ASSESSING CHANGES IN APPETITE DURING & AFTER MENSTRUAL CYCLE IN 18-25 YEAR OLD FEMALES

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ABSTRACT

BACKGROUND

Menstruation is the monthly process of shedding blood from the uterus in women of reproductive age, involving three primary phases: the follicular phase, the luteal phase, and the menstrual phase. Maintaining a healthy body weight requires a balanced and nutritious diet, yet several researchers have observed that the menstrual cycle can influence appetite changes at various stages.

During the menstrual cycle, hormonal fluctuations regulate reproductive functions and impact physiological and psychological states, including mood, energy levels, and appetite. Women often experience premenstrual syndrome (PMS), which includes symptoms such as mood swings, increased appetite, and cravings, particularly for carbohydrates. These cravings are linked to serotonin level fluctuations, as consuming carbohydrates can temporarily boost mood by increasing serotonin levels in the brain. However, indulging in sugary and unhealthy foods can lead to weight gain and increased health risks over time.

Despite partial insights provided by current research, a thorough understanding of the menstrual cycle's influence on appetite fluctuations remains incomplete. This study aims to fill this knowledge gap by assessing appetite changes during and after the menstrual cycle in young women.

OBJECTIVE:*To investigate how appetite changes during and after menstrual cycle among women of reproductive age. To understand how much changes happen in a person's appetite during different parts of their menstrual cycle.*

METHODOLOGY:

The study conducted was a cross-sectional observational study carried out at D Y Patil University, Nerul, Navi Mumbai. Data of 100 females were collected. The females were selected through purposive sampling and according to the inclusion and exclusion criteria.

The data was collected using Anthropometric measurements. (height, weight, BMI) and a questionnaire to assess appetite changes. The questionnaire consisted of demographic details of anthropometric measurements, regularity of the menstrual cycle & its length, appetite changes during & after the menstrual cycle & appetite scoring.

RESULT:

The study analyzed various aspects related to menstrual cycle and appetite changes among 100 participants. The age-wise distribution of participants, revealing a peak frequency at age 22 (21.2 %). The BMI distribution, indicated that 57.1% of participants were of normal weight, the duration of menstruation, with the most common duration being 4-5 days (45.7%). Menstrual cycle regularity was highlighted with 78.1% reporting regular cycles. Appetite changes during and after the menstrual cycle were explored with 78.1% experiencing changes during menstruation and 60.0% after menstruation. The comparative mean appetite score during and after menstruation was illustrated, showing a

slightly higher score after menstruation. The paired sample t-test indicated a significant decrease in appetite scores during menstruation compared to after menstruation ($p < 0.001$), suggesting a consistent pattern of decreased appetite during menstruation followed by an increase after.

CONCLUSION:
The comprehensive analysis of various parameters related to menstrual cycle and appetite changes among 105 participants provided valuable insights. The distribution of participants across different age groups, BMI categories, menstruation durations, and cycle regularities depicted a diverse sample. The majority of participants reported experiencing appetite changes during and after menstruation, indicating the significant impact of the menstrual cycle on appetite regulation. The comparative mean appetite scores further supported this finding, showing a slight increase in appetite after menstruation. The significant decrease in appetite scores during menstruation compared to after, as revealed by the paired sample t-test, underscores a consistent pattern of appetite fluctuations across the menstrual cycle. Overall, these findings emphasize the dynamic nature of appetite regulation during menstruation, highlighting the importance of considering menstrual cycle phases when addressing nutritional and health interventions for women.

