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Irregular Periods Can Disrupt Sleep Schedule? A Cross-Sectional Study on The Effects of Menstrual Regularity of Quality of Sleep

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ABSTRACT

Menstruation is an essential part of the monthly routine of any woman in the reproductive age group. The menstrual pattern of an individual has significant impact over quality of life she leads. An important factor in this is the pattern of her sleep. The present study investigates the effect of the menstrual pattern of a woman over her sleep. A 21 item Questionnaire was designed covering various aspects of the menstrual pattern of the individual. Questions studied dysmenorrhea, oligomenorrhea, heavy menstrual bleeding etc. For assessing the sleep pattern, the Sleep Quality Scale was used. It is a 28 item Questionnaire that measures sleep quality in the general population. Various aspects of sleep including day time symptoms, problems in maintaining sleep etc are included. After taking informed consent, 135 women were interviewed using these questionnaires based on what they experienced since last one month. After collecting the data, they were scored and analyzed through MS Excel. It was observed that factors like Menarche before 10 years of age, Heavy menstrual bleeding (using more than 6 tampons or pads per day), Intense bleeding in the first few days of menstruation, Cycle duration longer than 38 days, Individuals with Cycle-to-cycle variation of 11–20 days, Presence of clots in menstrual blood, Dysmenorrhea, Recent vaginal discharge in the lower genital tract and use of contraceptive pills seemed to be related with increased sleep problems. On the other hand, bleeding duration of more than 8 days and use of intrauterine devices (IUDs) seemed to reduce sleep problems. PCOD, Polymenorrhea, Absence of menstruation (not due to pregnancy or lactation) and Oligomenorrhea didn't seem to have any effect on sleep. This study was mainly done on the menstruating age group. The quality of sleep after menopause, can't be studied through this. Future scope of research lies in doing similar study on a different sample size or on a wider population including post-menopausal women..

KEYWORDS: Menstruation, Sleep, Dysmenorrhea, Periods, Oligomenorrhea, Heavy Menstrual Bleeding

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INTRODUCTION

Menstruation is an integral part of the life of every woman belonging to the reproductive age group. It is the cyclic shedding of the endometrial layer of the Uterus (**1**). Menstrual cycle mainly lasts between 21-35 days, but at advanced age the period decreases to 21-30 days. The cycle consists of ovarian and uterine cycle, distributed into different phases (**1**). Different hormones involved in maintaining the cycle are GnRH, FSH, LH, Oestrogen and Progesterone (**1**).

Sleep cycle is a natural process essential for physical and mental restoration, learning and memory. The sleep cycle comprises of two phases, i. e.REMand NREM (**1**). Different age groups require different amounts of sleep. The various parts of brain involved in sleep are hypothalamus , hippocampus, amygdala, thalamus and reticular formation (**1**).

Women in menstruating phase are often seen to have problems in their sleep cycle. This can be due to hormonal changes, pain, emotional factors, and pre-menstrual cramps. The altered Oestrogen and progesterone level causes sleep disturbance (**1**). Elevated progesterone level leads to an increase in body temperature and causes deformities (**1**). In contrast, melatonin and cortisol decrease during luteal phase.Mental anxiety, stress and change in life style also play a vital role in sleep disturbance (**1**).

Menstruating individuals differ in durations of periods and amount of bleeding. A variation from the normal routine, while at times physiological, can at times be of pathological origin. The irregularity of a woman's menstrual cycle directly influences her quality of life. According to Matsumoto et al[2] (2022) biopsychosocial changes are seen significantly in the late-luteal phase. Shim et al[3] (2024) pointed out that menstrual irregularities are more common among obese women and in those with lower educational

achievements. However, prolonged menstrual cycles were more likely in women with heavy work load and rotating night shifts (**4**).

Among the quality of life, lies the essential element of sleep. Short sleep duration, poor sleep hygiene, fatigue, stress and depression may disrupt circadian rhythm which in turn, is related to heavy bleeding and menstrual irregularities (**5**; **6**). Moreover, women who sleep less than 6 hours a day not only have abnormal menstrual cycles but they also have an increased risk of insulin resistance. Although, Arafa et al[7]. (2020) reported that women of 12-25 age group with premenstrual symptoms and dysmenorrhea have significant association with insomnia, but no substantial relationship has been indicated between sleep hour and most menstrual symptoms. However, pre-menstrual syndrome and dysmenorrhea are associated with poor and interrupted sleep patterns and daytime sleepiness (**8**). Poor sleep quality and sleep disturbances during pre-menstrual and menstrual phases are more commonly reported in PMS, their EEG showing increased sleep spindle activity in the luteal phase (**9**).

Menstrual phase mainly increases NREM phase and decreases the REM sleep (**1**). The amplitude of circadian oscillation may be dampened and daytime sleepiness increases in the luteal phase (**10**). Patients with moderate to severe dysmenorrhea have been reported to have persistent problems of falling asleep and staying awake (**11**). As the menstrual cycle can affect sleep, the reverse also holds true. Women with menstrual irregularities show poor sleep and increased breaks in sleep during periods (**12**). Romans et al[13] (2015) noted poor sleep quality in the pre-menstrual phase compared to other phases in the cycle. According to Kocabey et al[14]. (2024), high premenstrual syndrome assessment scale (PMSAS) has low sleep quality scale; dysmenorrhea and other menstrual symptoms have lower sleep quality scale and sleep efficiency with no significant difference amongst participants with HMB. A recent investigation (**15**) assessed that 7.3% females with good-quality sleep suffer from abnormal menstrual cycle patterns, while 18.7% with poor-quality sleep have irregular menstrual cycle.

The present study aims to correlate the pattern of menstruation during the last one month versus the quality of sleep. The work distinguishes itself from most of the previous works in its samples, population and the questionnaire.

MATERIALS AND METHODS:

Hypotheses: To find out how the menstrual pattern of an individual influences her sleep.

Sample Population: Women who have attained menarche, but did not attain menopause

Sample Collection Technique: Google Forms

Inclusion Criterion: Menstruating women

Exclusion Criterion: Pre-menarche girls, post-menopausal women.

Sample Size: 135

Ethical Approval: Since no intervention, pharmacological or invasive, were performed, institutional ethical clearance was not required for survey-based study.

Tools used:

1. A Questionnaire of 21 items to understand every minute details of the subject's menstrual pattern, from the age of menarche to duration, intensity of bleeding, occurrence of pain, and various irregularities in the cycle (**16**). The irregularities considered were oligomenorrhea, i.e. prolonged cycle without hampering duration and flow, the reverse problem or HMB, polymenorrhea or reduced cycle span with heavier flow, hypomenorrhea or lesser flow with unaltered cycle length and occurrence of intermenstrual cycle or metrorrhagia (**16**). The questionnaire was developed based on Howkins et al[16], (2022).

