

Menstrual Cycle Patterns of College Students in Gorgan–Northeast of Iran: Identify Its Association with Sociodemographic Factors

İrânın Kuzeydoğusu Gorgan'da Üniversite Öğrencilerinde Cinsel Döngü Kalıbı: Sosyodemografik Faktörler ile İlişkisi

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Abstract

Purpose: The menstrual cycle is used as a sign of women's health. Objective of study is determining the current menstrual patterns of students in Gorgan –Northeast of Iran, and evaluation of affecting factors on the cycle.

Material and Methods: The study participants included 106 college student, females aged 18-30 that filled a questionnaire to detect the menstrual pattern, affecting factors on menstrual cycle. Main outcomes of variables compared using ANOVA. Logistic regression was used to model factors for menstrual regularity.

Results: The mean \pm SD age, menstruation lengths, age at menarche in student girls were 20.58 ± 2.13 , 28.02 ± 1.88 and 13.53 ± 1.30 , respectively. 59.2% of girls had age 20-25 and 39.8% of these students had normal cycle. Also of 53.4 % of students with normal cycle, 31.8% of students had body mass index 20-24.99. Age at menarche of 56.8% of all participants was 13-14 years. Comparison of regression coefficients between factors and reported menstrual patterns shows similar results for students of all categories of menstrual cycle.

Conclusion: This study provides a look at negative correlation of menstrual cycle's length with factors in college students of Gorgan – Northeast of Iran and points to importance of racial differences.

Key words: **Body Mass Index; Menarche; Menstrual Cycle; Physical Activity, Stress.**

Özet

Amaç: Cinsel döngü kadın sağlığının bir işareti olarak kullanılmaktadır. Sunulan çalışmanın amacı İrânın Kuzeydoğusunda, Gorgan'da cinsel döngü kalıbının belirlenmesi ve döngüyü etkileyen faktörlerin değerlendirilmesidir.

Yöntem ve Gereçler: Çalışmaya yaşları 18-30 arasında değişen 30 üniversite öğrencisi kadın katıldı ve onlara cinsel döngü kalıbını ve bunu etkileyen faktörleri belirlemek üzere bir anket doldurtuldu. Değişkenler ANOVA testi kullanılarak karşılaştırıldı. Cinsel döngü düzenliliği Logistic Regresyon testleri ile analiz edildi.

Bulgular: Katılımcıların ortalama yaş ve standart sapmaları, cinsel döngü süresi ve menarj yaşları $20,58 \pm 2,13$, $28,02 \pm 1,88$ ve $13,53 \pm 1,30$ olarak bulundu. Katılımcıların % 59,2'si 20-25 yaşları arasındaydı ve bunların % 39,8'inde cinsel döngü normaldi. Katılımcıların % 53,4'ü normal cinsel döngüye sahip idi ve % 31,8'inde Vücut kitle indeksi 20-24,99 arasında idi. Katılımcıların % 56,8'inde menarj yaşı 13-14 yıl idi. Bildirilen cinsel döngü kalıpları ve faktörler arasındaki regresyon sabitelerinin karşılaştırması cinsel döngünün tüm kategorilerindeki katılımcılar için benzer sonuçlar verdi.

Sonuç: Sunulan çalışma İrânın Kuzeydoğusunda Gorgan'da yaşayan üniversite öğrencilerinde cinsel döngü ile negatif ilişkili faktörlere bir bakış açısı sağlamakta ve ırksal farklılığın önemine işaret etmektedir.

Anahtar Kelimeler: **Cinsel Döngü; Fiziksel Aktivite; Menarj; Stres; Vücut Kitle İndeksi.**

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Introduction.

The menstrual cycle is used as a sign of women's health. The length of menstruation is related to levels of ovarian steroid production. Several factors can influence the ovarian steroid production that lead to menstrual cycle disturbance. There are many causes of menstrual cycle disturbance: many of the causes that essentially disrupt or suppress the rhythms of the hypothalamic-pituitary-ovarian axis (1, 2).

Various variables may influence its length and regularity of menstrual cycle. Study of Hooff and cowakes revealed that menstrual cycle abnormalities may also be associated with psychosocial stress, strenuous physical exercise, low body weight and endocrine disturbances (3). Several Researchers have investigated the effects of psychological stress in the workplace, caffeine consumption, smoking, and occupation on menstrual function, shown women in stressful jobs had a more than doubled risk for short cycle length compared with women not working in stressful jobs (4 - 6). Liu et al (7) examined that the association of demographic and lifestyle factors with menstrual cycle characteristics and concluded that non modifiable host factors, such as ethnicity, and potentially modifiable risk factors, such as smoking, physical activity, and alcohol consumption, may affect menstrual cycle outcomes. Sternfeld et al (8) hypothesized that moderate levels of physical activity can lengthen the menstrual cycle.

