

Social media addiction and sleep disturbances affect the occurrence of pre-menstrual syndrome

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ABSTRACT

Background: *Premenstrual Syndrome (PMS) is a common condition experienced by adolescent girls that can adversely affect daily activities, emotional well-being, and overall quality of life. In Indonesia, approximately 85% of women of reproductive age experience PMS. One contributing factor is sleep disturbances, which are often associated with hormonal fluctuations prior to menstruation. In addition, excessive use of social media has been shown to influence sleep patterns and mental health, thereby potentially exacerbating PMS symptoms. This issue is particularly relevant among female university students, who are frequently exposed to social media and academic stress, both of which may affect sleep quality and emotional regulation.*

Objectives: *The purpose of this study was to analyze the relationship between social media addiction and sleep disorders with the incidence of PMS among female students at the Faculty of Health Sciences, Universitas Muhammadiyah Purwokerto.*

Methods: *This study used an observational analytic design with a cross-sectional approach. A total of 92 female students were selected using a proportionate stratified random sampling. Research instruments included the Bergen Social Media Addiction Scale (BSMAS), the Pittsburgh Sleep Quality Index (PSQI), and the Shortened Premenstrual Assessment Form (SPAF). Data were analyzed using the Spearman rank correlation test.*

Results: *The findings revealed significant associations between social media addiction and PMS ($p = 0.002$), as well as between sleep disturbances and PMS ($p < 0.001$).*

Conclusions: *Social media addiction and sleep disturbances are significantly related to the incidence of PMS among female university students.*

KEYWORD: *pms; pre-menstrual syndrome; sleep disturbance; social media addiction; social media overuse*

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INTRODUCTION

Premenstrual syndrome (PMS) is a common health issue experienced by adolescents and young adult women, and it can disrupt daily activities, academic performance, and emotional well-being. According to the World Health Organization (WHO, 2024), approximately 1.3 billion individuals representing 16% of the global population are adolescents (1). Data from the Central Statistics Agency (BPS) recorded 68.82 million adolescents in Indonesia in 2022, representing approximately 24% of the national population (2). Adolescence is a transitional stage that bridges childhood and adulthood (3). According to the National Population and Family Planning Agency (BKKBN), adolescents are defined as individuals aged 10 to 24 years who are unmarried (4). This developmental period is characterized by rapid physical, mental, and cognitive changes (5).

A meta-analysis examining the epidemiology of PMS reported a cumulative incidence of approximately 47.8% among women worldwide (6). Meanwhile, in Indonesia, approximately 85% of women of reproductive age experience PMS (7). The prevalence of PMS in Central Java varies across regions. In Semarang, 71.1% of adolescent girls experience mild PMS, while 75.4% of adolescents in Purwokerto experience moderate PMS. Additionally, 53.2% of adolescent girls in Pekalongan Regency are reported to have PMS,

whereas data on PMS prevalence in Tegal Regency are not yet available (8). The menstrual cycle consists of several phases regulated by hormonal changes (9). Hormonal imbalances particularly involving estrogen, progesterone, and serotonin, play a key role in triggering PMS symptoms (10). Studies by Lutfiyati et al. (2021) and Fidyowati et al. (2021) indicate that lifestyle factors particularly sleep quality, contribute significantly to PMS symptoms. Sleep disturbances and withdrawal from certain activities are among the common indicators (11).

A decrease in serotonin levels may lead to mood disturbances, changes in appetite, and sleep disorders such as insomnia (10). Mulyana et al. (2022, as cited in Jannah et al., 2024) reported that the global prevalence of sleep disorders ranges from 5% to 15%, with 31% to 75% at risk of experiencing chronic insomnia (12). In Indonesia, approximately 64.7% of adolescents sleep less than seven hours per night. This issue affects many individuals, including university students, particularly during the later stages of their education. The National Sleep Foundation (2019) found that individuals aged 19–29 years, especially college students, are the group most affected by sleep problems (13). One of the main factors contributing to sleep disturbances among adolescents is excessive screen time, particularly at night (12). Exposure to light from digital devices suppresses melatonin production, thereby