2. The Sleep Quality Scale is a 28 item Questionnaire that measures sleep quality in the general population. It assesses the various aspects of sleep including daytime symptoms, restoration after sleep, problems in initiating sleep, problems in maintaining sleep, difficulty waking up or feeling refreshed in the mornings (**17**).

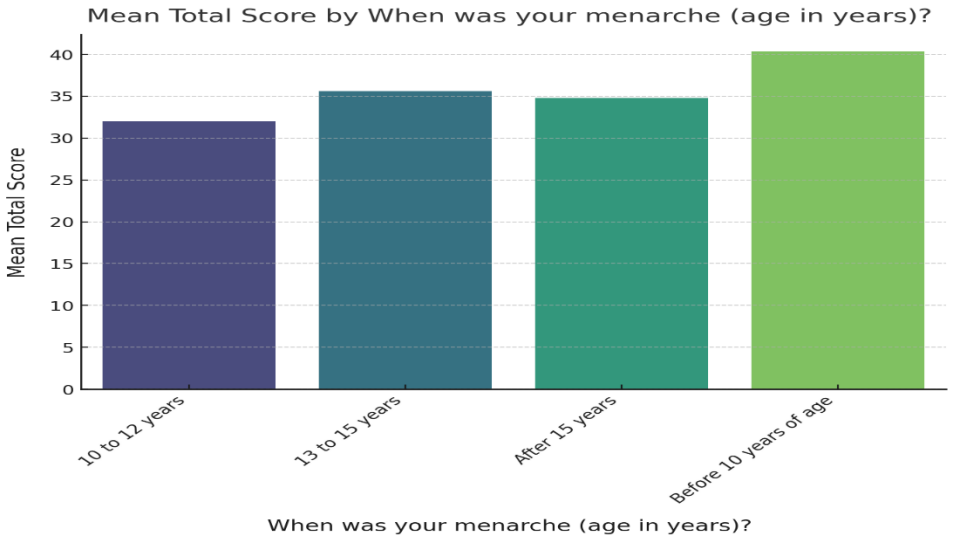
Methods: 135 females were interviewed on the basis of the two above mentioned questionnaires, through Google Form based on what they had observed in the last 1 month. Informed consent was taken from all participants. Their responses were recorded and analyzed using MS Excel.

RESULTS:

When was your menarche (age in years)?

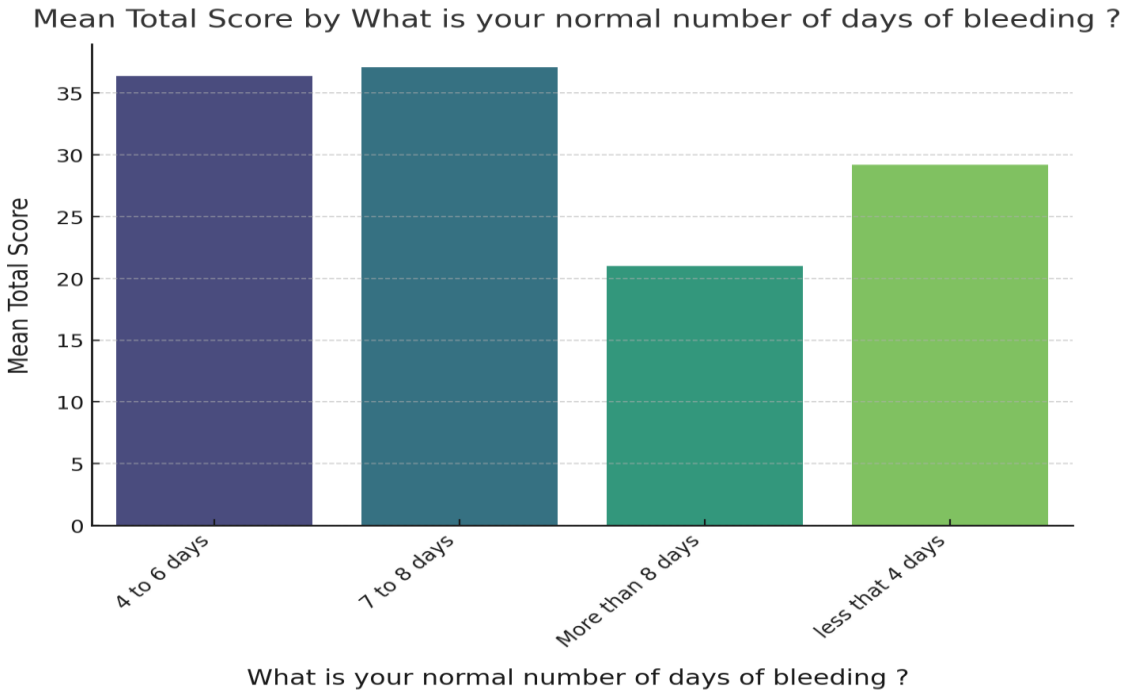
Option	Mean Total Score
10 to 12 years	32.00
13 to 15 years	35.58

After 15 years	34.75
Before 10 years of age	40.33



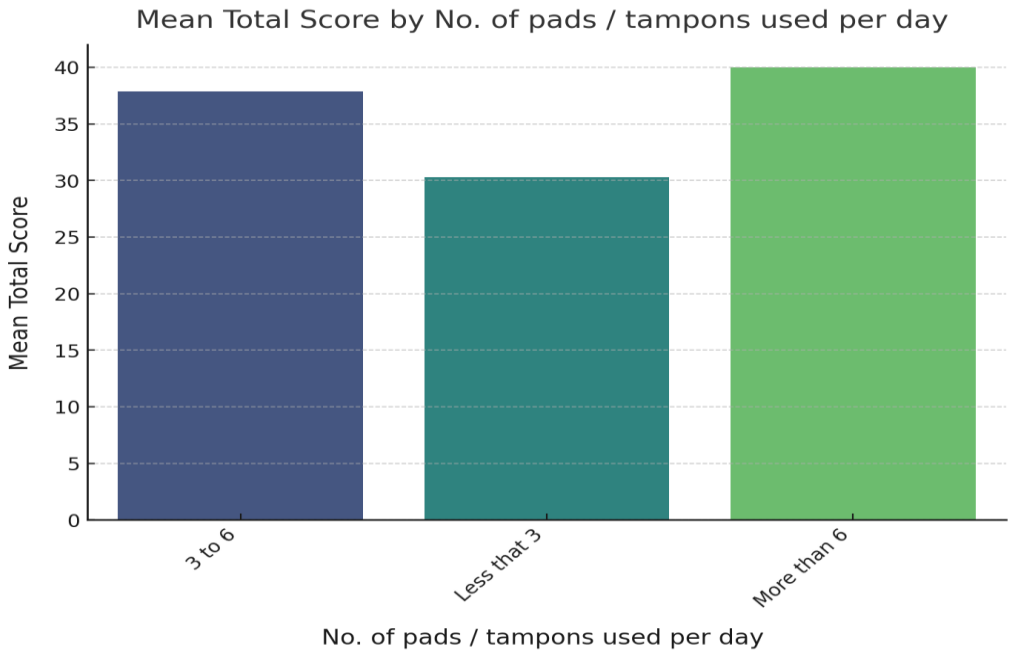
What is your normal number of days of bleeding ?

