

## Effects of Food Habits on Menstrual Cycle among Adolescent Girls

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### ABSTRACT


**Background:** Menstruation, a normal consequence of hormonal changes in a woman's body is affected by dietary habit. Menstrual health is affected by the food habit and it can arise different menstrual disorders. The aim of this study is to find out the menstrual health status of young female and its association with their food habit.

**Methods:** A cross-sectional study was conducted among the nursing students of Maharajgunj Nursing Campus from March, 2019 to September, 2019 to analyze the association of dietary habits with menstrual disorders. Pretested and semi-structured questionnaire was used to collect the data regarding the menstrual history, dietary habit, fast food intake and food skipping behavior. HEAT (Healthy Eating Assessment Tool) Score was used to assess the food habit and Visual Analogue Scale (VAS) was use to assess the intensity of dysmenorrhea.

**Result:** Data was collected among 140 students. The mean age was  $24.56 \pm 2.65$  years. The study showed that 87.9% had problems; and 80.7% have dysmenorrhea. The occurrence of the menstrual problems was more in the participants who were having non-vegetarian diet than in vegetarian diet which was statistically significantly ( $p < 0.001$ ). Similarly, 68.6% of the participants eat fast food and 91.6 % of them have menstrual problems. Meal skipping habit was found to significantly association with the menstrual problems ( $P = 0.03$ ). Similarly, 105 (75%) of the participants had good food eating habit, and 32 (22.9%) of the participants had poor eating habit. The poor eating habit was significantly associated with menstrual problems. The intensity of dysmenorrhea was more in the participant having non- vegetarian diet. Further, the pain is more severe among the participants who consume tea and coffee more frequently.

**Conclusion:** The menstrual problems were the alarming problems in the adolescent college going girls of Kathmandu Valley. Excessive intake of junk/ fast food, alcohol and tea/coffee had significant association with menstrual problems.

**Keywords:** Menstruation, Menstrual Cycle, Menstrual Problem, Food, Habits, Nursing

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## INTRODUCTION

Food is any nutritious edible substance that the living organism consumes in order to maintain life and growth. Food plays very important role in development, sustenance, reproduction and termination of life.<sup>1</sup> Fast food refers to the food that is easily prepared and can be served ready to eat. They are the food designed for commercial benefits and with focused priority on speed of service rather than the quality of product. Nowadays, fast foods are getting more popularity and become an emerging trend among the young generation which might be due to easy availability, taste, low cost, marketing strategies and peer pressure, busy lifestyle has made them popular among youths, adolescence and children.<sup>2</sup>

The foods and Junk food, lack micronutrients such as vitamins, minerals, fibres and amino acids; are used synonymously in literature.<sup>3</sup> They are made tastier by adding additives such as monosodium glutamate, tartrazine etc. These foods are known to be the cause of various chronic diseases including obesity and diabetes<sup>4</sup>, and increases the risk of breast cancer and prostate cancer, and osteoporosis at an early age.<sup>5</sup> People who eat fast food consume more fat, salts and saturated fat. Most of the youths of Nepal are very fond of street foods such as Mo:Mo, Chowmein, Paanipuri, Chatpatte and packed foods like chips, instant noodles, etc.<sup>6,7</sup>

Adolescence is the transitional phase between childhood and adulthood. The most significant change a female adolescence faces is the onset of menstruation which is known as menarche. The average age of menarche is 11 to 16 years.<sup>8</sup> However, various environmental, and genetic and nutritional factors affect the age of menarche.<sup>9</sup>

Menstruation, an indicator for fertility is normal physiological phenomenon manifested as periodic bleeding from vagina due to the mucosal shedding of uterus<sup>10</sup>. Normal menstrual cycles are characterised by a cycle length of 28 days ( $\pm 7$  days), duration of flow of 4 days ( $\pm 2$  days).<sup>11</sup> Though it is normal physiological process, menstruation is not easy. Almost every woman suffers one or any of the menstrual problems including missing a period, change in the length of the cycle, changes in the flow, colour, or consistency of menstrual blood, and extreme pain or other menstrual symptoms

like lower abdominal pain, nausea, vomiting, mood swing, irritability, fatigue, bloating, acne, breast tenderness, etc. which is triggered by diet as well as dietary behaviours.<sup>12</sup> Seventy five percentage of girls experience problems associated with menstruation<sup>13</sup>. Dysmenorrhoea and menstrual abnormalities are the frequent problem of adolescent girls. Many researchers have claimed that girls those who take fast food regularly are found to developed menarche in early ages.<sup>3</sup>