Keyword: *Menstruation, Young females, Appetite changes, Anthropometric measurements, Menstrual Cycle Appetite Fluctuations.*

1. INTRODUCTION

The menstrual cycle, scientifically known as the ovarian cycle, is a regular process involving the shedding of the uterine lining, known as menstruation. It typically lasts around 28 days, beginning with the onset of menstruation. This cycle marks the maturation and release of an egg from the ovaries, preparing the uterus for possible fertilization and pregnancy. It's a fundamental aspect of reproductive health in people assigned females at birth.(1)

Women of reproductive age undergo various symptoms known as premenstrual syndrome (PMS), affecting emotions, physical well-being, thinking patterns, and behavior, linked to their menstrual cycle. These symptoms commonly include irritability, feelings of sadness, appetite changes, discomfort, and anxiety. They typically occur during the luteal phase (LP) and often ease shortly after menstruation begins. Factors such as nutrition, stress, and emotional state can influence the menstrual cycle. (2)

During different times of the month, women may notice changes in their appetite, cravings, and how much energy they have. These changes can happen because of natural rhythms in a chemical called serotonin in the body. Low serotonin levels have been linked to both mood disturbances and increased appetite. When serotonin levels are low, individuals may experience dysphoria, a feeling of unease or dissatisfaction. It's proposed that cravings for specific foods, particularly those rich in carbohydrates, arise as a mean to elevate serotonin levels in the brain. (3)

This phenomenon may serve as an adaptive mechanism to counteract serotonin deficiency, particularly evident premenstrually. The consumption of carbohydrates is suggested to function as a form of self-medication to improve mood. Before their period starts, some women might feel more likely to eat more, crave specific foods, and feel down. This is often linked to lower serotonin levels, which can affect mood. (3)

During the menstrual phase, individuals have been observed to increase their consumption of sugary and spicy foods based on their mood to enhance feelings of well-being.

Craving sugary treats and junk food before your period, and regularly indulging in unhealthy eating habits, can lead to weight gain and raise the risk of diseases like diabetes and high blood pressure later in life.(4)

This study aims to assess the appetite changes during & after menstrual cycle.

2. METHODOLOGY

2.1-Study Design: The study conducted was an Observational Study.

2.2- Setting /Site: The study was conducted in D. Y. Patil University, Nerul, Navi Mumbai.

2.3- Study Duration: The study was conducted for a duration of 6 months.
The Ethical clearance was obtained from the Institutional Ethical Committee prior to data collection.

2.4- Sample Size:A sample size of 100 participants was taken from D.Y.Patil College who fulfilled the inclusion criteria of the study.

2.5- Sampling Procedure: Purposive sampling

2.6- Selection Criteria:

INCLUSION CRITERIA	EXCLUSION CRITERIA
1. Menstruating women aged 18-25 years.	1. Women with any disease condition or any menstruation disorder.

2.7: Development of Tools

The following tools and materials were used to carry out the study:

1. ANTHROPOMETRIC MEASUREMENTS:
   - Height- Height was measured using a measuring tape.
   - Weight- Weight was assessed using a digital Weighing scale.

2. MENSTRUAL CYCLE :
   - MENSTRUAL CYCLE REGULARITY: regular/irregular
   - AVERAGE CYCLE LENGTH: how many days
   - LAST MENSTRUAL PERIOD: last time when did you have your menstrual cycle?

3. APPETITE CHANGE:
   - DO YOU EXPERIENCE CHANGES IN APPETITE DURING YOUR MENSTRUAL CYCLE? YES/NOIF YES, PLEASE DESCRIBE HOW YOUR APPETITE CHANGES: i)INCREASED. ii)DECREASED.
   - My appetite during menstruation is :1. Very poor. 2. Poor. 3. Average. 4. Good. 5. Very good.
   - I feel hungry during menstruation :1. Never. 2. Occasionally. 3. Some of the time. 4. Most of the time. 5. All of the time.
   - When I eat during menstruation, I feel full after: 1. Eating only a few mouthfuls . 2. Eating about a third of a plate/meal. 3. Eating over half of a plate/meal. 4. Eating most of the food. 5. Hardly ever.
   - Normally, I eat when I'm on my menstrual cycle :1. Less than one regular meal a day. 2. One meal a day. 3. Two meals a day. 4. Three meals a day.5. More than three meals a day (including snacks).