disrupting the circadian rhythm. In the digital era, the use of the internet and social media has become an integral part of daily life (14). The Ministry of Communication and Informatics (KOMINFO) reported a 12.6% increase in social media use equivalent to 21 million new users in Indonesia in 2023 (15). Approximately 77% of Indonesia's population, or 212.9 million people, were active internet users as of January 2023. The average daily duration of social media use reached 5 hours and 6 minutes on tablets or computers, and 3 hours and 52 minutes on smartphones (16). Social media facilitates communication across geographical boundaries. However, these benefits are often accompanied by the risk of social media addiction, characterized by an excessive preoccupation with and dependence on social media use (17). Kandell (in Hartinah et al., 2019) suggested that university students are highly vulnerable to social media addiction, as they are in the transitional phase of "emerging adulthood," characterized by increasing independence and identity exploration, processes that are often facilitated through social media use (18). In addition, Griffiths (2000, as cited in Hartinah et al., 2019) proposed six diagnostic criteria for social media addiction: salience, mood modification, tolerance, withdrawal, conflict, and relapse (18). One of the negative impacts of social media addiction is insomnia (17). Syifa et al. (2023) found that university students often lose track of time

when using social media at night, which subsequently leads to difficulty falling asleep (19).

A preliminary study among 92 undergraduate midwifery students from Universitas Muhammadiyah Purwokerto (2022-2024 cohort) revealed that 77 students had moderate social media use, while 15 had high usage. Regarding sleep quality, 68 students experienced mild insomnia, 21 had severe insomnia, and 3 had very severe insomnia. Although many studies have examined the relationship between social media addiction, sleep disturbances, and PMS, most have analyzed these factors separately. Therefore, this study aims to fill this research gap by examining all three variables simultaneously to provide a more comprehensive understanding of the factors influencing PMS.

Based on the above background, this study aims to analyze the relationship between social media addiction and sleep disturbances with the occurrence of premenstrual syndrome among female students of the Faculty of Health Sciences, Universitas Muhammadiyah Purwokerto.

MATERIALS AND METHODS

This study employed a quantitative design with a cross-sectional approach. The research was conducted from March to April 2025 at the Faculty of Health Sciences, Universitas Muhammadiyah Purwokerto. The study population consisted of 2,847

female students. The sample size was calculated using the analytical correlation formula for ordinal variables according to Dahlan (2023), with $\alpha = 0.05$ ($Z\alpha = 1.64$), power $\beta = 0.10$ ($Z\beta = 1.28$), and a minimum expected correlation coefficient of $r = 0.30$. The result of the calculation showed that 92 respondents were sufficient to represent the population of 2,847 female students at the Faculty of Health Sciences, Universitas Muhammadiyah Purwokerto. A proportionate stratified random sampling technique was applied to ensure representativeness from each study program. Resulting in the following proportional distribution: Bachelor of Midwifery 11, Bachelor of Nursing 40, Diploma of Nursing 7, Anesthesiology Nursing 9, Medical Laboratory Technology 14, Electromedical Engineering 2, Radiology Imaging Technology 4, and Health Information Management 5, for a total of 92 respondents. Primary data were collected through self-administered questionnaires after obtaining informed consent. The independent variables were social media addiction and sleep disturbances, while the dependent variable was the incidence of premenstrual syndrome (PMS). The instruments used were the Bergen Social Media Addiction Scale (BSMAS) to measure social media addiction (20) which has been validated in a study by Ratnasari (2019) (21), the Pittsburgh Sleep Quality Index (PSQI) to assess sleep quality (22) which was validated in a study by Sukartini (2022) (23),

and the Shortened Premenstrual Assessment Form (SPAFA) to identify PMS symptoms (24) which was validated in a study by Pasaribu (2023) (25).

All instruments used in this study are standardized and have been validated in previous research. Data were analyzed using the Spearman rank correlation test with SPSS software. This study received ethical approval from the Research Ethics Committee of Universitas Muhammadiyah Purwokerto, with registration number KEPK/UMP/263/III/2025, issued on March 20, 2025. All respondents were informed about the purpose and procedures of the study and were asked to provide informed consent before completing the questionnaire. Data confidentiality was ensured by omitting any personal identifying information.

RESULTS AND DISCUSSION

Univariate Analysis

Univariate analysis was conducted to describe the distribution and frequency of each variable under study. In this research, the univariate analysis aimed to provide an overview of the incidence of premenstrual syndrome and the characteristics of female students, including semester, age, age at menarche, duration of menstruation, and menstrual cycle.