Menstrual health is one of the important issue of women's health and hence affects the menstrual characteristics. The busy and modern life style of today is influencing our food habit. In one hand, the consumption of fast food, caffeine, alcohol and other beverage is increasing. On the other hand, the prevalence of menstrual problems and reproductive problems are also increasing. The reproductive function depends on the hormonal balance which in turn depends upon the type of food and food habit. Menstrual disorders are the common feature of eating disorders and is multifaceted and the result of a complex interplay of many factors including weight loss, decreased body fat, hypoleptinemia, abnormal eating attitudes and behaviours, exercise, and psychological stressors.<sup>14</sup>

Nepal is still facing the problems of lack of proper nutrition. The problem of malnutrition (under nutrition) has not been erased; we are facing the emerging problem of addiction to fast food and junk food. Easy availability, better taste, attractive packaging and advertisement influence the youngsters to consume fast food and busy schedule compels them to skip the meal.<sup>15</sup> Various health problems have been associated with adolescent overweight, including hypertension, respiratory disease, several orthopaedic disorders, diabetes mellitus and elevated serum lipid concentrations. But not many studies are done on their relation with menstrual abnormalities. The main objective of this research to find out the effect of food habits on menstrual cycle of the adolescent girls of Kathmandu valley.

## MATERIALS AND METHOD

This was a descriptive cross sectional study conducted among nursing students of Maharajgunj Nursing Campus, Kathmandu Nepal. A structured

questionnaire regarding details of menstrual cycle and food habits was developed to collect the data. Prior to the distribution of the questionnaire, a brief orientation lecture was conducted in local language. The eating habit/behaviour was assessed by using the Healthy Eating Assessment Tool (HEAT), designated by Government of Southwest Territory. The pain during menstruation was assessed by using Visual Assessment Scale (VAS) tool. The reliability of the questionnaire was checked by pretesting of the questionnaire in the 10% of the total sample.

All second and third years nursing students who were willing to participate, were included and who were suffered from any known medical disease or under long term medication were excluded from this study. After collection of data it will be checked and analysed by editing, coding and entering in computer. An analysis will be performed using SPSS software.

Ethical approval was taken from Institutional Research Committee (IRC) and permission from Padma Kanya Campus and permission was taken from concerned authority Maharajgunj Nursing Campus.

## RESULT

Out of 140 female participants surveyed, 100 (71.4%) of the participants were between the age of 22-25 years. The age of the participant ranges from 20 to 35 years and mean age 24.56 with S.D. of 2.65 year. The 70 % of the participant were married and about half were Brahmin (Table 1).

Table 1: Demographic Variables of the participants

SN	Age Group	Frequency	Percentage
1	20-25	100	71.4
2	25-30	37	26.4
3	30-35	3	2.1
Mean age = 24.56, S.D. = 2.65			
Marital Status			
1	Married	42	30.0
2	Unmarried	98	70.0
Ethnicity			
1	Bramhin	46	32.9
2	Kshetri	35	25.0
3	Newar	32	22.9
4	Rai/Limbu	3	2.1

5	Tamang / Gurung	7	5.0
6	Other	17	12.1

Table 2: Menstrual Problems among the participants

Menstrual Problems		Frequency	Percentage
1	Yes	123	87.9
2	No	17	12.1
Type of Menstrual Problems		Frequency	Percentage
1	Lower Abdominal Pain	113	80.7
2	Backache	107	76.4
3	Headache	92	65.7
4	Bodyache	86	61.4
5	Anorexia (loss of appetite)	82	58.6
6	Malaise	75	53.6
7	Mood Swings	29	20.7

Table 2 showed that 123 (87.9%) of the participants had menstrual problems during their menstrual cycle. Similarly, among all the menstrual problems lower abdominal pain was the main problems suffering to almost 80.7% of the participant. Back ache, headache, body ache, anorexia, malaise and mood swings were the subsequently less common menstrual problems occurring during their menstrual cycle.

