarche followed by 19.3 % medium menarche and 4.3% experienced early menarche **(1)**. The mean inter-menstrual interval in the current study was 27.95±14.5 days. The study of Prasad *et al.* showed that 74.5% of the adolescents were menstruating at an interval of 26-30 days (average: 28.21±1.58 days) **(19)**. One of the interesting results of our study was the prolonged duration of flow compared to other studies. The average menstrual flow was 6.99±3.35 days in the present study, Patil *et al.* reported this to be 3.95±0.7 in rural areas of India, and Koshi and coworkers 4.5±1.6 days in urban areas of India **(5, 6)**.

In women of child-bearing age, the frequency of amenorrhea reported to be 5-13%. The prevalence of cycles> 35 days or oligomenorrhea ranged from 8-22%. A WHO multi-national study reported irregular bleeding ranged from 8% to 83%. In a large study in Italy, the prevalence of irregular cycles varied from 5% to 16%, with common prevalences demonstrated after medical interviews (9–16%) compared to non-expert interviews (5–15%) **(20)**. A study based on a sample of 3783 adolescents in Italy shows that the frequency of irregular length is 8.3% **(21)**. However, the highest frequency of irregularity was observed in a study in

Vietnamese factory workers (30%) (20). Although infrequent cycling is not in overall related to deteriorate health consequences, irregular cycles or amenorrhea may be referred to infertility, which is a main worry of women in many developing countries. Menorrhagia, identified by excessively heavy or prolonged menstrual blood loss, affected 10–15% of female within their lifetime. There are multiple reasons for menorrhagia such as anatomical gynecological pathology, hormonal fluctuations and pathological conditions medical problem such as hypothyroidism. Congenital and acquired hematologic disorders of hemostasis, thrombocytopenia and inherited bleeding diseases von Willebrand disease, platelet function disorders are a popular cause of menorrhagia among juveniles (22). In present study, 18.7% of girls reported irregular menses, 2.1% reported having menorregia and 3.1% reported having cycles <21 days. In Brazilian study, 21% of adolescent girls experienced menorrhagia (7). In Nigerian girls, profuse periods were reported by 21% (23), and in the Sri Lanka, 26% had hypermenorrhea (24).

Backache and tendency to cry easily were common premenstrual disorders among responders but Singh and co-authors expressed the common symptoms were backache, headache and fatigability (25).

Regularity of menstruation did not relate to age, exposure to smoking and BMI. Other study on adolescents population reported no statistically significant value of the regularity of menstruation was exist by age and BMI (9). While Zhou and co-workers claimed that a high BMI was predictive for an abnormal menstrual cycles, the difference in age and marital status between present study and that study could be one of the underlying reasons (26). In our study, we evaluated girls aged 12–19 years, while in that study, they only included married women aged 19–39 years.

In the present study, BMI in girls with early menarche was significantly higher compared to those with delayed menarche. Consistently, in several studies BMI of girls who had reached the age of menarche were increased versus their peers (27, 28). Tiyuri and colleagues have reported a significant inverse correlation between the BMI and age at menarche (r=-0.12, P=0.01) (15). The explanation of this association is not completely understood, though, some evidences have showed it necessary to have a specific percentage of body fat or particular BMI for menarcheal onset, and propose that thin female arrest to these essential values later and have delayed menarche (29, 30). Other report have found that this is a consequence of hormonal variations in obese individuals (31), and some have suggested the causality role of childhood obesity in early menarche (32). In addition, the relationship between more adiposity and puberty could be as a result of accelerating of neuroendocrine system maturation.

Dysmenorrhea includes abdominal pain or cramps with menstruation. It can be both primary and secondary dysmenorrhea reasons. PD is not related with any identifiable pelvic pathology. In present study, the subject was to find out the frequency of PD. Secondary dysmenorrhea was excluded with medical and menstrual history. PD as a major menstrual disorder among adolescents was observed in 617(68.8%) of the girls. This frequency was comparable to 73% reported by Pitungi and co-researcher (7) in their study.

The statistical significant association between presence of PD and earlier menarche in this research confirmed results of similar studies among adolescent students in Egypt (33) as well as medical student in Serbia (34). Prostaglandin (PG) levels have been found to be increased in women with severe menstrual pain compared to those without it. Similarity of hormonal secretion pattern and ovulatory productivity of early pubertal girls and adult females could causes to a lengthy exposure to uterine PGs which are responsible for pain (34).

A statistical significant association was found between treatment needed for relief pain and presence and severity of PD. This finding in the present study is in agreement with results obtained by Sharma *et al.*. Most of the adolescent with PD follow self-medication practice with few consulting health care provider. Another survey, did not found a connection between regularity of menstruation and PD that our finding agree with their result (9).

The statistical significant association was existed between presence of PMS and PD. Sahin *et al.* in their research found frequency of PMS is 1.5 times more in cases with a history of PD (8).

An important limitation of our study was the potential for recall bias, as all of the variables associated to menstruation were obtained by recall method. In this matter, the data obtained in present study could be a guide to the ministry of health for the implementation of an appropriate health strategy regarding to the reproductive health of the adolescent girls of Iran. We suggested a study to evaluate adverse effect of these problems on routine/social activates and quality of life among adolescent.

Conclusion

PD and PMS were the most frequent menstrual disorders among adolescent girls. Girls with PD often need medical treatment. Adolescents need to be aware of menstrual disorders and unimpeded access to early counseling about menarche and menstrual issues. It may be important to refer girls with menstrual disorder to healthcare facilities for treatment. The results of current study can provide baseline information for inspection of time trends and for international comparisons.

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Conflicts of Interest

There is no conflict of interest.

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