Based on **Table 1**, the majority of respondents were 6th-semester students, totaling 54 individuals (58.7%), followed by 4th-semester students with 20 individuals

Table 1. Distribution of respondents' characteristics

Variable	Frequency (f)	Percentage (%)
Semester		
Semester 2	10	10.9
Semester 4	20	21.7
Semester 6	54	58.7
Semester 8	8	8.7
Age		
Middle Adolescence (16–20 years)	55	59.8
Late Adolescence (21–24 years)	37	40.2
Menarche		
< 12 years	23	25
> 12 years	69	75
Menstruation Duration		
< 3 days	1	1.1
3-7 days	80	87
>7 days	11	12
Menstrual Cycle		
< 21 days	18	19.6
21-35 days	69	75
>35 days	5	5.4
Total	92	100

(21.7%), 2nd-semester with 10 individuals (10.9%), and 8th-semester with 8 individuals (8.7%). In terms of age category, most respondents were in the middle adolescence group (16-20 years), accounting for 55 individuals (59.8%), while the remaining 37 individuals (40.2%) were in late adolescence (21-24 years). Supported by Rahmawati (2019), adolescents can experience premenstrual syndrome in their 20s, which can be very disruptive and make it difficult to carry out activities, especially as they get older, up to the age of 35 (26). The majority experienced menarche at the age of over 12 years (69 individuals or 75.0%), while 23

individuals (25.0%) experienced menarche under the age of 12. Most respondents experienced menarche at the age of >12 years. This is supported by Kholifah's (2024) research, which states that menarche occurs at an age of more than 12 years, namely in the range of 12-15 years, which is considered normal menarche (27). Regarding menstrual duration, 80 respondents (87.0%) reported having menstruation for 3-7 days, 1 individual (1.1%) had menstruation for less than 3 days, and 11 individuals (12.0%) for more than 7 days. Most respondents experience menstrual periods lasting between 3 and 7 days, which is considered normal. This is

supported by research conducted by Salsabila et al (2025), which found that a normal menstrual period lasts between 3 and 7 days (28). Meanwhile, most respondents had a normal menstrual cycle (21-35 days) with 69 individuals (75.0%), while 18 individuals (19.6%) had cycles of less than 21 days, and 5 individuals (5.4%) had cycles of more than 35 days. This is in line with Winengsih et al (2023) who stated that a normal menstrual cycle lasts between 21 and 35 days (29).

Table 2. Distribution of respondents' social media addiction

Category	Frequency (n)	Percentage (%)
Normal	4	4.3
Alert	35	38
Addict	53	57.6
Total	92	100

Table 2 indicates that most respondents were categorized as having social media addiction, totaling 53 students (57.6%). Meanwhile, 35 students (38.0%) were in the alert category, and only 4 students (4.3%) were classified as normal. These findings suggest a high prevalence of excessive social media use among female students. In line with the research by Novita & Utami (2024), that social media addiction is widely experienced, with 245 (81.7%) of 300 respondents falling into the addict category (30).

Table 3 shows that the majority of respondents experienced poor sleep quality, with 88 students (95.7%) categorized as having poor sleep. Meanwhile, only 4

students (4.3%) were classified as having good sleep quality. This indicates that inadequate sleep was highly prevalent among the participants. In line with the research by Basri et al. (2023), the results show that poor sleep quality was more prevalent among students, with 140 students (75.7%) experiencing poor sleep quality, while good sleep quality was experienced by 45 students (24.3%) (31).

Table 3. Distribution of respondents' sleep disturbances

Category	Frequency (n)	Percentage (%)
Good	4	4.3
Poor	88	95.7
Total	92	100

Table 4. Distribution of respondents' premenstrual syndrome

Category	Frequency (n)	Percentage (%)
Mild	2	2.2
Moderate	13	14.1
Severe	77	83.7
Total	92	100

Table 4 demonstrates that most respondents experienced severe PMS, totaling 77 students (83.7%). In addition, 13 students (14.1%) were categorized as having moderate PMS, and only 2 students (2.2%) reported mild PMS. These findings indicate that PMS symptoms were predominantly severe among the respondents. In line with Pridynabilah's (2023) research, which shows that PMS is commonly suffered by female students with moderate and severe symptoms, where it was found that most respondents

experienced PMS with moderate symptoms (45.2%) and severe symptoms (45.2%). Meanwhile, 9.7% of other respondents experienced mild PMS symptoms (32).

Table 5. Distribution of respondents' sleep duration

Sleep Duration	Frequency (n)	Percentage (%)
< 4 hours	53	57.6
4–6 hours	29	31.5
> 6 hours	10	10.9
Total	92	100

As shown in **Table 5**, more than half of respondents (53 students; 57.6%) reported sleeping less than 4 hours per night. A total of 29 students (31.5%) slept 4–6 hours, while only 10 students (10.9%) slept more than 6 hours. This indicates that

inadequate sleep duration was highly prevalent among the participants. In line with Marhenisaputri's (2025) research, 14.3% of respondents slept between 4–5 hours per night, which is less than the normal sleep requirement for adults (33). This is not only bad for health but can also increase PMS symptoms, as stated in Haniyah's (2024) research that poor sleep quality can worsen PMS symptoms (34).