Among the total participants 7 (5%) were smokers and 66 (47.14%) consume alcohol. The were found more in the participant The habit of taking alcohol more often was found to be associated with menstrual problems which was statistically significant (table 3 and figure 1).

Table 3: Smoking and alcohol drinking habit and Menstrual Problems

S N	Smoking and Drinking Habit	Menstrual Problems		p-value
		Yes	No	
A. Smoking Habit				
1	Yes	5	2	0.315
2	No	98	35	
B. Alcohol Drinking Habit				
1	Yes	59	7	0.046
2	No	64	10	
C. Frequency of Drinking Alcohol				
1	Occasionally	5	0	

### Alcohol drinking habit among the participants

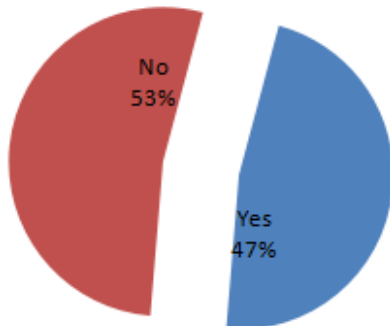


Figure 1: Alcohol drinking habit of the participants  
Out of 140 participants of this study 118(84.2%) of the participants were non-vegetarian, out of them 102(86.4%) had menstrual problems ( $p<0.001$ ). The occurrence of the menstrual problems was significantly ( $p=0.02$ ) in the participant with non-vegetarian diet especially in chicken (table 3 and figure 2)

Table 4: Food habit and Menstrual Problems

S N	Smoking and Drinking Habit	Menstrual Problems		p-value
		Yes	No	
<b>A. Food Habit</b>				
1	Vegetarian	21	1	< 0.001
2	Non-vegetarian	102	16	
<b>B. If non-vegetarian</b>				
1	Chicken	58	8	0.02
2	Mutton	29	10	
3	All Types of Meat	8	5	

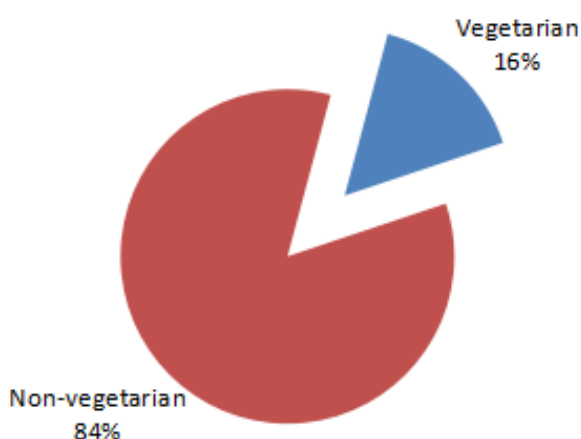


Figure 2: Food habit of the participants

Table 5: Association of Obesity index and eating pattern with and Menstrual Problems

S N	Smoking and Drinking Habit	Menstrual Problems		p-value
		Yes	No	
<b>Obesity Index</b>				
		Freq.	%	
1	Under Weight	17	2	<0.001
2	Normal Weight	9	81	
3	Over Weight	26	4	
4	Obesity	1	0	
<b>Favourite Junk Food</b>				
1	With MSG	88	8	<0.001
2	Without MSG	5	39	
<b>Habit of having Tea/coffee</b>				
1	Yes	104	16	
2	No	19	1	

This study found that the occurrence of menstrual problems were found to have more in the over-weight, under-weight and obese person rather than the normal weight person which were found statistically significant ( $p<0.001$ ). Our study also showed that the menstrual problems was significantly high in the participant who consume fast food or junk food with MSG and tea/coffee (table 4).

Table 6 showed that 88(62.8%) of the participant skip dinner, 70(50%) of the participants skip their lunch and remaining skipped their breakfast. Dietary skipping behaviour of the participant significantly ( $p=0.03$ ) play major role in the occurrence of menstrual problems among the participants of our study. Similarly, we categorized the participants by using HEAT Score and found that 105 (75%) of the participants had good food eating habit, and 32 (22.9%) of the participants had fair eating habit. The occurrence of menstrual problems was significantly ( $p<0.001$ ) high in the participants who had poor and fair eating habit as calculated by HEAT (Healthy Eating Assessment tool).