Option	Mean Total Score
4 to 6 days	36.41
7 to 8 days	37.12
More than 8 days	21.00
less that 4 days	29.19



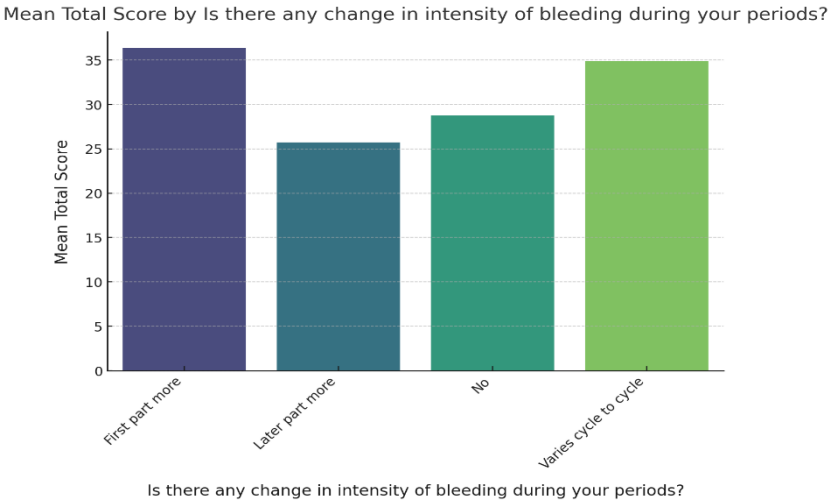
No. of pads / tampons used per day

Option	Mean Total Score
3 to 6	37.88
Less that 3	30.32
More than 6	40.00



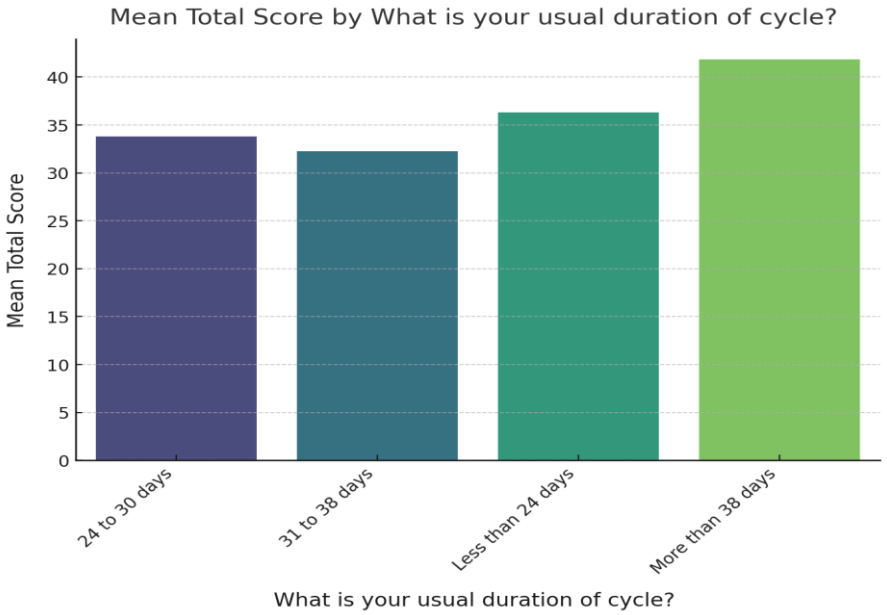
Is there any change in intensity of bleeding during your periods?

Option	Mean Total Score
First part more	36.35
Later part more	25.75
No	28.76
Varies cycle to cycle	34.90



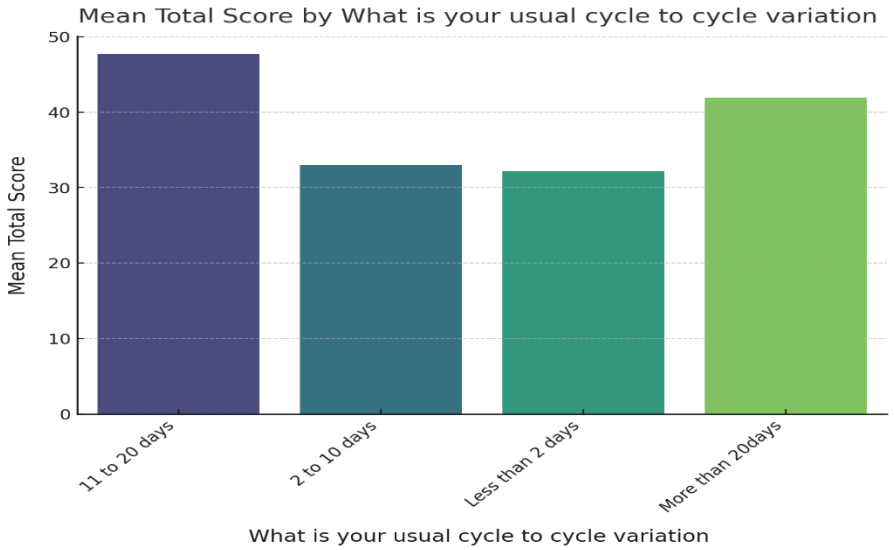
What is your usual duration of cycle?

Option	Mean Total Score
24 to 30 days	33.80
31 to 38 days	32.25
Less than 24 days	36.33
More than 38 days	41.86



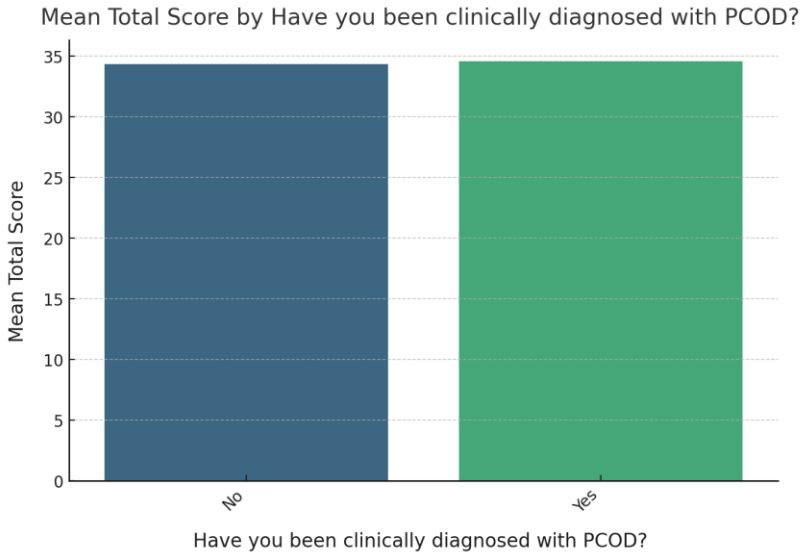
What is your usual cycle to cycle variation

