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Nutrition and BMI as a Potential Factor of Menstrual Disorders: A comparative study between Medical and Nursing students

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ABSTRACT

The study participants, both medical and nursing students were classified based on whether they suffered from any kind of menstrual problems and the ones who suffered from menstrual problems were further classified into either suffering from menorrhagia or dysmenorrheal as they are the 2 most commonly prevalent menstrual problems into day's time. Studies regarding the prevalence of menstrual problems and their association with BMI are available in the literature. However, there are no studies done to compare the prevalence of menstrual problems between medical and nursing students and their association with food habits. **Objective:** To compare and assess the prevalence of menstrual problems between medical and nursing students. (a) To compare and assess the prevalence of menstrual problems between medical and nursing students. (b) To assess the association of menstrual problems with BMI. (c) To assess the association of menstrual problems with food habits. **Methodology:** This is across-sectional comparative study that was conducted between medical and nursing students. ***Inclusion criteria:*** Young female nursing and medical students who are willing to participate in the study. ***Exclusion criteria:*** Females who suffer from chronic diseases, positive pregnancy test and lactating mothers. The following definitions were used to define normal menstruation and various menstrual disorders: **Normal menstrual cycle:** The duration of a normal menstrual cycle is 21 to 35 days, with a menstrual flow ranging from 2 to 6 days, and average blood loss is 20 to 80 ml (4-16 pads as 1 normal pad holds approximately 5 ml of blood). **Irregular cycle:** If there is an abnormal variation in the length of the menstrual cycle. Increased calorie consumptions and excessive junk food cravings is seen in premenstrual periods and is linked with increased menstrual problems prevalence. **Results:** The study participants, both medical and nursing students were classified based on whether they suffered from any kind of menstrual problems and the ones who suffered from menstrual problems were further classified into either suffering from menorrhagia or dysmenorrheal as they are the 2 most commonly prevalent menstrual problems into day's time. In the comparison of menstrual problems between medical and nursing students it was clear that about 96% of them suffered from either kind of menstrual problem. Of this 96%, majority of them suffered from menorrhagia and was seen more in medical students (about 53.7%) where as dysmenorrheal which constituted for 22% of the menstrual problems was seen more in nursing students. In the comparison of prevalence of PMS between medical and nursing students, 80% of them suffered from PMS. **Conclusion:** The present study results will be helpful to explore the association of menstrual problems with BMI and food habits, and for creating strategies to improve nutritional and reproductive health. Although a variety of factors play an important role in affecting menstrual cycles, studies have suggested that having a high BMI may cause an absence of menstruation, irregular menstruation, heavy or long menstruation and painful menstruation.

Key words: Menstrual disorders, Body Mass Index, Irregular Menstruation

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Introduction

Menstruation is a normal physiological process during which there is shedding of endometrial wall every month in the form of loss of blood indicating her capability for procreation. Menstruation first occurs in adolescents between 11 to 14 years of age with a normalcy length of 21 to 45 days, a period length of 7 days or less and average blood loss of 20-80ml.[1]Any deviation from the normal characteristics of menstruation is an indication of menstrual problems. Premenstrual Syndrome (47%), Amenorrhea, Menorrhagia (3.4%), Dysmenorrhoea (89.7%), abnormal vaginal bleeding (9.3%) and irregular menstruation (27%) are some of the common menstrual disorders faced by women into day's world.[1]Majority of the menstrual problems can be prevented by early detection and appropriate treatment, but they are often neglected.

Affected women experience cramps in the lower abdomen, pain radiating down the legs, back pain, nausea, diarrhoea, vomiting, fatigue, fainting and headache.[2] Long term consequences of them being increased risk of getting breast cancer, endometrial cancer and hyperplasia. Apart from health problems, there can be consequences such as limitations on attend Anceat college which can hinder academic achievements and employments prospects.[3]Menstrual patterns are affected by a number of factors such as age (>30years), family history, ethnicity, food habits, high socioeconomic status, depression and stress.[2]Although a variety of factor play an important role in affecting menstrual cycle, studies have suggested that having a high BMI is risk factor for menstrual problems.