Table 6: Relationship between Food skipping behaviour and HEAT Score with menstrual problem

S. N.	Behaviour & Habits	Menstrual Problems		p-value
		Yes	No	
<b>A. Food Skipping Behaviours</b>				
1	Breakfast	23	11	0.03
2	Lunch	52	18	
3	Dinner	79	9	
<b>B. Dietary Habits by using HEAT (Healthy Eating Assessment Tool) Score</b>				
1	Need Improvement	82	7	<0.01
2	Fair Eating Habit	35	13	
3	Good Eating Habit	5	90	
4	Excellent Eating Habit	0	112	

Table 7: Association of Menstrual Pain with food habit among the participants

S N	Food Habit of the participant	Menstrual Pain Score as recorded by Visual Analogue Scale (VAS)							p-value* (Spearman Correlation)
		No Hurt	Hurt Little Bit	Hurt Little More	Hurt Even More	Hurt Whole lot	Hurts Worst	Total Score	
<b>A. Food Habit</b>									
1.	Vegetarian	5	0	5	8	3	1	22	0.008
2.	Non-vegetarian	22	5	37	22	20	12	118	
	Total	27	5	42	30	23	13	140	
<b>B. Tea/Coffee</b>									
1.	Yes	24	5	35	26	17	13	120	0.031
2.	No	3	0	7	4	6	0	20	
	Total	27	5	42	30	23	13	140	
<b>C. Smoking History</b>									
1.	No	27	5	42	30	19	10	133	<0.001
2.	yes	0	0	0	0	4	3	7	
	Total	27	5	42	30	23	13	140	
<b>D. Alcohol History</b>									
1.	Yes	10	1	18	13	16	8	66	0.014
2.	No	17	4	24	17	7	5	74	
	Total	27	5	42	30	23	13	140	
<b>E. Eating Habit Scored by HEAT</b>									
1.	Poor	3	9	12	21	29	31	105	
2.	Fair	1	3	2	3	8	15	32	
3.	Good	0	0	1	1	0	0	2	
4.	Excellent	0	0	1	0	0	0	1	
	Total	27	5	42	30	23	13	140	

Table 7 shows the association of menstrual pain with food habit of the participants. The intensity of dysmenorrhea was measured using Visual Analogue Scale. It shows that the intensity of pain is more among Non-vegetarian compared to vegetarian. Out of 22 vegetarian participants, 5 (23%) have no pain during menstruation. While, 22 (18.6%) out of 118 non-vegetarian participants have no pain. Similarly the pain is more severe among the participants who consume tea and coffee. There was significant correlation between the consumption of tea and coffee and pain during menstruation ( $p=0.031$ ). Likewise, table 7 showed the significant association between the consumption of alcohol and dysmenorrhea ( $p=0.014$ ). The dysmenorrhea was common to the participants who had poor eating habit. The incidence of dysmenorrhea is decreasing among the participants having fair, good and excellent eating habit.

## DISCUSSION

This study was done with 140 nursing students with mean age of  $24.56 \pm 2.6$  years. Among them 70% were unmarried, about half were Brahmin and about one third were Kshetri and Newar. This study found that 87.9% of the participants had menstrual problems during their menstrual cycle. Similarly, among all the menstrual problems lower abdominal pain was the main problems suffering to 80.7% of the participant.

When comparing the severity of the problem and food habit, our study showed that menstrual problems were associated with food eating pattern of the participants. Menstrual problems were found to have significant relationship with the non-vegetarian diet. The person with vegetarian diet had less menstrual problems than that of non-vegetarian diet. Similarly, menstrual problems had found more in participant with the habit of alcohol drinking, and smoking than non-alcoholic, non-smoker and non-junk food. In the similar way, menstrual problem was found to have more in the participant who took junk food and tea/coffee.