Option	Mean Total Score
11 to 20 days	47.71
2 to 10 days	33.03
Less than 2 days	32.17
More than 20days	41.92



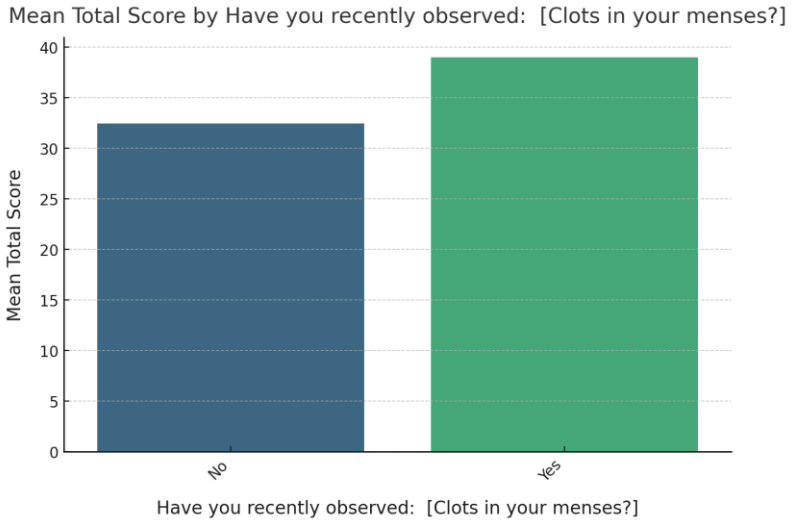
Have you been clinically diagnosed with PCOD?

Option	Mean Total Score
No	34.35
Yes	34.61



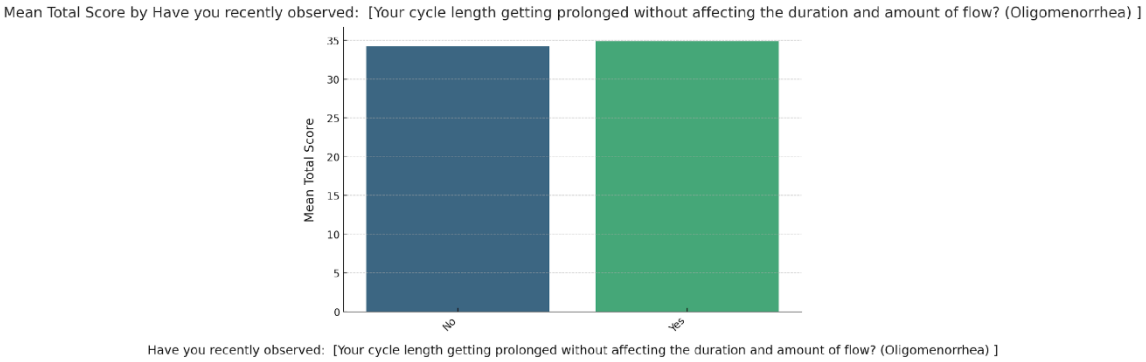
Have you recently observed: [Clots in your menses?]

Option	Mean Total Score
No	32.47
Yes	39.02



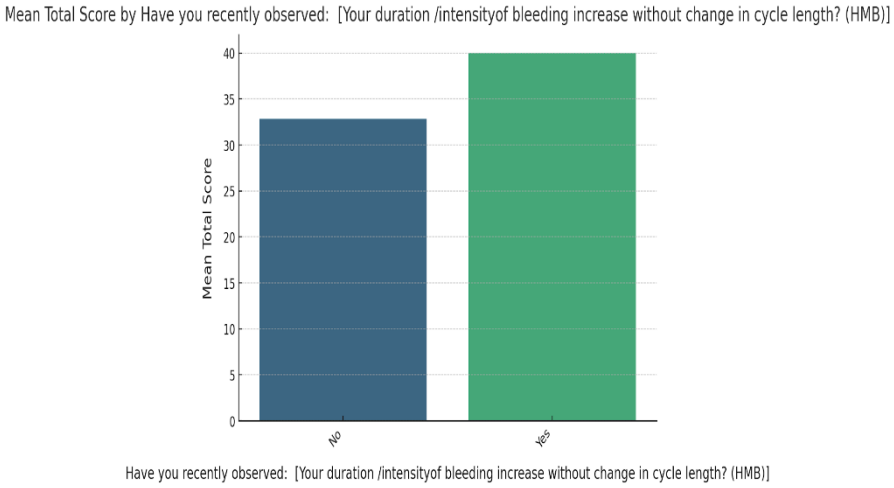
Have you recently observed: [Your cycle length getting prolonged without affecting the duration and amount of flow? (Oligomenorrhea)]

Option	Mean Total Score
No	34.25
Yes	34.94



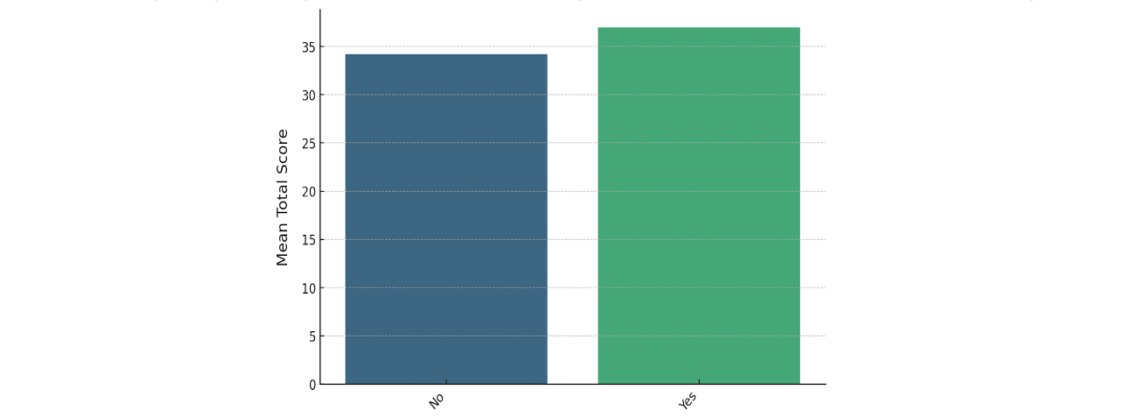
Have you recently observed: [Your duration /intensityof bleeding increase without change in cycle length? (HMB)]