Food habits of women in the urban cities have changed in the recent past in terms of nutrient intake such as consumption of high calorie fast food, skipping of breakfast and reduced intake of fruits, vegetables and pulses.It has been recently observed that young women who ignore eating breakfast significantly suffer from dysmenorrheal more, compared to those who eat breakfast, and a high-fiber diet is seen to reduce menstrual abnormalities.[4]Apart from this, frequent consumption of meat adulterated with estrogen has been noticed to cause heavy bleeding, irregular periods and PMS.As studies show the positive role of different diet so menstrual disorders, recognition of their role is essential. Body mass index (BMI) is an indicator of body size; it combines a person's weight with their height.

Studies regarding the prevalence of menstrual problems and their association with BMI are available in the literature. However, there are no studies done to compare the prevalence of menstrual problems between medical and nursing students and their association with food habits. Therefore, this study is taken upto compare and assesses the association.

Objective

1. To compare and assess the prevalence of menstrual problems between medical and nursing students.
2. To assess the association of menstrual problems with BMI.
3. To assess the association of menstrual problems with food habits.

Methodology

This is across-sectional comparative study that was conducted between medical and nursing students who attend Vydehi Institute of Medical Sciences & Research Centre and Vydehi Nursing College in Bangalore during the year 2019-2020 with an objective to rule out menstrual problems in the last three cycles.

Sample size: $n = z^2pq/d^2$

Z = 1.96 at 95% confidence level

P = proportion of female medical students having irregular cycles

Q = 1-pd= precision (6%)

Considering the study "Primary Dysmenorrhoea among Medical and Dental University Students in Kelantan: Prevalence and Associated Factors[5], using the above mentioned formula the sample size comes upto 270.

A total of 270 girls were chosen for the study. The participants were made comfortable and clarified about the details of the study. Permission was obtained by the Principal of the institution and a written informed consent was taken.

Inclusion criteria: Young female nursing and medical students who are willing to participate in the study.

Exclusion criteria: Females who suffer from chronic diseases, positive pregnancy test and lactating mothers.

Data collection method: The chosen students were given a pre-tested questionnaire. Basic information of the respondent included: name, age, residence (home or hostel), family size and marital status (married or unmarried).

Questions regarding menstruation included: Age of menarche, length of cycle, duration of flow (≤2 days, 5-7 days and>7 days), blood loss per cycle (based on the number of pads changed), regularity of cycle, absentee is inform college and pre-existing menstrual disorders. If PMS is present, then questions related to associated pains, water retention and negative effects were to be answered.

Questions regarding food habits included, consumption of fruits and vegetables (servings per week), consumption of meat, consumption egg and fish, intake of sweets and chocolates, tea and coffee consumption, carbonated drinks consumption, consumption of high calorie junk food, skipping of breakfast and consumption of water on daily basis.

The following definitions were used to define normal menstruation and various menstrual disorders:

Normal menstrual cycle: The duration of a normal menstrual cycle is 21 to 35 days, with a menstrual flow ranging from 2 to 6 days, and average blood loss is 20 to 80 ml(4-16 pads as 1 normal pad holds approximately 5 ml of blood).

Irregular cycle: If there is an abnormal variation in the length of the menstrual cycle.

Cycle length variation between 8 to 20 days is classified as moderately irregular, whereas variation of 21 days or more is categorized as very irregular.[6]Menstrual bleeding occurring more than 35 days apart and which remains constant at that frequency is called oligomenorrhea.[7]Amenorrhea refers to the absence of menstrual periods. It is classified as primary, if menstrual bleeding has never occurred by age 15 in the absence of hormonal treatment, or secondary, if menstrual periods are absent for >3months in a woman with previous periodic menses.[10]

Menorrhagia is defined as cyclic bleeding at normal intervals; the bleeding is either excessive in amount or duration (>7days) or both.[7]

Painful menstruation of sufficient magnitude so as to in capacitate day-to-day activities is termed dysmenorrhea.[5]There may also be some lower backache, and the condition may or may not be associated with autonomic symptoms such as sweating, nausea, and diarrhoea.

