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Menstrual Profile and Body Mass Index among Female University Students

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Abstract Menstruation is a uniquely female phenomenon and the most important part of the female reproductive cycle. But painful menstrual pain is a common gynecological complain among women. Many factors play a role and affect the menstrual cycle, which includes hormonal changes, psychological factors, genetic factors and body mass index (BMI). **Aim**: The current study aimed to assess the relationship between Body Mass Index (BMI) and the severity of menstrual pain and to spotlight on the dietary habits of students and its association with the menstrual profile. **Methods**: Cross-sectional correctional study design was utilized. 177 agreed to participate in the study selected by stratified cluster sampling technique. A semi-structured self- administered questionnaire was used in data collection. **Results**: The findings revealed that less than one quarter 14.1 % & 17.5% of the study sample were in the extreme range either underweight or overweight, respectively. 79.1% of the study participants had reported pain during menses and 33.5 % of them describe this pain as severe pain. Furthermore, a statistically significant difference was found between BMI and menstrual profile. **Conclusion**: It can be concluded that BMI had an effect on the menstrual profile. Therefore, special attention should be given to adolescent's nutrition which leads to maintain the normal BMI and regulate the menstrual cycle. **Recommendation**: Lifestyle modification and nutritional counseling for female students could alleviate menstrual problems, promoting healthy eating habitats and maintaining an optimal BMI can improve menstrual health. Further research in the nutritional pattern in adolescents can be done especially during the menstrual cycle should be implemented.

Keywords: *menstrual profile, BMI, adolescent female*

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1. Introduction

Adolescence is one of the most challenging periods in human development. The uniform growth of childhood is suddenly altered by a rapid increase in the growth rate and the occurrence of menarche. Menstruation occurs once a month as a regular rhythmic period and remains as a normal physiological phenomenon from menarche to menopause. It is regulated by cyclical changes in female sex hormones and regularity of menstrual cycles reflects changes in the level of these hormones. Menarche is the first menstrual period; it is generally occurring normally with the following profile: The average length of the menstrual cycle is 28 days with a normal range of 21 to 35 days. The normal duration of bleeding is 5 to 7 days with a normal range of 3 to 7 days. The average blood loss during menses is 35 ml with a normal range of 20 to 80 ml [1].

Factors that often play a role in the regularity and flow of a woman's menstrual cycle include physiological, cultural, and psychological factors. In addition, inappropriate nutritional diet, lower age, obesity, family history, and reduced frequency of breakfast meals per week hormonal changes, genetics, serious medical conditions, and BMI are factors affecting the frequency of this problem [2].

Dietary habits are fundamental factors that influence human lifestyles and individual quality of life. In addition, the adverse effects of environmental hormones or toxins on human health, which will be manifested in later life, have been pointed out. Nutritional deficiency is considered one of the important factors that induce hypothalamic-pituitary-ovarian dysfunction. Recently, adolescents have tended to try to lose body weight by dietary restriction for cosmetic purpose. Body mass index is a statistical measure which compares a person's height and weight. Due to its ease of calculation, BMI is the most widely used diagnostic tool to identify obesity problems within a population [3]. BMI also can be used to know the impact regularity of the period. Both extremes underweight and overweight/obese can lead to variations in the menstrual cycle due to de-regulation of hormonal pathways. However, even the smaller changes in weight

not placing us in another BMI zone may be strong enough to cause shifts in our hormones and as a consequence changes in our cyclicity [4]. So, the current study aimed to assess the relationship between BMI and menstrual profile and to spotlight on the dietary habits of students and its association with menstrual pain severity.

2. Subjects & Methods

Descriptive cross-sectional correctional study design was utilized. A convenient sample of 177 students who agree to participate in the study was included. Stratified cluster sampling technique was followed in sample selection. A semi-structured self-administered questionnaire was prepared after in-depth reviewing of literature and it was revised by a jury of specialists in the field of obstetrics and gynecological nursing and community health nursing. A pilot study of 10 % of the study sample was done and it was excluded from it. All necessary modifications were done in the questionnaire. The tool was fully explained by the researchers before the students go on it. They assured about the confidentiality of information for the purpose of research only. They asked to prepare themselves for weight and height measurements. Weight was measured in a kilogram, without footwear using a regularly standardized beam balance. Checks on the scale were made routinely before recording the weight of each girl. Height was also taken barefooted in centimeter using standard measuring tape fixed vertically. It was recorded to the nearest 1 cm to avoid possible error. Finally, the Body Mass Index was calculated as weight in kg/height in m^2. Students were classified as underweight if their BMI was < 18.5, normal if it was between 18.5-24.9, overweight if it was 25-29.9 and obese if their BMI was greater than 30 [5]. An ethical approval permission to implement the study was granted from the authorized person during the time of data collection (during February to April 2017). Official permission was granted. Informed written consent was taken from all participated students after a full explanation about the aim of the study. The inclusion in the study was totally voluntary. Also, students were notified that they can withdraw at any stage of the research.