Option	Mean Total Score
No	32.82
Yes	40.00



Have you recently observed: [Shorter duration of cycles with heavier/ increased duration of blood flow? (Polymennorhea)]

Option	Mean Total Score
No	34.19
Yes	37.00

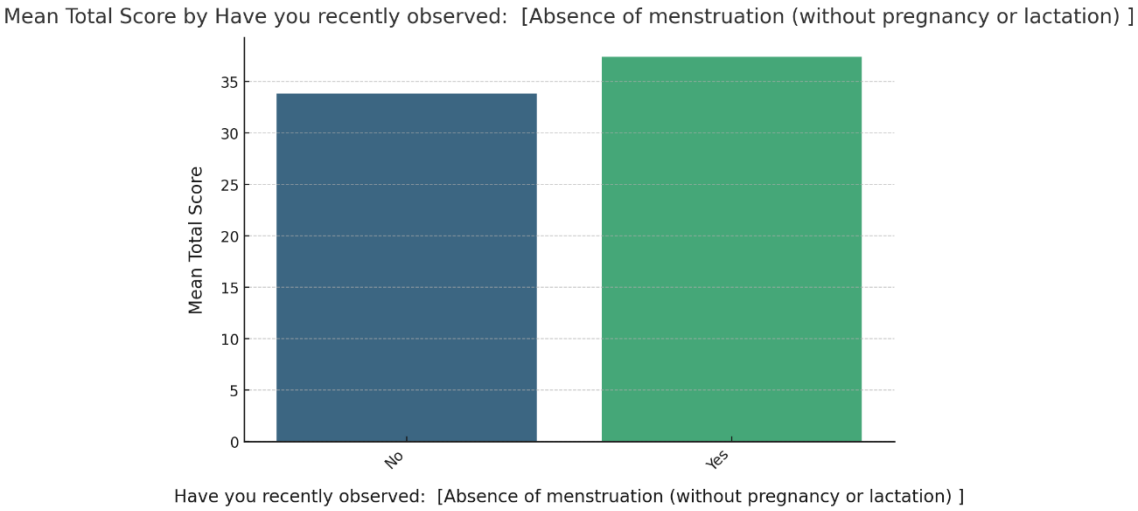


Have you recently observed: [Reduction in duration/ intensity of bleeding in which cycle length remains unaltered? (Hypomenorrhea)]

Option	Mean Total Score
No	34.43
Yes	34.35

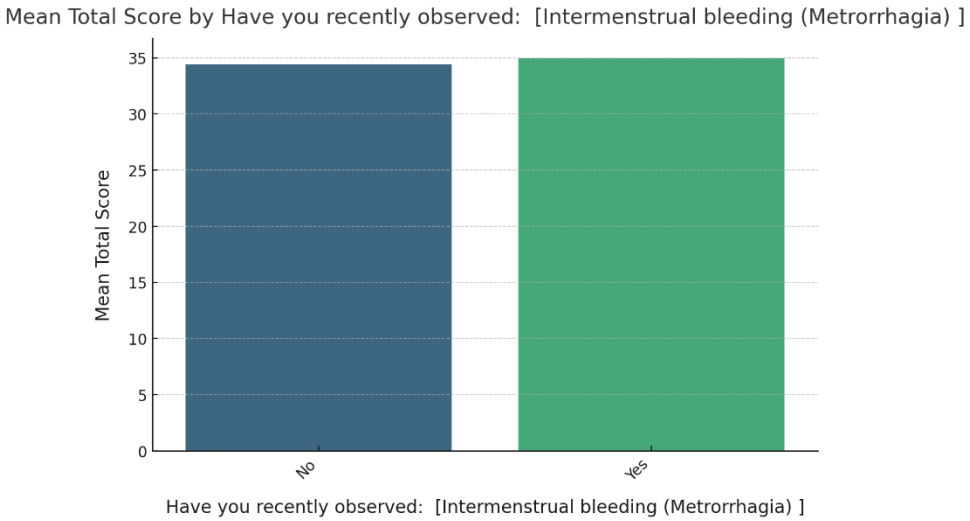
Have you recently observed: [Absence of menstruation (without pregnancy or lactation)]

Option	Mean Total Score
No	33.83
Yes	37.41



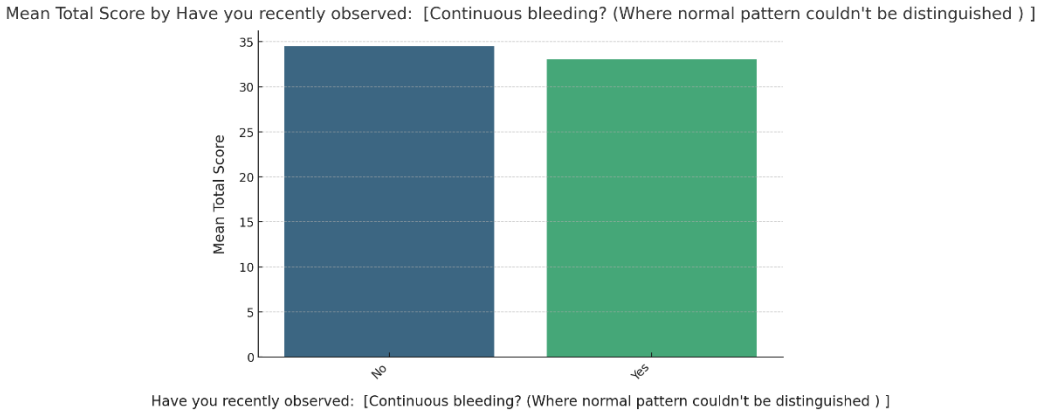
Have you recently observed: [Intermenstrual bleeding (Metrorrhagia)]