Total the score by adding the numbers associated with the participant's response. A score of less than 10 is very low. If the total is -

<10 – low appetite

11-15- Average appetite

16-20 - Good appetite

   - DO YOU EXPERIENCE CHANGES IN APPETITE AFTER YOUR MENSTRUAL CYCLE? YES/ NO
   - YES, PLEASE DESCRIBE HOW YOUR APPETITE CHANGES: i)INCREASED. ii)DECREASED.
   - My appetite during menstruation is :1. Very poor. 2. Poor. 3. Average. 4. Good. 5. Very good.
   - I feel hungry during menstruation :1. Never. 2. Occasionally. 3. Some of the time. 4. Most of the time. 5. All of the time.

- When I eat during menstruation, I feel full after: 1. Eating only a few mouthfuls . 2. Eating about a third of a plate/meal. 3. Eating over half of a plate/meal. 4. Eating most of the food. 5. Hardly ever.
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Total the score by adding the numbers associated with the participant's response. A score of less than 10 is very low. If the total is -

<10 – low appetite

11-15- Average appetite

16-20 - Good appetite

Comparing both the scoring we'll come to know the changes in appetite.

2.8 - Method of Data Collection:

• The study was carried out in D.Y.Patil College, Nerul, Navi Mumbai.

• People who met the inclusion criteria were considered for the study.

• All the participants were given consent forms, and a model information sheet and explained about the study, subject of the study, study duration, location, benefits, etc.

• The data was collected by the investigator by using a questionnaire about diet, lifestyle, and anthropometric measurements.

• The data that was collected was coded and analyzed using the SPSS Tool.

• The result and outcome were discussed to conclude.

• The final thesis was prepared.

NUTRITIONAL STATUS	Asian Range
Underweight	< 18.5
Normal	18.5 – 22.9
Overweight	≥ 23.0
At risk	23 – 24.9
Obese I	25 – 29.9
Obese II	≥30

Asian Classification of B.M.I

2.9- Method of data collection relevant to the objective :
The data was collected through personal interviews of the subject with the help of a questionnaire. The questionnaire consisted of anthropometric measurements like height. weight & BMI, last menstrual cycle & its regularity , appetite changes during & after menstrual cycle.

2.10 -Data Analysis plan and methods:
Statistical Analysis
SPSS software tool was used to statistically analyze the data obtained.

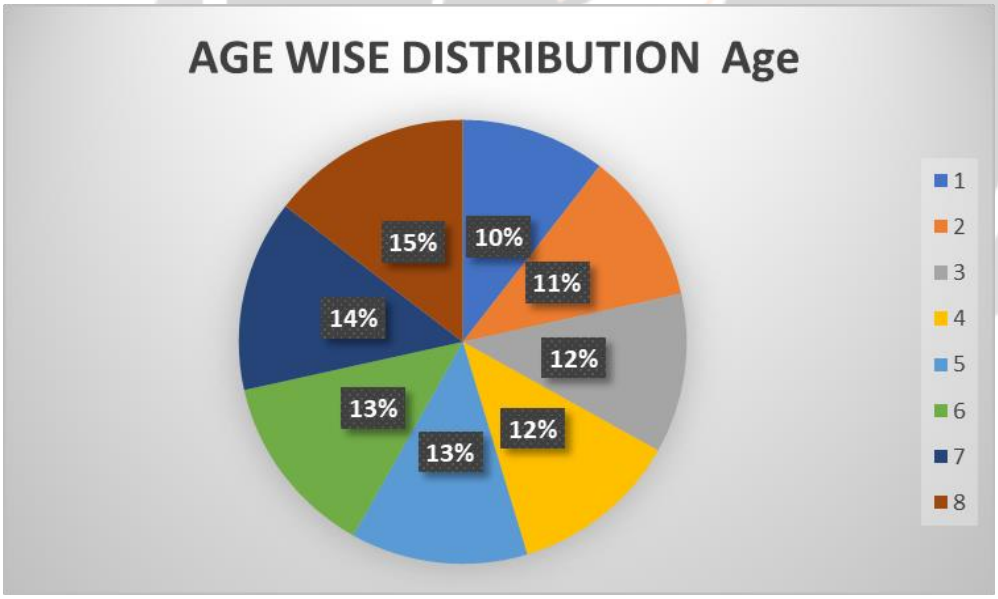
General Considerations :
Incomplete questionnaires were excluded from the study, resulting in 100 questionnaires being included in the data