There is limited published data on menstrual patterns in Iran and presently no publications are available on this subject from Gorgan - northeast of Iran . This study was therefore undertaken to determine the current menstrual patterns between students in Gorgan and to identify its association with sociodemographic factors. Objective of study is to evaluate the affecting factors (age, body mass index, using pain relief drug, physical activity, and age at menarche, stress in life, marriage status, food type, food additive) on length and regularity of menstrual cycle.

Material and Methods

This study was performed in Gorgan - northeast of Iran during academic year 2005-2006. Gorgan is the centre of Golestan province of Iran. The city is located 400 km Northeast of Tehran (Iran's capital) and 20 km south of the Caspian Sea. Gorgan has a moderate and humid climate known as "the moderate Caspian climate" and has a population of 250 thousand.

Sample collection and participation. There are two levels of college education in Iran: governmental university

(free of salary) and Azad university (with salary). The study participants included 106 healthy (no smoker) university student (Azad university), females aged 18-30. They belonged to northern parts of Iran, Tehran, Mazandran, Guilan, Semnan and Golestan provinces. These students have been resided in Gorgan province for 2- 4 years based their education courses. The samples of this study were part of an age at menarche investigation of between college (18-30 aged women) and school girl (10-13 aged women) student. Total sample of the study was 310 girls, but 204 girls have not first menstruation (because they were under puberty).

Data collection. The research data were collected by filling a questionnaire to detect the menstrual pattern, affecting factors on menstrual cycle and socio-demographic features of the girl students. The questionnaires were delivered to the girls by ten midwives. Girls with chronic disorders as Thalassemia and type I diabetes were excluded. Questionnaire forms were filled by students and additional information obtained with interview.

The evaluation of menstrual patterns included the following data: (i) Menstrual cycle length: being the time from the first day of menstrual bleeding to the first day of next menstrual bleeding. (ii) Menstrual cycle regularity: the difference between the longest and shortest cycle. (iii) The length of menstruation: time from the first day of menstrual bleeding to the cessation of menstrual bleeding. (iv) Student - mother menstruation uniformity: do student and her mother have same menstrual cycle length or not. The questionnaires also included age of student and current mother age, body mass index, use of pain relief drug among cycle days, physical activity, and age at menarche, stress in life, marital status, food type and use spice (food additives).

The menstrual pattern was defined as short ($25 \leq$) days, normal (26-29) days, and long ($30 \geq$) days. Age was distributed into three groups: 15-19, 20-25 and 26-30 years. BMI (kg/m^2) was divided into four groups: 15-19.99, 20-24.99, 25-29.9 and 30-35. Age at menarche was distributed into four groups: 11-12, 13-14, 15-16 and 17-18 years.

Ethical consideration. Study design was approved by the relevant ethical committee of Gorgan University of Medical Sciences. All participants gave informed consent.

Statistical analysis. First the menstrual pattern was defined as short ($25 \leq$) days, normal (26-29) days, and long ($30 \geq$)

days. Main outcomes of variables were compared using one-way analysis of variance after grouping the study population into three groups based on menstrual pattern, followed by Tukey- was used to test for differences in various factors in the different menstrual pattern groups. P-values, 0.05 were considered evidence of significant differences.

In next step Odds ratio (OR) and their 95% confidence interval (CI) for menstrual regularity and student –mother uniformity of menstrual cycle were estimated by logistic regression. Therefore Logistic regression was used to model factors for menstrual regularity and student –mother uniformity of menstrual cycle in relation to age ,body mass index (4 categories), pain relief drug use (yes/no), physical activity (yes/no), and age at menarche, stress in life (yes/no), marriage status (yes/no), Food type (animal protein /herbal protein), food additive (yes/no). Moreover multiple linear regressions were also employed to predict length (number of days) of cycle by age and other independent variable. In addition Spearman’s correlations were computed for menstrual pattern related to variables.

Results

Of 106 questionnaires distributed, 103 were answered by College students, a response rate of 97 percent. The Mean \pm SD age, menstruation length, menarche in student girls were 20.58 \pm 2.13, 28.02 \pm 1.88 and 13.53 \pm 1.30 Table I.

Table I. Total Mean \pm SD of age, weight, menstruation length, age at menarche in student girls (n=103).

Avariable	Mean \pm SD
Age	20.58 \pm 2.13
Weight	58.44 \pm 9.66
BMI	22.09 \pm 3.50
Menstrual cycle length	28.02 \pm 1.88
Age at menarche	13.53 \pm 1.30
Current mother age	46.5 \pm 6.34

Frequency of variable, in three patterns of menstrual cycle length depicted in Table II. 59.2%of girls had age 20-25 and 39.8% of these students had normal (26-28 days) menstrual cycle. Also of 53.4 % of students with normal cycle 31.8% of students had BMI 20-24.99. 88.8 % of all subjects were not married. And age at menarche of 56.8% of all participant were 13-14 years.