1. Option	2. Mean Total Score
3. No	4. 34.39
5. Yes	6. 35.00



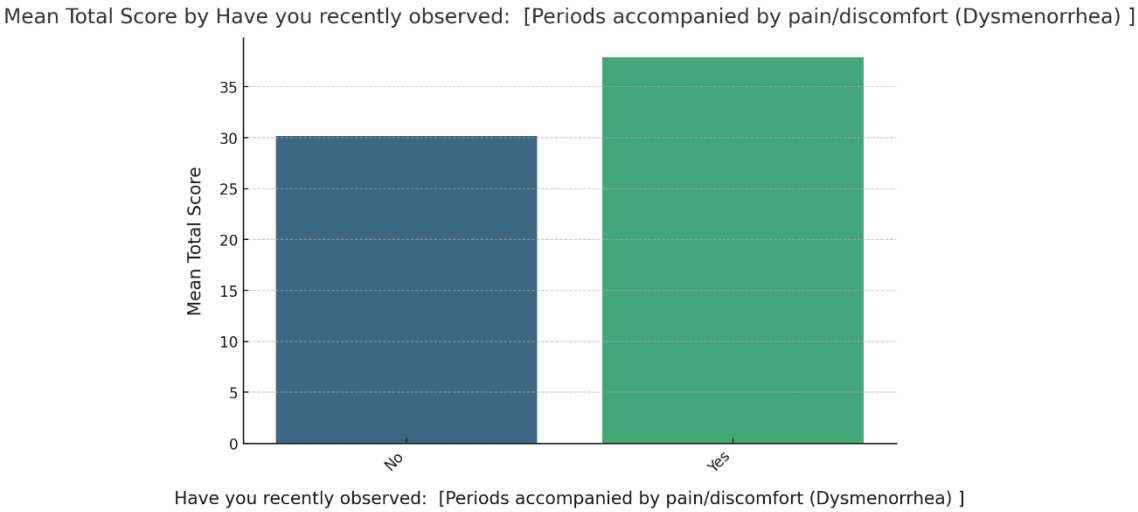
Have you recently observed: [Continuous bleeding? (Where normal pattern couldn't be distinguished)]

Option	Mean Total Score
No	34.52
Yes	33.10



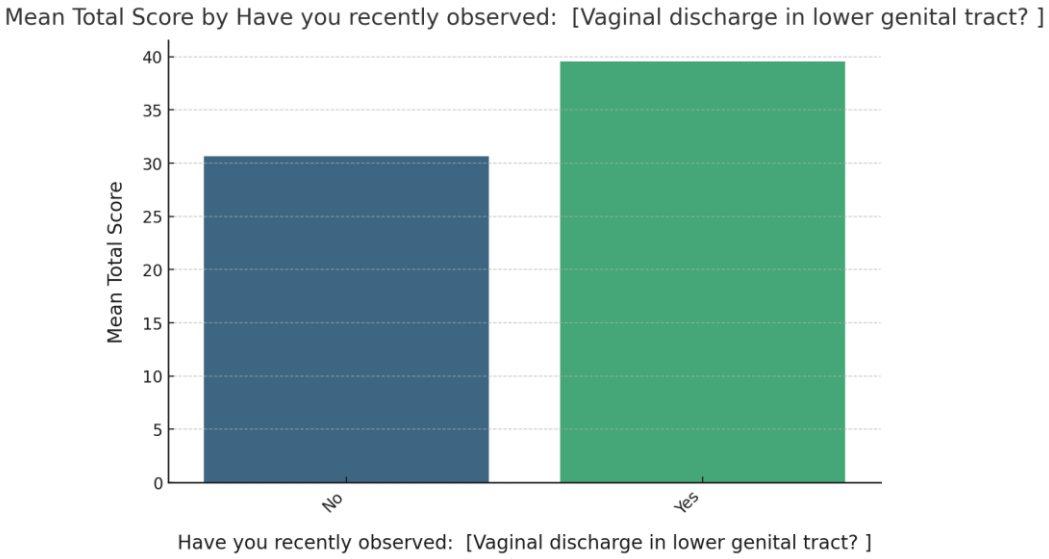
Have you recently observed: [Periods accompanied by pain/discomfort (Dysmenorrhea)]

Option	Mean Total Score
No	30.15
Yes	37.93



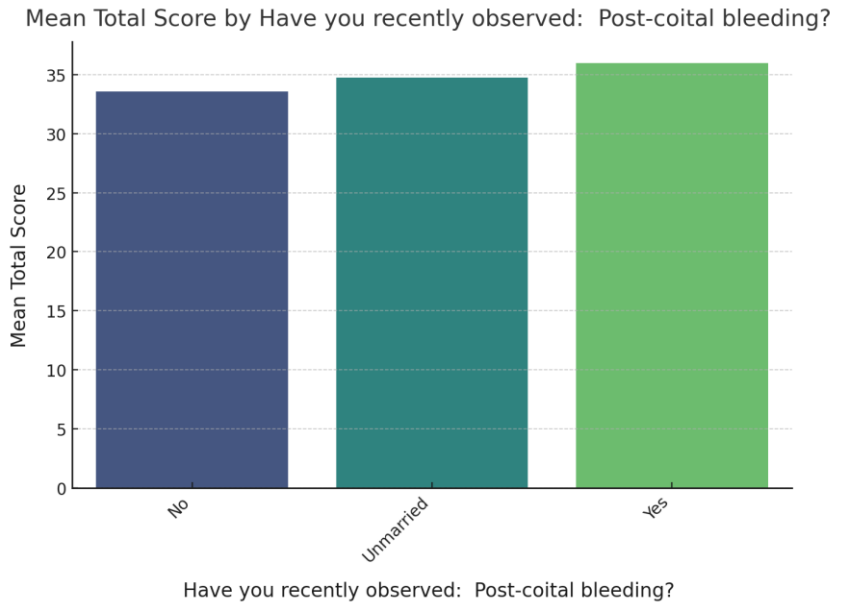
Have you recently observed: [Vaginal discharge in lower genital tract?]

Option	Mean Total Score
No	30.65
Yes	39.56



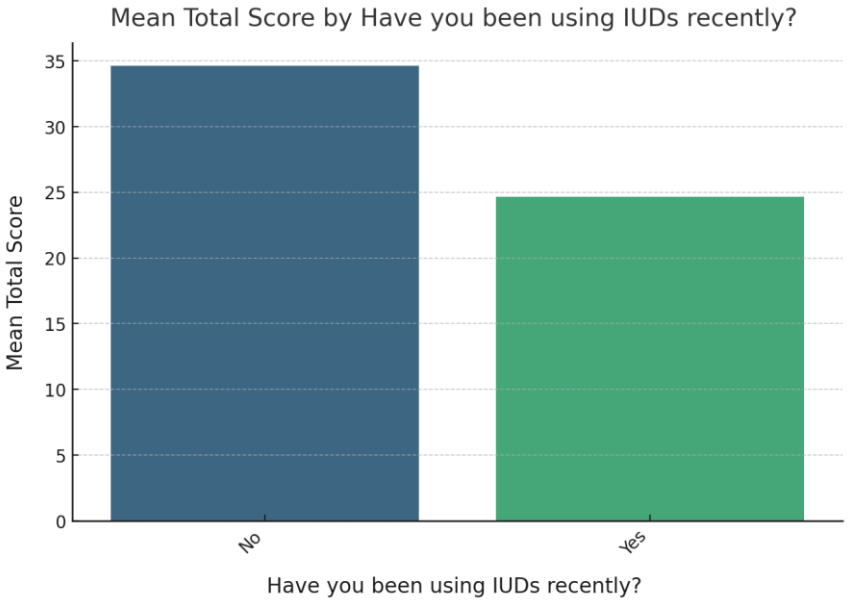
Have you recently observed: Post-coital bleeding?