Similar study conducted in Garwal India found that this association between skipping behavior and consumption of junk food with dysmenorrhea which was considerably higher in girls who consistently have fast food<sup>16</sup>. It is because junk foods are rich

in saturated fatty acids, and these acids affect the metabolism of progesterone in the menstrual cycle<sup>16,17</sup>. Another study also supports this finding showing the results that indicate adherence to “snacks” pattern is associated with an increased risk of moderate to severe dysmenorrhea during menstruation among young women.<sup>17</sup>

Our study revealed that 84.3% were non-vegetarian and occurrence of the menstrual problems were more in the participants who were having non-vegetarian diet than in vegetarian diet which was statistically significantly ( $p < 0.001$ ). Similar findings was presented by Pendersen et al. that the incidence of menstrual irregularity was 4.9% among non-vegetarians and 26.5% among vegetarians.<sup>18</sup>

This study found that 5% of the participants smokes cigarettes and 49.3% of the participants drinks alcohol. Frequency of drinking alcohol had significant effects on menstrual cycle causing menstrual problems. Alcohol intake was positively associated with premenstrual anxiety and mood swings; and active and/or smoke exposure was associated with PMS<sup>19</sup>. In contrast, we did not find significant association between the smoking habit and menstrual cycle ( $p=0.315$ ). However, this study show the significant relationship between alcohol intake and menstrual problems ( $p=0.001$ ).

Our study found that 87.9% of the participants had problems during their menstrual cycle. Though most of the research had found dysmenorrhea as the most common problem, the frequency of occurrence varies; 84.2% in India, 89.5% in Turkey and 64.5% in Japan.<sup>21-23</sup> Among them in our study, 9.3% suffers worst pain during menstruation and 3.6% of them suffer the least pain. In contrast, Sharma et al found that 71.5% had dysmenorrhoea, among them 53.2% had mild, 37.6% had moderate and 9.1% had severe dysmenorrhea in a study done in Pokhara.<sup>20</sup>

Likewise our study found that 68.6% of the participants eat fast food like noodles, kurkure, etc. containing MSG, and 31.4% of the participants eat fast food without MSG. Similarly, 46.4% of the participants eat fast food two times per day, and 61 43.6% of the participants eat fast food one time per day. The higher frequency of taking fast food had significant prevalence of menstrual problems. Comparatively, study of Pramanik and Dhar

showed significant relation between the frequency of fast food consumption and menstrual disorders.<sup>3</sup> Similarly, shindey et al. in their study revealed that with increase in consumption of junk food / fast food there is increase in problems in women for early menarche, irregular menses, dysmenorrhea and excessive menses. They had further added that the Junk food / fast food affect the menstruation by disturbing the hormonal levels.<sup>1</sup> Fujiwara et.al in Japan also found an association between fast food consumption and dysmenorrhea.<sup>24</sup>

We also found association between food skipping behaviours and menstrual disorders. In our study the higher prevalence of menstrual problems was prevalent among those who skip their either of their dinner, lunch or breakfast. Similarly, Fujiwara et al., reported that skipping of breakfast had adverse effect on menstrual cycle in young college students.<sup>25</sup> Our study showed that 64.3% of the participants had normal weight, 21.4% of the participants were overweight and 13.6% of the participants were under weight. The occurrence of menstrual problems was found to have more in the over-weight, and under-weight rather than the normal weight participants which was found statistically significant ( $p < 0.001$ ). A study by Thapa and Shrestha also revealed that there was association between the BMI and irregular menstrual cycle but their study showed no association of BMI and dysmenorrhea.<sup>26</sup> In contrast, Widayanti and Widawati in indonesia showed that primary dysmenorrhea was 56% in women with BMI more than normal (overweight)<sup>27</sup>.

Similarly, 75% of the participants had good food eating habit, and 22.9% of the participants had fair eating habit. In context of Nepal we still have myths related to menstruation. As the etiology of menstrual dysfunction is multifaceted and it is the result of a complex interplay of many factors including weight loss, decreased body fat, abnormal eating attitudes and behavior, exercise, and psychological stressors.<sup>14</sup> Apart from this, as the study was done among nursing students, their shift duty and work load and work pattern also influence the menstrual cycle.<sup>20</sup> To address this, further study with large sample covering the participant of a various occupation should be done to find out the impact of food habit on menstrual health.

## CONCLUSION

The menstrual problems were the alarming problems in the adolescent college going girls of Kathmandu Valley. Excessive intake of junk/fast food, alcohol and tea/coffee had significant association with menstrual problems. The lower abdominal pain, backache, headache, loss of appetite, malaise and mood swings are the major menstrual problems. Public awareness programs regarding the effects of food habit for maintain good menstrual health is the must to improve the reproductive health of the adolescent.

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