analysis. Statistical analysis was conducted to reach a valid conclusion for the study. The data was analyzed using means, standard deviation, frequency, and percentage. Analytical analysis utilized the Chi-square test, while descriptive analysis employed the mean, median, and standard deviation. A T-test was applied to identify significant differences in the variables. All analyses were performed using Microsoft Excel Windows 10 Software and IBM SPSS software (version 26).

3. RESULT AND DISCUSSION:

Table 7.1. Age-wise distribution of study participants:

AGE-WISE DISTRIBUTION		
Age	Frequency	Percent
18	9	8.7
19	10	9.6
20	12	11.5
21	14	13.5
22	22	21.2
23	14	13.5
24	7	6.7
25	13	12.5

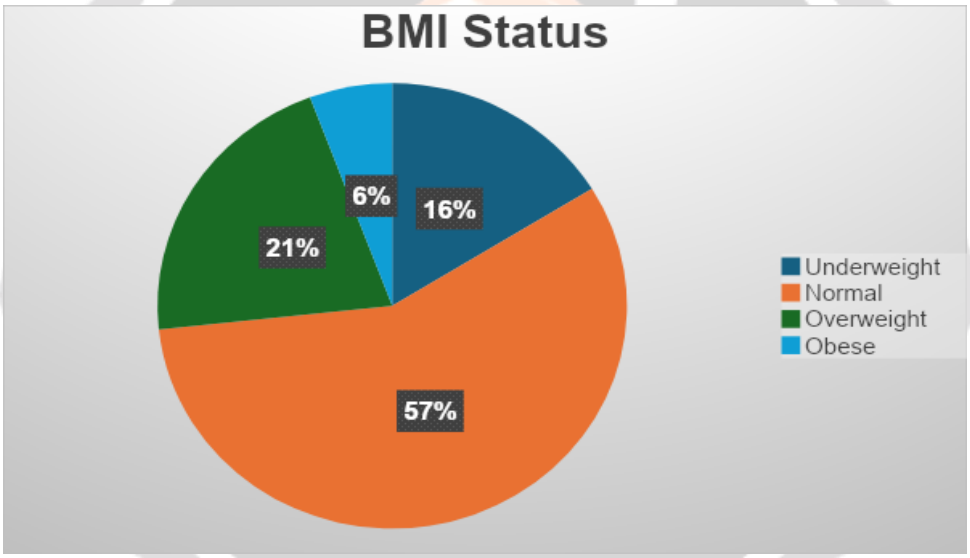


7.1 Age-wise distribution of study participants.

This table represents the distribution of ages among a population, with frequencies and percentages provided. The ages range from 18 to 25, with the highest frequency observed at age 22 (22 individuals, 21.2%). The distribution shows a gradual increase in frequency from ages 18 to 22, peaking at 22, and then a decline in frequency for ages 23 and 24, with the lowest frequency at age 24 (7 individuals, 6.7%). Overall, the majority of the population falls within the range of 20 to 23 years old, comprising 38.3% of the total population surveyed.

Table 7.2. BMI-wise distribution of study participants

BMI STATUS		
	Frequency	Percent
Underweight	17	16.2
Normal	60	57.1
Overweight	22	21.0
Obese	6	5.7
Total	100	100.0



7.2 BMI-wise distribution of study participants.

This table presents data on the distribution of weight categories within a certain population, categorized as underweight, normal weight, overweight, and obese. Among 100 individuals surveyed, the majority fall into the normal weight category, comprising 60 individuals (57.1% of the population). Overweight individuals constitute the next largest group, with 22 individuals (21.0%), followed by underweight individuals at 17 (16.2%). The smallest group is the obese category, with 6 individuals (5.7%). Overall, the data suggests that a significant portion of the population falls within the normal weight range, while fewer individuals are classified as underweight, overweight, or obese.