Option	Mean Total Score
No	33.58
Unmarried	34.74
Yes	36.00



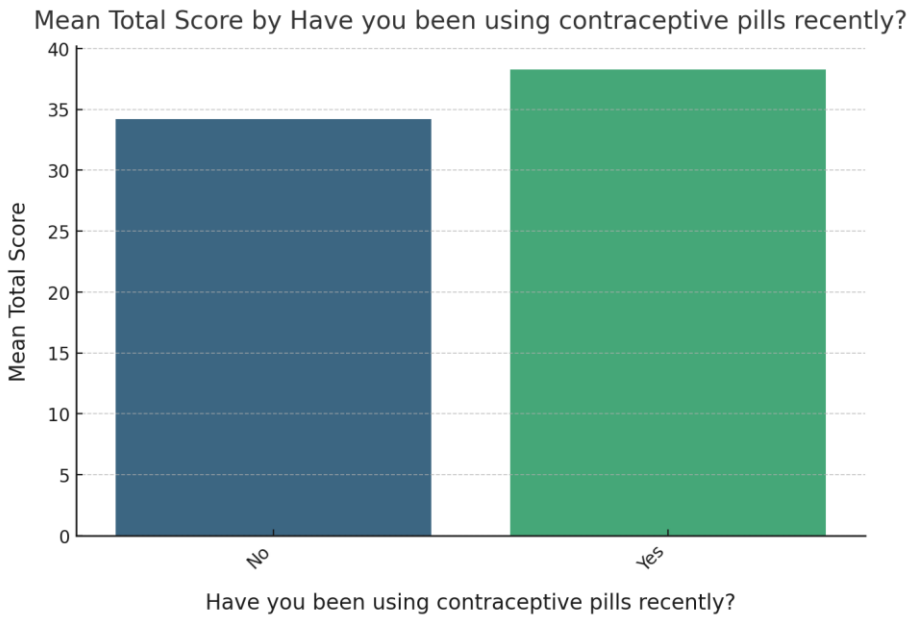
Have you been using IUDs recently?

Option	Mean Total Score
No	34.64
Yes	24.67



Have you been using contraceptive pills recently?

Option	Mean Total Score
No	34.20
Yes	38.29

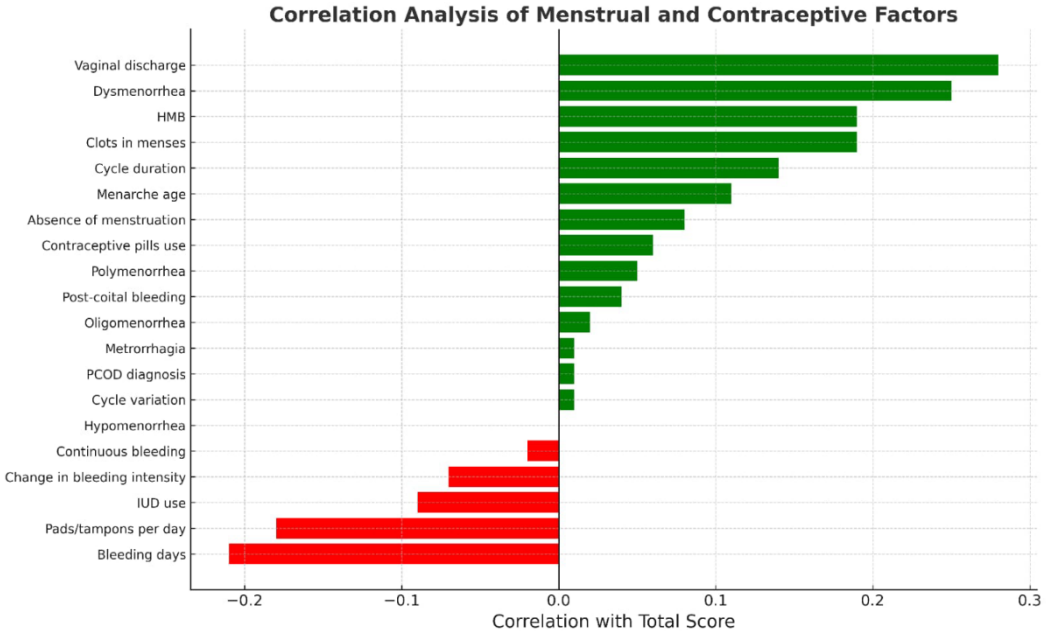


Correlation Analysis with Total Score

Correlation Table

Question	Correlation with Total Score
When was your menarche (age in years)?	0.11
What is your normal number of days of bleeding ?	-0.21
No. of pads / tampons used per day	-0.18
Is there any change in intensity of bleeding during your periods?	-0.07
What is your usual duration of cycle?	0.14
What is your usual cycle to cycle variation	0.01
Have you been clinically diagnosed with PCOD?	0.01
Have you recently observed: [Clots in your menses?]	0.19
Have you recently observed: [Your cycle length getting prolonged without affecting the duration and amount of flow? (Oligomenorrhea)]	0.02
Have you recently observed: [Your duration /intensityof bleeding increase without change in cycle length? (HMB)]	0.19
Have you recently observed: [Shorter duration of cycles with heavier/ increased duration of blood flow? (Polymennorhea)]	0.05
Have you recently observed: [Reduction in duration/ intensity of bleeding in which cycle length remains unaltered? (Hypomenorrhea)]	-0.00
Have you recently observed: [Absence of menstruation (without pregnancy or lactation)]	0.08

Have you recently observed: [Intermenstrual bleeding (Metrorrhagia)]	0.01
Have you recently observed: [Continuous bleeding? (Where normal pattern couldn't be distinguished)]	-0.02
Have you recently observed: [Periods accompanied by pain/discomfort (Dysmenorrhea)]	0.25
Have you recently observed: [Vaginal discharge in lower genital tract?]	0.28
Have you recently observed: Post-coital bleeding?	0.04
Have you been using IUDs recently?	-0.09
Have you been using contraceptive pills recently?	0.06



DISCUSSION:

Women who had menarche before 10 years of age had higher mean scores for acute sleep problems. For women with a period of bleeding of more than 8 days, acute sleep problems seemed to be the least. Individuals who needed to use more than 6 tampons or pads per day showed the highest mean score, for sleep problems. Women who had more intense bleeding on the first few days of their periods suffered from more troubles with sleep and so did women with normal duration of cycle more than 38 days. This was in similarity with the findings of Kathryn et al[5] (2021) and Sugapriya et al[6] (2023), although Kocabey et al[14] (2024) didn't find any significant correlation of sleep quality with Heavy Menstrual Bleeding. Women who had the cycle to cycle variation of 11-20 days range had the highest score for sleep problems. PCOD didn't seem to have a significant impact on the menstrual health of the individual. Women with clots in their menses showed more problems with sleep. Heavy menstrual bleeding seemed to be related to more sleep problems unlike Oligomenorrhea. Criterion like polymenorrhea or absence of menstruation without pregnancy or lactation, while showing differences, weren't much significant. Individuals with Dysmenorrhea showed more sleep troubles similar to the observations of Arafa et al[7] (2020) and Woosley et al[11] (2014). The same was seen in women who recently had observed vaginal discharge in the lower genital tract. Use of Intrauterine Devices seemed to decrease the mean total score indicating less acute sleep problems, while use of contraceptive pills increased the score. Significant positive correlations included vaginal discharge from the lower genital tract, Dysmenorrhea, clots in menses and High Menstrual Bleeding. These factors apparently decreased the quality of sleep. The same was suggested by Khotimah et al[15] in 2024. On the other hand, the number of days of bleeding showed a strongly negative correlation, indicating that women with longer period durations have lesser sleep problems. This can be due to the altering levels of estrogen and progesterone in the body (**1**).