Table 2. Frequency and Rates (%) of menstrual lengths according to the age, body mass index (BMI), menarche, physical activity, marital status, food type, Relief drug use.

	Menstrual Cycle Patterns							
	Total No	%	Long No	%	Normal No	%	Short No	%
Age (years)								
15-19	36	36.7	12	12.2	18	18.4	6	6.1
20-25	58	59.2	13	13.3	39	39.8	6	6.1
26-30	4	4.1			3	3.1	1	1
BMI (kg/m²)								
15-19.99	20	22.7	5	5.7	12	13.6	3	3.4
20-24.99	47	53.4	14	15.9	28	31.8	5	5.7
25-29.9	19	21.6	4	4.5	12	13.6	3	3.4
30-35	2	2.3			2	2.3		
Physical activity								
yes	48	49.5	11	11.3	30	30.9	7	7.2
No	49	50.5	13	13.4	30	30.9	6	6.2
Marital status								
Married	11	11.2	3	3.1	6	6.1	2	2
Not Married	87	88.8	22	22.4	54	55.1	11	11.2
Age at menarche								
11-12	20	21.1	4	4.2	12	12.6	4	4.2
13-14	54	56.8	12	12.6	36	37.9	6	6.3
15-16	19	20	6	6.3	11	11.6	2	2.1
17-18	2	2.1	1	1.1			1	1.1
Regularity of cycle								
Yes	66	68	11	11.3	49	50.5	6	6.2
No	31	32	14	14.4	10	10.3	7	7.2
Stress in life								
Yes	37	38.5	11	11.5	21	21.9	5	5.2
No	39	61.5	12	12.5	39	40.6	8	8.3
Food type								
animal protein	6	6.2	6	6.2	6	6.2	6	6.2
vegetable protein	7	7.2	7	7.2	7	7.2	7	7.2
Food additive use								
Yes	28	59.6	6	12.5	18	38.3	4	8.5
No	19	40.4	5	10.6	12	25.5	2	4.3
Relief drug use								
Yes	28	59.6	6	12.8	18	36.8	4	8.5
No	19	40.4	5	10.6	12	25.5	2	4.3

When variables were compared using one-way analysis of variance after grouping the study population into three groups (based on menstrual pattern) there were no significant difference between factor variables in the different menstrual pattern groups. Age, weight, BMI and

menarche age of students in three menstrual cycle patterns were similar (Table III). For example the BMI of student in three patterns of menstrual length were 21.61 ± 3.54 , 22.15 ± 3.56 and 21.86 ± 3.46 in short, normal and long menstrual period respectively.

Table III. Mean \pm SD of age, weight, BMI, menstruation length and Age at menarche in three patterns of menstrual cycle length compared and analyzed by one –way ANOVA.

Variable	Menstrual Cycle Patterns			p- value
	Short	Normal	Long	
Age	20.71 \pm 2.70	20.86 \pm 2.24	19.76 \pm 1.33	0.097
Weight	55.07 \pm 9.52	58.69 \pm 9.70	58.66 \pm 9.30	0.480
BMI	21.61 \pm 3.54	22.15 \pm 3.56	21.86 \pm 3.46	0.876
Menarche age	13.71 \pm 1.77	13.47 \pm 1.18	13.65 \pm 1.40	0.767
Mother age	46.14 \pm 5.03	46.85 \pm 7.18	46 \pm 5.46	0.840

Risk factor (hereby indicated as odds ration) for menstrual cycle regularity and mother-student cycle uniformity were evaluated by logistic regression model, as shown in Table IV and Table V. Comparison of regression coefficients between factors and reported menstrual patterns showed similar results for students of all categories of menstrual cycle. Regression modeling showed a negative association between factors and menstrual patterns. In this study the

factor variable such as age, age at menarche, BMI and stress did not have any impact on menstrual cycle regularity and mother-student cycle uniformity. For example BMI in logistic regression result for regularity of menstrual cycle were: p-value <0.798 (OR: 0.963, 95% CI .719-1.288) also result of logistic regression for regularity of mother- student menstrual cycle uniformity were: p-value <0.818 (OR: 0.966, 95% CI 0.717-1.301).