Table7.3. Frequency distribution of study participants as per the period of Menstruation

NO. OF DAYS OF MENSTRUATION		
	Frequency	Percent
3 days	16	15.2
4-5 days	48	45.7
5-6 days	28	26.7
More than 6 days	13	12.4

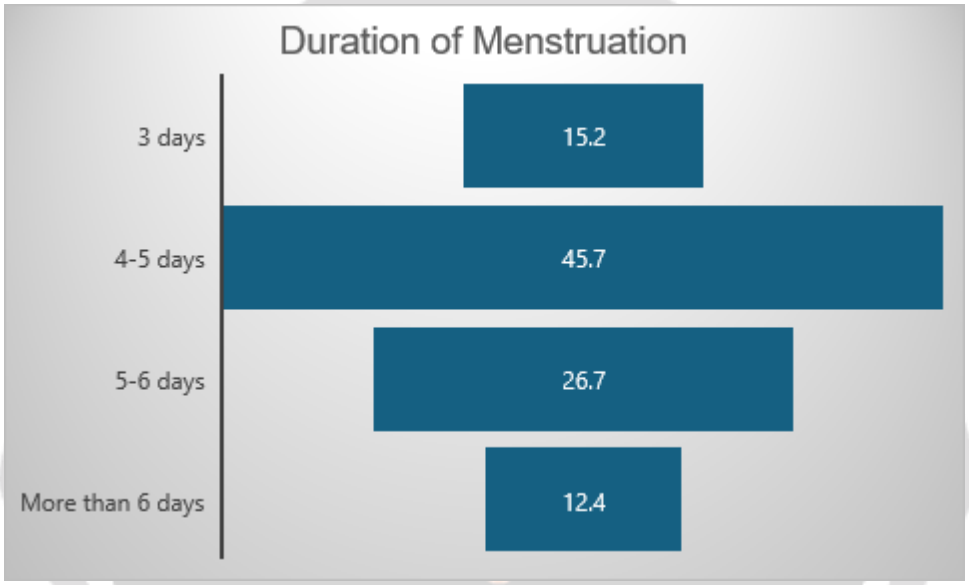


Fig 7.3 Frequency distribution of study participants as per the period of Menstruation.

This table outlines the distribution of the number of days of menstruation within a certain group, categorized as 3 days, 4-5 days, 5-6 days, and more than 6 days. Among the surveyed individuals, the most common duration of menstruation is 4-5 days, with 48 individuals representing 45.7% of the total. The next prevalent category is 5-6 days, comprising 28 individuals (26.7%). There are 16 individuals (15.2%) who experience menstruation for 3 days, and 13 individuals (12.4%) have periods lasting more than 6 days. This data suggests that the majority of individuals experience menstruation for a duration ranging from 4 to 6 days, with fewer individuals experiencing shorter or longer durations.

Table7.4. Frequency distribution of study participants as per the regularity of Menstruation

MENSTRUAL CYCLE REGULARITY		
	Frequency	Percent
Irregular	23	21.9
Regular	82	78.1