Bivariate Analysis

In this study, bivariate analysis was conducted to determine the relationship between social media addiction and sleep disorders with the incidence of premenstrual syndrome (PMS), using the Spearman Rank test.

Table 6. Association between social media addiction and premenstrual syndrome among health sciences students at Universitas Muhammadiyah Purwokerto

Independent Variable	Dependent Variable	p-value	Correlation Strength	Spearman's rho (ρ)	Description
Social Media Addiction	Pre-Menstrual Syndrome	0.002	Weak	0.313	Significant

Based on **Table 6**, the results of the bivariate analysis using Spearman's rank correlation test showed a correlation coefficient of $\rho = 0.313$ with a significance value of $p = 0.002$. This indicates a positive correlation of weak strength between social media addiction and premenstrual syndrome (PMS). In other words, the higher the level of social media addiction experienced by the respondents, the higher their tendency to experience PMS

symptoms.

Based on **Table 7**, the results of the bivariate analysis using the Spearman correlation test showed a correlation coefficient of $\rho = 0.517$ with a significance value of $p < 0.001$. This coefficient indicates a moderate positive correlation between sleep disturbances and premenstrual syndrome (PMS). In other words, the more severe the sleep disturbances or the poorer the sleep quality experienced by

Table 7. Association between sleep disturbance and pre-menstrual syndrome among health sciences students at Universitas Muhammadiyah Purwokerto

Independent Variable	Dependent Variable	p-value	Correlation Strength	Spearman's rho (ρ)	Description
Sleep Disturbance	Pre-Menstrual Syndrome	<0.001	Moderate	0.517	Significant

respondents, the higher their likelihood of experiencing PMS symptoms.

DISCUSSION

Association Between Social Media Addiction and Premenstrual Syndrome Among Health Sciences Students at Universitas Muhammadiyah Purwokerto

The results **Table 6** of the Spearman Rank correlation test showed a significant positive relationship between social media addiction and premenstrual syndrome ($\rho = 0.313$; $p = 0.002$). The strength of this relationship falls into the weak category, indicating that higher levels of social media addiction are associated with a greater tendency to experience PMS symptoms. However, this weak correlation suggests that PMS is multifactorial in nature, with other contributing factors such as hormonal fluctuations, micronutrient deficiencies, psychological conditions, stress, dietary patterns, physical activity, and social environment also influencing the severity of PMS symptoms (35).

Based on the **Table 1** findings revealed that the majority of students were categorized as addicts in their social media use, with 53 respondents (57.6%) out of 92 falling into this category. A total of 35

respondents (38.0%) were in the alert category, while only 4 respondents (4.3%) were classified as normal. These results indicate a high level of social media addiction among female students, with the highest proportion falling into the addict category. This is consistent with the findings of Yunfahnur et al. (2022), who stated that university students often cannot detach from social media and tend to use it excessively for entertainment, such as accessing Instagram, YouTube, or playing online games. Such habits may reduce academic motivation and lead to a dependence on technology for academic task (36). Social media addiction may exacerbate PMS symptoms through both psychological and biological mechanisms. Excessive social media use can trigger chronic stress and activate the HPA axis, leading to increased cortisol levels and disrupting the balance of estrogen and progesterone, which play a key role in the development of PMS. This condition is further aggravated by late-night social media use, which reduces melatonin production and disrupts the circadian rhythm, resulting in poorer sleep quality and more severe PMS symptoms (37). In addition, social media addiction leads to imbalances in neurotransmitters such as

dopamine and serotonin, which play essential roles in mood regulation and pain perception. Disruptions in these neurotransmitters help explain why students with social media addiction are more susceptible to mood swings, irritability, anxiety, and increased pain sensitivity during PMS. These findings are consistent with a study by Mousavi et al. (2025), which reported that students with high levels of addiction have more than a fivefold increased risk of experiencing severe PMS (38).

The high use of social media in the digital era is common not only among adolescents but also among adults, thereby increasing the risk of addiction. The American Psychological Association notes that addiction is not limited to addictive substances but may also arise from behavioral patterns, including excessive internet use (39). Measuring social media addiction requires more than simply assessing screen time; it also involves several behavioral indicators. Griffiths (2000) proposed six core components of social media addiction: salience, withdrawal, tolerance, mood modification, relapse, and conflict (18).

This study also found that the majority of respondents were aged 17–23 years, which is consistent with data reported by Salim et al. (2023), showing that individuals aged 18–24 years constitute the largest social media user group in Indonesia (40). This age range is typically associated with

individuals pursuing higher education. According to Kandell, as cited in Jamaludin et al. (2022), university students are more vulnerable to social media addiction compared to the general population. This vulnerability is linked to a psychological developmental stage known as early adulthood, a transitional period between late adolescence and the beginning of adulthood, which is characterized by emotional changes and identity exploration (39).