Premenstrual syndrome (PMS) is a psychoneuro-endocrined is order of unknown netiology, of ten noticed just prior to menstruation.[7]In addition, ovulatory women may experience somatic symptoms during the few days prior to menses, including edema, breast engorgement, and abdominal bloating or discomfort. A symptom complex of cyclic irritability, depression, and lethargy is known as premenstrual syndrome (PMS).[6]

For anthropometric examination, weight was recorded bare foot to the nearest 500g and height was measured using an on stretchable tape. BMI was calculated using WHO Asia-Pacific classification. The cut-off points are<18.5kg/m^2 (underweight), 18.5-22.9 kg/m^2 (normal range), ≥23kg/m^2 (over weight) and ≥30kg/m^2 (obese).[6]

Results

The participants in the study were classified based on their BMI. Girls with BMI <18.5kg/m^2 were defined as underweight, who had BMI between 18.5 and 22.9 were considered as having normal BMI and who had >23 were considered as overweight. The Table-1 describes the prevalence of under weight and overweight in study participants. Almost 33 (12%) were having low BMI and 101 (37%) participants were overweight.

Table-1: Distribution of the study participants based on their BMI

BMI	No.	%
>18.5	33	12
18.5-22.9	136	51
>23	93	34
>30	8	3
Total	**270**	**100**

Table-2: Comparison of menstrual problems between medical and nursing students

Variables	Medical		Nursing		Total		P value
	No.	%	No.	%	No.	%	
Menorrhagia	107	53.7	92	46.3	199	73.7	0.114
Dysmenorrhoea	24	40	36	60	60	22.2	
None	4	36.4	7	63.6	11	4.1	
Total	**135**		**135**		**270**		

The study participants, both medical and nursing students were classified based on whether they suffered from any kind of menstrual problems and the ones who suffered from menstrual problems were further classified into either suffering from menorrhagia or dysmenorrheal as they are the 2 most commonly prevalent menstrual problems into day's time. There was no statistically significant association in the menstrual problems between medical and nursing students as shown in table-2.

Table-3: Comparison of PMS between Medical and Nursing students

Variables	Medical		Nursing		Total		P value
	No.	%	No.	%	No.	%	
Yes	114	52.5	103	47.5	217	80.0	0.09
No	21	39.6	32	0.4	53	20.0	
Total	**135**		**135**		**270**		

In table-3, the 2 study groups were divided based on whether they had premenstrual syndrome (PMS), a group of symptoms a woman experiences about 1-2 weeks prior to her cycle owing to the change of hormone levels in her body. With a P value of 0.09, it is clear that there is no statistically significant association between the two.

Table-4: Summarizes the association of menstrual problems with BMI

BMI	Menstrual Problems						Total		P value
	Menorrhagia		Dysmenorrhoea		None				
<18.5	16	6	14	5.1	3	1.1	33	12.2	0.02
18.5-22.9	102	37.8	28	10.4	6	2.2	136	50.4	
>23	75	27.6	16	6.0	2	0.8	93	34.4	
>30	6	2.2	2	0.8	0	0	8	3.0	
Total	**199**		**60**		**11**		**270**		

Table-4 summarizes the effect BMI has on menstrual problems in women. There is a statistically significant association between the two, based on the P value of 0.02.

Table-5: Summarizes the association of menstrual problems with meat consumption

Menstrual Problem	Meat Consumption								Total		P value
	Nil		1-2 times		3-4 times		>4 times				
	No.	%	No.	%	No.	%	No.	%	No.	%	
Menorrhagia	7	26.3	104	38.5	17	6.3	7	2.6	199	73.7	0.03
Dysmenorrhea	25	9.3	22	8.1	13	4.8	0	0.0	60	22.2	
None	2	0.8	7	2.5	2	0.8	0	0.0	11	4.1	
Total	**98**		**133**		**32**		**7**		**270**		

Table 5- Shows the association of the frequency of consumption of meat products (white or red meat) with prevalence of menstrual problems. With P value of 0.03 it is seen that there is a positive relationship between them.