Total	100	100.0

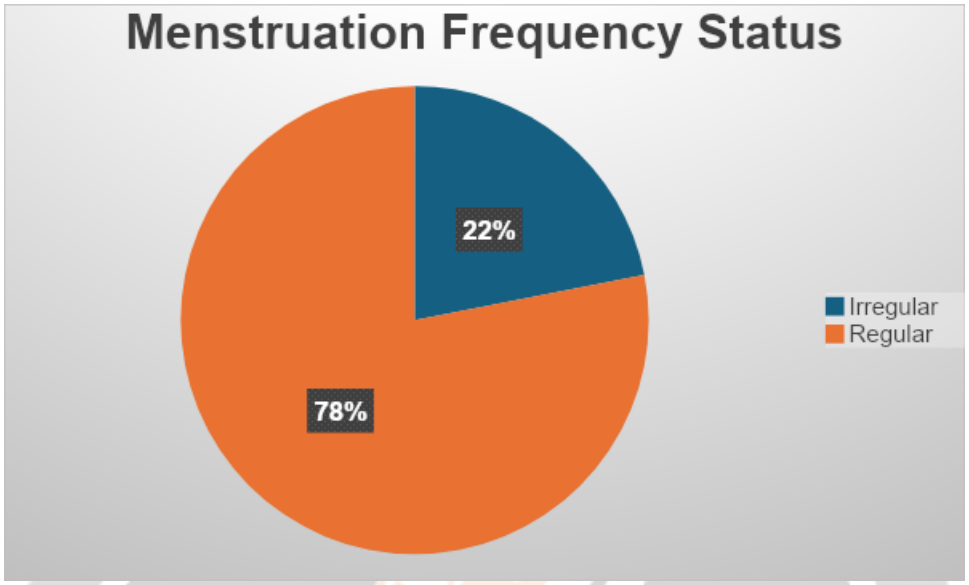


Fig 7.4 Frequency distribution of study participants as per the regularity of Menstruation.

This table illustrates the menstrual cycle regularity within a surveyed population, dividing individuals into two categories: irregular and regular cycles. Among the 105 individuals surveyed, the majority, constituting 82 individuals (78.1% of the total), report having regular menstrual cycles. In contrast, 23 individuals (21.9%) report experiencing irregular menstrual cycles. This data indicates that a significant portion of the population maintains a regular menstrual cycle pattern, while a smaller but still notable proportion experience irregularities in their menstrual cycles.

Table 7.5. Frequency distribution of study participants for appetite change status during the Menstruation Cycle

APPETITE CHANGE DURING YOUR MENSTRUAL CYCLE		
	Frequency	Percent
YES	82	78.1
NO	23	21.9
Total	100	100.0

This table presents data on changes in appetite during the menstrual cycle within a surveyed population. Among the 100 individuals surveyed, the majority, accounting for 82 individuals (78.1% of the total), report experiencing changes in appetite during their menstrual cycle. In contrast, 23 individuals (21.9%) indicate that they do not experience appetite changes during this time. This data suggests that a significant proportion of individuals undergo alterations in appetite patterns throughout their menstrual cycle, while a smaller portion do not experience such changes.

Table 7.6. Frequency distribution of study participants for appetite change status after the Menstruation Cycle

APPETITE CHANGE AFTER YOUR MENSTRUAL CYCLE		
	Frequency	Percent
YES	63	60.0
NO	42	40.0
Total	100	100.0

This table outlines the occurrence of appetite changes after the menstrual cycle within a surveyed population. Among the 100 individuals surveyed, 63 individuals (60.0% of the total) report experiencing changes in appetite following their menstrual cycle, while 42 individuals (40.0%) indicate no such change. This data suggests that a majority of individuals experience alterations in appetite patterns after their menstrual cycle, while a significant portion does not undergo such changes.

Fig 7.5 Comparative change in respondents who felt appetite change during and after the Menstruation Cycle