Table IV. Logistic regression for regularity of menstrual cycle in relation to factors

Factor definition	p-value	95% CI	OR
Age (per year)	0.890	-0.789-1.228	0.985
BMI (4 th v 1 st)	0.798	0.719-1.288	0.963
Age at menarche (4 th v 1 st)	0.251	0.543-1.173	0.798
Physical activity (yes)	0.166	0.187-1.334	0.499
Use pain relief drug (yes)	0.757	0.334-4.519	1.228
Weight (per kilogram)	0.927	0.908-1.112	1.005

Table V. Logistic binary regression for regularity of mom–student uniformity in relation to factors

Factor definition	p-value	95% CI	OR
Age (per year)	0.848	0.769- 1.241	0.977
BMI (4 th v 1 st)	0.818	0.717-1.301	0.966
Age at menarche (4 th v 1 st)	0.197	0.518-1.145	0.770
Physical activity (yes)	0.140	0.175-1.278	0.473
Use pain relief drug (yes)	0.757	0.329-4.608	1.232
Weight (per kilogram)	0.966	0.904-1.112	1.002
Current Mother age per year	0.831	0.915-1.074	0.991

In the Multiple regressions analysis using cycle length as a continuous variable, the length of menstrual was not associated with age at menarche, marital status, BMI and

Stress (Table VI). For example p value of BMI was not significant (Parameter estimate: 0.518, Std. Error: 0.059 and p-value: 0.606)

Table VI. Multiple regressions analysis for the menstrual cycle length (days) among 106 girls

Factors	p-value	Std. Error	Parameter estimates
Age	0.355	0.100	-0.931
Marital status	0.824	0.674	0.223
BMI	0.606	0.059	0.518
Physical activity	0.974	0.403	-0.033
Use Pain relief drug	0.478	0.524	0.713
Stress in life	0.492	0.444	-0.690
Age at menarche	0.784	.160	.275
Type of food	0.654	.721	-.450
Current mother age	0.765	.034	.300

Also no correlation were between menstrual cycle and age ($p < 0.258$), body mass index ($p < 0.845$), physical activity ($p < 0.658$), age at menarche ($p < 0.845$), stress in life ($p < 0.233$), marital status ($p < 0.742$), food type ($p < 0.526$) and food additive ($p < 0.70$).

Discussion

The present study showed that there were no association between menstrual cycle and variables such age, BMI, physical activity, age at menarche, stress in life, marital status. Also analysis of data with ANOVA showed there were no significant differences between factor variables in the different menstrual pattern groups. Age, weight, BMI and menarche age of students in three menstrual cycle patterns were similar. Menstrual cycle length and its regularity is one of important women’s health issues.

It is also an important indicator of underlying reproductive health, since the menstruation reflect the production of steroid hormone and function and the rhythms of the hypothalamic-pituitary-ovarian axis. It has been observed that that exercise, psychological stress and nutritional are the factors associated with menarche as well as with the regularity of menstrual cycle (10). But some investigations reported controversial and opposite results.

Results of Williams study showed that there was no association between average cycle length-age and BMI (14).

These results are consistent with above mentioned study and age was not associated with menstrual cycle length or regularity, but this was also not surprising because of the limited age range (18–3) of this sample. Studies were revealed that cycle disturbances are associated with obesity as well as with energy shortages. A high prevalence of obesity among amenorrhic women was reported (10, 15). But subjects of this study were not obese. Mean \pm SD weight of girls of this study were 58.44 ± 9.66 .

It is suggested that vegetarianism is associated with menstrual disturbances, which clinical menstrual disturbances may be more common in vegetarians but these results cannot be generalized (9) In spite above investigation this study There were no association between menstrual cycle and two use protein source foods since we investigated differences of two protein source foods (animal and vegetable proteins foods) and any Subjects of this study were not actual vegetarian.

Psychosocial stressors are associated with menstrual cycle disturbances (11). Also Wang et al proposed that there is an association between stress and the incidence of dysmenorrhoea, which is even stronger among women with a history of dysmenorrhoea (12). Stress of subjects of study was not high. In consistent with this study Susan and Clarvit proposed that no evidence found to support the hypothesis that a high-perceived level of stress was associated with a change in any of the measures of menstrual function examined in Medical Students. (13).

Sternfeld et al, 2002 hypothesized that moderate levels of physical activity can lengthen the menstrual cycle. (8). Physical activities of subjects of the study were not in high exercise, for example just low exercises such as running that reported by the girls.

Age at menarche is known to influence menstrual cycle length. (16). Patterns and mean of age at menarche of girls (13.53 ± 1.30) is different from most European and other countries. In Iran it is higher age at menarche.

Difference these results from other studies can be assumed by reasons of different ethnicity, since Ethnic difference in the menstrual patterns has also been reported. (16) Also low physical activity, lower age, non smokers and healthy girls of study subjects were different from most mentioned investigation. Other factor for example smoking, alcohol consuming, may be more effective. This study has also consistent with other studies (16 and 17) demonstrated the importance of examining differences in different ethnic when studying the menstrual cycle.

In conclusion this study provides a look at negative correlate of menstrual cycle's length in college students and points to importance of racial differences. Therefore additional investigation of potential differences in menstrual characteristics is proposed.

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