Table-6: Summarizes the association of menstrual problems with tea/coffee consumption

Menstrual Problem	Tea/Coffee Consumption								Total		P value
	Nil		1-2 times		3-4 times		>4 times				
	No.	%	No.	%	No.	%	No.	%	No.	%	
Menorrhagia	51	18.9	51	18.9	64	32.2	33	12.2	199	73.7	0.03
Dysmenorrhea	9	3.3	10	3.7	30	11.1	11	4.1	60	22.2	
None	0	0.0	7	2.5	4	1.5	0	0.0	11	4.1	
Total	**60**		**68**		**98**		**44**		**270**		

Tea and coffee are 2 drinks almost all students rely on during their lives to keep them awake and active, but the harm the caffeine with in these drinks have on their menstrual cycle is shown in this table-6. With a P value of 0.0004, it is clear that there is a significant relationship between the consumption of these drinks and menstrual problems (Table-6).

Discussion

The study participants were classified based on BMI. <18.5kg/m^2 as underweight, 18.5-22.9 kg/m^2 considered as normal range, ≥23kg/m^2 as overweight and ≥30kg/m^2 as obese. Almost 93 (34%) were found to be overweight in compare is on to the findings in the study done in India between medical and nursing students[4],where only 26 (13.8%) were found to be overweight.

In the comparison of menstrual problems between medical and nursing students it was clear that about 96% of them suffered from either kind of menstrual problem. Of this 96%, majority of them suffered from menorrhagia and was seen more in medical students (about 53.7%) where as dysmenorrheal which constituted for 22% of the menstrual problems was seen more in nursing students. In the study conducted in Sudan among the nursing students[11] there was a higher prevalence of Dysmenorrhoea (94.5%). In the comparison of prevalence of PMS between medical and nursing students, 80% of them suffered from PMS. Of this 80%, majority of them were medical students who constituted to 52.5% in comparison to their nursing counter parts who constituted to 47.5%. However in the study done between medical and nursing students in India it was found that 70% of them suffered from PMS and majority of them were nursing students (52%).

The association of BMI and menstrual problems shows that out of the people who suffered from menorrhagia, about 40% of them were overweight. All the participants who had a BMI >30 suffered from either kind of menstrual problem similar to the findings in the study conducted in China[10] where there was found to be increase in the blood loss during menses in obese participants.

Although a variety of factors play an important role in affecting menstrual cycles, studies have suggested that having a high BMI may cause an absence of menstruation, irregular menstruation, heavy or long menstruation and painful menstruation. This could be due to increased adipose tissue within the body that increases estrogen production, which is the main hormone affecting menstrual cycles.[9]

Menstrual problems are found to be more prevalent amongst women who consumed more meat and caffeinated drinks such as tea/ coffee as shown in table 5 and 6 respectively, nearly 50% of women who suffered from Dysmenorrhoea and 32% of them who suffered from menorrhagia consumed tea/coffee at least 3-4 times a day consumed tea/coffee 3-4 times a day on an average.

A similar study based on lifestyle and prevalence of Dysmenorrhoea conducted among Spanish university students[12] showed that participants who suffered from dysmenorrhea had a high in take of tea, cola, sugar and meat. This is probably due to the estrogen hormones injected into meat products interfering with the normal menstrual cycle and the high caffeine content in drinks. Increased calorie consumptions and excessive junk food cravings is seen in premenstrual periods and is linked with increased menstrual problems prevalence. Diet appears to be an essential factor in regulating and managing some of the symptoms, but the actual effect that these foods might have linked to these menstrual problems is still not well understood.

The increase in prevalence of such menstrual irregularities could be due to skipping of meals, consumption of junk food and lack of physical activity owing to the highly stressful lives the students in medical field lead.

Further studies need to be performed to determine the reason for this and newer strategies are to be employed to reduce the prevalence of such problems.

Conclusion

In this study, we found that the re-exists a positive relationship between BMI with length of the cycle, loss of blood and existing menstrual problems. No significant association was found between BMI and PMS or duration of bleed. As heavy blood loss can limit the routine activities of women causing absentee is and hindering her efficiency it is important to take measures such as life style modification, weight loss, consumption of meals on time and regular physical activity. The present study results will be helpful to explore the association of menstrual problems with BMI and food habits, and for creating strategies to improve nutritional and reproductive health.

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