3. Results

Table 1 shows that more than one half 56.5% of the study participants were in the age group between 18-20 years. As much as 35.6% & 28.2 % of them were in preparatory and second year, respectively. Regarding the time spending at the college, 50.8 % of the study participants had reported spent between 7-8 hours daily.

Table 1. Personal characteristics of the study participants

Variable	frequency	%
Age		
less than 18	66	37.3%
18-20	100	56.5%
21-23	11	6.2%
Grade		
Preparatory year	63	35.6%
Second year	50	28.2%
Third year	31	17.5%
Four year	33	18.8%
Time staying in college		
5-6 hours	41	23.2 %
7-8 hours	90	50.8%
More than 8	46	26.0%

Concerning the BMI of the participants, Figure 1 shows that 45.2% of the students had a normal BMI (18.5- ≤ 25 kg/m^2), while near to one quarter 23.2 % were overweight and 17.5% were obese (BMI 18.5- ≥ 30 kg/m^2).

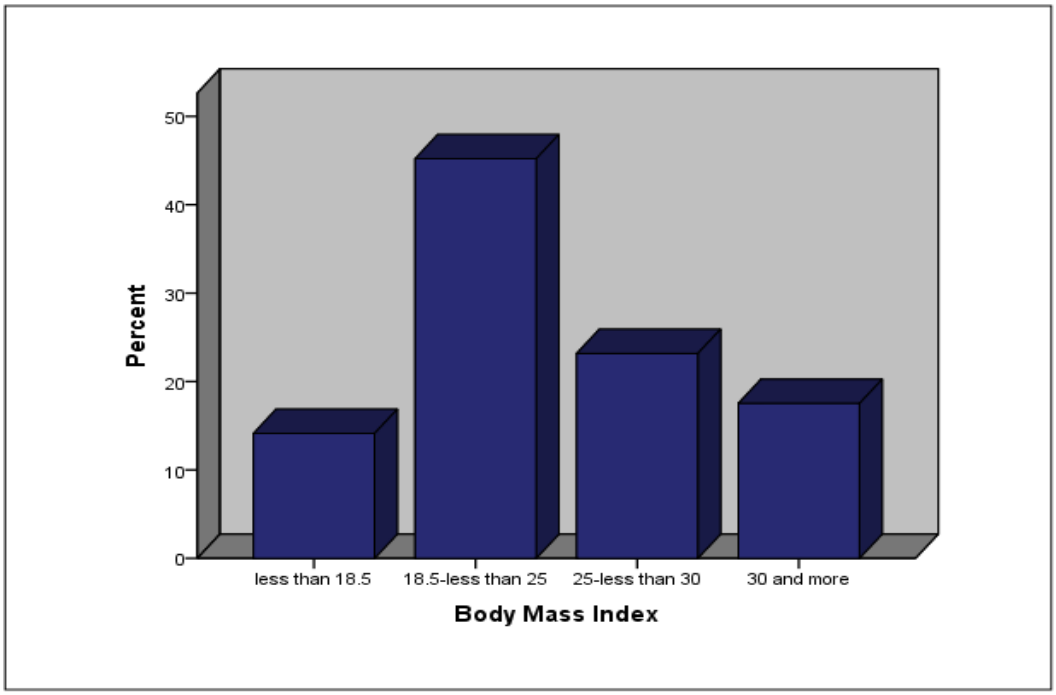

Figure 1. Distribution of the study participant according to their body mass index

Table 2. Menstrual profile of the student participants

Menstrual history	No.	%
Age of menarche		
• less than 13	76	42.9
• more than 13	101	57.1
Duration		
• less than 5 day	51	28.8
• more than 5	126	71.2
Interval		
• less than 28	91	51.4
• More than 28	86	48.6
Rhythm		
• Regular	108	61
• Irregular	69	39
No. of pads changed / day		
• less than 3 pads	29	16.4
• more than 3 pads	148	83.6
Presence of pain		
• Yes	140	79.1
• No	37	11.9
The severity of pain (No. = 140)		
• Mild	25	17.9
• Moderate	68	48.6
• Severe	47	33.5

Table 3. Correlation between participant's menstrual profile and BMI

Menstrual profile	BMI								
	Underweight (n= 25)		Normal (n=80)		Overweight (n=41)		Obese (n=31)		Sig.
	No.	%	No.	%	No.	%	No.	%	
Age of menarche									
< 13 year	8	32	34	42.5	19	46.3	6	19.4	0.283
> 13 year	17	68	46	47.5	22	53.7	25	80.6	
Duration of menses									
< 5 days	5	20	22	27.5	14	34.1	15	48.4	0.013*
> 5 days	15	80	58	72.5	27	65.9	16	51.6	
Amount of blood loss:									
< 3 pads	4	16	17	21.3	4	9.8	16	51.6	0.008**
> 3 pads	21	84	63	78.8	37	90.2	15	48.4	
Interval of menstrual cycle:									
< 28 day	12	48	43	53.8	25	61	9	29	0.190
< 28 day	13	52	37	46.3	16	39	22	71	
Rhythm menstrual cycle									
Regular	17	68	47	58.8	27	65.9	10	32.3	0.019*
Irregular	8	32	33	41.3	14	34.1	21	67.7	
Severity of pain									
Mild	13	52	11	13.8	9	21.9	22	71	
Moderate	8	32	35	43.7	20	48.9	5	16.1	0.000**
Sever	4	16	34	42.5	12	29.2	4	12.9	

*Correlation is significant at the 0.05 level
**Correlation is significant at the 0.01 level.