CONCLUSION:

The current study observed that factors like Menarche before 10 years of age, Heavy menstrual bleeding (using more than 6 tampons or pads per day), Intense bleeding in the first few days of menstruation, Cycle duration longer than 38 days, Individuals with Cycle-to-cycle variation of 11–20 days, Presence of clots in menstrual blood, Dysmenorrhea, Recent vaginal discharge in the lower genital tract and use of contraceptive pills seemed to be related with increased sleep problems. On the other hand, bleeding duration of more than 8 days and use of intrauterine devices (IUDs) seemed to reduce sleep problems. PCOD, Polymenorrhea, Absence of menstruation (not due to pregnancy or lactation) and Oligomenorrhea didn't seem to have any effect on sleep. Significant positive correlations included vaginal discharge from the lower genital tract, Dysmenorrhea, clots in menses and High Menstrual Bleeding. These factors apparently decreased the quality of sleep, while the number of days of bleeding showed a strongly negative correlation, indicating that women with longer period durations have lesser sleep problems. This study was mainly done on the menstruating age group. The quality of sleep after menopause, can't be studied through this. Future scope of research lies in doing similar study on a different sample size or on a wider population including post-menopausal women.

REFERENCES

[1] Barrett KE, Barman SM, Brooks HL, Yuan JJ. 2019. Ganong's review of medical physiology. 26th ed. New York: McGraw-Hill Education.

[2] Matsumoto, T, Egawa M, Kimura T, Hayashi, T, 2022. A relationship between menstrual phase and regularity, sleep duration and biopsychosocial symptoms among college students: a prospective observational study. Gynecological and Reproductive Endocrinology and Metabolism, 3(1): 32-38

[3] Shim, J., Han, S. & Baek, J, 2024. Factors influencing menstrual regularity among female workers: a cross-sectional analysis study. BMC Women's Health. 24: 299. https://doi.org/10.1186/s12905-024-03142-8

[4] Sihan Song, Choi, H, Pang Y, Kim O, Park HY., 2022. Factors associated with regularity and length of menstrual cycle: Korea Nurses' Health Study. BMC Womens Health. 22(1) :361. doi: 10.1186/s12905-022-01947-z.

[5] Kathryn E. R. Kennedy, Chidera Onyeonwu, Sara Nowakowski, Lauren Hale, Charles C. Branas, William D. S. Killgore, Chloe C. A. Wills, Michael A.Grandner, 2021, Menstrual regularity and bleeding is associated with sleep duration, sleep quality and fatigue in a community sample. Journal of Sleep Research, 31(1): e13434. doi: https://doi.org/10.1111/jsr.13434.

[6] Sugapriya G, Mani MS, Ponneshwer J, Swapnatai A Meshram, Umamaheswari K, Snekalatha R, 2023, Association of sleep hygiene and quality with menstrual health among young women. Int J Acad Med Pharm, 5 (3): 329-333

[7] Arafa, A., Mahmoud, O., Abu Salem, E. Mohamed, A, 2020. Association of sleep duration and insomnia with menstrual symptoms among young women in Upper Egypt. Middle East Curr Psychiatry 27 (2) . doi: https://doi.org/10.1186/s43045-019-0011-x

[8] Jeon B, Baek J., 2023, Menstrual disturbances and its association with sleep disturbances: a systematic review. BMC Womens Health. 23(1): 470. doi: 10.1186/s12905-023-02629-0.

[9] Alzueta E & Baker FC.,2023. The Menstrual Cycle and Sleep. Sleep Med Clin, 18(4) : 399-413. doi: 10.1016/j.jsmc.2023.06.003

[10] Shibui, K, Uchiyama, M, Okawa, M, Kudo, Y, Kim, K, Liu, X, Kamei, Y, Hayakawa, T, Akamatsu, T, Ohta, K, Ishibashi, K, 2000, Diurnal fluctuation of sleep propensity and hormonal secretion across the menstrual cycle, Biological Psychiatry, 48(11): 1062-1068, doi: https://doi.org/10.1016/S0006-3223(00)00912-4.

[11] Woosley, J. A., & Lichstein, K. L., 2014. Dysmenorrhea, the Menstrual Cycle, and Sleep. Behavioral Medicine, 40(1) : 14–21. doi: https: //doi.org /10.1080/ 08964289.2013.829020

[12] Kaur, R, Singh, S, Kaushal, K, 2020, Prevalence of Sleep Disturbances in Menstrual Cycle Irregularities: A Pilot Study. International Journal of Science and Healthcare Research, 5 (3)

[13] Romans, S. E, Kreindler, D, Einstein, G, Laredo, S, Petrovic, M. J, Stanley, J, 2015. Sleep quality and the menstrual cycle. Sleep Medicine. 16 (4): 489-495 doi: https://doi.org/10.1016/j.sleep.2014.12.001.

[14] Kocabey, H. A, Akman,. O, Kasim, I, 2024, The Impact of Menstrual Disorders on Sleep Quality in Adolescents: An Observational Study, Journal of Pediatric and Adolescent Gynecology, 37 (6): 579-585, doi: https://doi.org/10.1016/j.jpag.2024.08.005.

[15] Khotimah Fatmaningsih, N, Trisyani Koeryaman, M, Rosidin, U, 2024, Relationship of sleep quality with menstrual cycle in teenagers. Indonesian Journal of Global Health Research. 6(5)

[16] Howkins & Bourne: Shaw's Textbook of Gynaecology. 18th ed. New Delhi: Elsevier; 2023

[17] Yi, H., Shin, K., & Shin, C. (2006). Development of Howell, A. J., Digdon, N. L., Buro, K., & Sheptycki, A. R. the sleep quality scale. Journal of Sleep Research, (2008). Relations among mindfulness, well-being, and 15 (3), 309–316. sleep. Personality and Individual Differences, 45 :773–777.