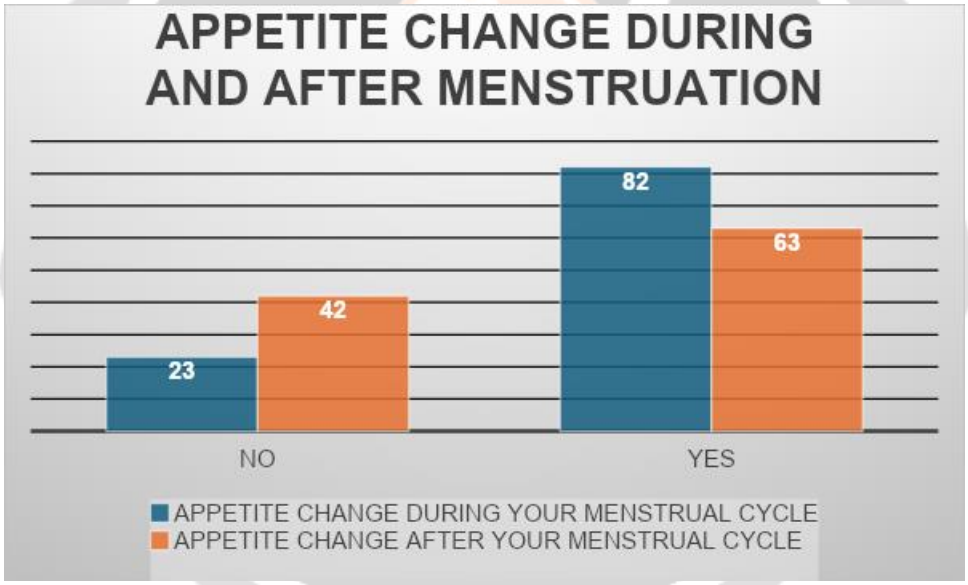


Table 7.7 Comparative mean appetite score during and after the Menstruation cycle

	Mean	Std. Deviation
During Appetite Menses Score	12.32	3.118
After Menses Appetite Score	13.63	2.535

The mean and standard deviation values for appetite scores during and after menstruation are provided. The mean appetite score during menstruation is 12.32 with a standard deviation of 3.118, while the mean appetite score after

menstruation is 13.63 with a standard deviation of 2.535. This data suggests that, on average, individuals tend to have slightly higher appetite scores after menstruation compared to during menstruation. Additionally, the standard deviation values indicate that there is more variability in appetite scores during menstruation compared to after menstruation, implying that appetite patterns may be more consistent following the menstrual cycle.

Table7. 8 Paired Sample T-test for relative appetite score during and after the Menstruation cycle

Paired Differences						
	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
During Menses appetite score – After Menses appetite score	-1.305	3.576	0.349	-3.738	104	0.000*

*- Significant change

The paired differences analysis reveals a significant change in appetite scores between during and after menstruation. The mean difference in appetite scores is -1.305, indicating that, on average, individuals report lower appetite scores during menstruation compared to after menstruation. This difference is statistically significant ($t = -3.738$, $df = 104$, $p < 0.001$), suggesting that the change in appetite scores is unlikely to have occurred by random chance. Therefore, the data suggests a consistent pattern of decreased appetite during menstruation followed by an increase in appetite after menstruation.

4. CONCLUSION:

In conclusion, this study aimed to investigate how women's appetites change during and after their menstrual cycles. The primary objective was to explore these changes, while the secondary objective focused on understanding the extent of appetite fluctuations throughout different menstrual phases.

The study revealed that the surveyed population consisted mostly of young adults aged between 18 and 25 years, with a significant portion falling within the 20 to 23 age range. Most participants were of normal weight, although there were smaller groups categorized as underweight, overweight, or obese.

Regarding menstrual cycles, nearly half of the participants experienced cycles lasting 4-5 days, and the majority reported having regular cycles. Many participants noticed changes in their appetite, particularly during menstruation and after, with a general trend of decreased appetite during menstruation compared to the post-menstruation period.

Despite these valuable insights, the study has several limitations. Its cross-sectional nature prevents definitive conclusions, and the participants, being students with basic health knowledge, may not represent the broader population. Additionally, the questionnaire did not address the frequency or types of food cravings, nor did it inquire about food preferences.

In summary, while the study sheds light on appetite changes during the menstrual cycle among young women, further research with diverse populations and more comprehensive questionnaire assessments is needed to deepen our understanding of these phenomena. Nonetheless, these findings underscore the importance of considering menstrual cycle phases in dietary studies and highlight potential areas for targeted health interventions.

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