Table 2 showed that more than one half 57.1% of the students experience the menarche for the first time in the age more than 13 years and 71.2% of them reported have a duration of flow more than 5 days. More than half 51.4% of them have cycle length less than 28 days, and 83.6% of them reported change an average of more than 3 soaked pads per day. Regarding the pain during menses, 79.1% of the study participants reported suffering from pain during menses and 33.5 % of them describe this pain as severe pain.

According to Table 3, the current study revealed that there is a statistically significant correlation between students' menstrual profile and BMI. It was noticed that a positive significant correlation was found between the duration of menstruation, amount of blood loss, rhythm and severity of pain with BMI p. value= 0.013, 0.008, 0.019 & 0.000, respectively.

4. Discussion

Adolescence is the phase between childhood and adulthood. The most striking change in adolescent girls is the onset of menstruation or menarche. Menstruation is a natural phenomenon in women after puberty and is often associated with discomfort. The current study revealed that less than four-fifths (79.1%) of the study participants had suffered from pain or dysmenorrhea and 33.5% of them describe this pain as severe pain. These results go on the same line with Sanctis, [6] who found that the prevalence of dysmenorrhea among adolescents in this age is high and associated with change and limitation of other daily activities especially dietary habits.

Dysmenorrhea is one of the most common health problems in young adolescent girls as it affects 50-90% of the general population. Also, as statistics have indicated, 10-12% of women suffer from severe dysmenorrhea Primary dysmenorrhea is a common problem among females and young women, and its monthly recurrence reduces their performance level and quality of life [7,8].

The anthropometric measurements help to confirm an adolescent's healthy growth and development, or to identify early a potential nutritional or health problem, also is particularly important because it acts as a tool for monitoring and evaluating the hormone-mediated changes in growth and reproductive maturation during this phase of life. Body mass index (BMI) is a commonly used anthropometric measurement to estimate the indices of underweight/overweight) of adolescents and adults [9] The current study revealed that less than one quarter (14.1 % & 17.5%) of the study participants were found to have low BMI indicating the deficiency of nutritional requirement or /have high BMI indicated to overweight, respectively. This findings supported by the study conducted by Bhargava [10] Where the prevalence of chronic energy deficiency among adolescent girls was found in extreme rang between underweight either overweight this due to the similarity of the two study where the same age, grad, and weather. Where the most common student takes just two meal per day and skipped one meal commonly the breakfast [10].

The present study revealed that there is a highly significant correlation *(P. value* = 0.000) between body mass index (BMI) and severity of pain during menstruation. Where 36.8% of the study participants with low (BMI) had reported low pain during menses. These results contradict another study findings reported by Chauhan [11], who found the frequency of dysmenorrhea to be greatest in the underweight group. [11,12]

On the same time this result goes online with other study findings where the percentage of students having mild and moderate pain has low BMI [13].

On the other hand, results show that 30% of the study participant who reported suffers from severe pain during menses had high BMI and classified as obese female. This results agreed with the study of Hong [14] who reported that overweight was an important factor for dysmenorrhea and shown to be a risk factor for dysmenorrhea, overweight was referred to women with a weight-for-height index above the 90th percentile in that study. The primary disease pathogenesis for dysmenorrhea has been related to increased prostaglandins in the menstruating uterus, leading to reduced endometrial blood flow and subsequent pain. There is a suggestion that endometrial thickness may be influenced by adiposity through its estrogen-mediated effect [14]. The current study revealed that have a significant correlation between body mass index and menstrual profile (age of menarche, duration, changes in body weight can change menstruation patterns. Extremes of body mass index are associated with changes in menstrual cycle patterns and fertility patterns. A minimum proportion of body weight is needed to initiate menstrual cycles and maintain them. Thus, women who lose too much weight or are underweight can have changes in menstruation including but not limited to the cessation of menstruation or prolonged periods of amenorrhea. Also, excess body weight and body fat are associated with irregular and heavy menstrual cycles. Conditions such as polycystic ovarian syndrome are common in obese women [15].

5. Conclusion & Recommendation

Based on the result of the current study it can be calculated BMI had effect on the menstrual profile. Lifestyle modification and nutritional counseling for female students could alleviate menstrual problems. It will not only improve the girls' current health, sense of well-being and overall quality of life but may also lower her risks for future disease and ill health after proper advice about diet and exercise. Promoting healthy eating habits and maintaining normal & optimal BMI should improve menstrual health. Further research in the nutritional pattern in adolescents can be done. There is a need to study in depth the other factor that may interfere with the occurrence of dysmenorrhea.

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