Hurlock (1973) further explains that during this phase, individuals begin to seek independence, reduce dependence on their parents, and strive to develop a stronger sense of identity (39). In addition, social media addiction often leads adolescents to spend more time sitting, engaging in less physical activity, and spending prolonged hours online, thereby increasing the risk of PMS through disrupted hormonal regulation and heightened physiological stress. Consistent with this, a study by Nisa et al. (2023) reported that low levels of physical activity are significantly associated with PMS among adolescents and female university students (8).

According to Hombokau (2024), the factors contributing to social media addiction include gender, psychological factors such as stress, social factors such as loneliness, and biological factors such as low self-control (41). The study conducted by B and Hamzah (2020) supports these findings, revealing that stress particularly academic

stress is the most dominant contributing factor among female university students (42). Similarly, a preliminary study by Jamaludin et al. (2022) reported that among ten students from the Faculty of Health Sciences at UIN Syarif Hidayatullah Jakarta, six experienced social media addiction as a result of academic stress (39).

Stress among adolescents can have a significant impact on their health, including reproductive health conditions such as menstruation and premenstrual symptoms. Stress can reduce serotonin levels in the body, thereby disrupting the balance of estrogen and progesterone hormones. This hormonal imbalance contributes to physical PMS symptoms such as breast tenderness and abdominal bloating. A similar explanation is provided by Wiarsini (2023), who states that stress activates the hypothalamic pituitary adrenal (HPA) axis and increases cortisol secretion. Cortisol, in turn, inhibits the production of gonadotropin-releasing hormone (GnRH) and luteinizing hormone (LH), both of which are essential in regulating estrogen and progesterone levels during the menstrual cycle. Consequently, the resulting hormonal imbalance may trigger various PMS symptoms (43).

Association Between Sleep Disturbance and Pre-Menstrual Syndrome Among Health Sciences Students at Universitas Muhammadiyah Purwokerto

Based on the **Table 7**, the bivariate analysis using the Spearman Rank

correlation test showed a correlation coefficient of $p = 0.517$ with a significance value of $p < 0.001$. This indicates a positive relationship with moderate strength between sleep disturbances and Pre-Menstrual Syndrome (PMS). This means that the greater the intensity of sleep disturbances experienced by the respondents, the more likely they are to experience PMS symptoms.

The results of the **Table 2** study also indicated that the majority of female students experienced sleep disturbances, with poor sleep quality reported by 88 participants (95.7%), while only 4 participants (4.3%) exhibited good sleep quality. These findings are consistent with the study conducted by Wiyandini et al. (2018), which revealed that difficulties and disturbances in sleep are common among university students and may negatively affect their health and academic performance (44). Fadlilah et al. (2020) also stated that students' sleep quality is influenced by behavioral and lifestyle changes, with many students experiencing sleep problems, particularly poor sleep quality (45). As presented in **Table 3**, the majority of sixth-semester female students reported sleeping less than 4 hours per night, with 38 out of 56 students in that semester falling into this category. In contrast, a higher proportion of students who reported sleeping more than 6 hours per night was found among fourth-semester students. Overall, this trend indicates that

the higher the semester level, the greater the likelihood of experiencing a decline in sleep duration. Students are required to possess adequate knowledge, skills, and professionalism, which may lead to psychological changes. High levels of academic activities and pressure can trigger stress among students (13). This condition is closely related to the increased academic workload and the pressure of final assignments that are commonly experienced by students in higher semesters (46).

Sleep disturbances refer to conditions in which an individual is dissatisfied with the quality, quantity, or timing of their sleep. These conditions may include difficulties in initiating or maintaining sleep, non-restorative sleep (12). Types of sleep disorders include insomnia, hypersomnia, excessive daytime sleepiness, circadian rhythm disorders, and disturbances caused by insufficient sleep duration or poor sleep hygiene (47). Several internal factors may contribute to sleep disturbances among adolescents, such as unhealthy lifestyle habits including the consumption of caffeinated beverages, smoking, excessive use of electronic devices, and lack of physical activity. Psychological factors such as stress and anxiety also play a role in decreasing sleep quality. Placing a smartphone under or near the pillow during sleep may increase the risk of brain tumors due to exposure to electromagnetic field (EMF) radiation (48).

Electromagnetic radiation emitted by smartphones, particularly when used for prolonged periods or placed in close proximity to the body, may interfere with sleep quality. The radiofrequency (RF) waves produced by such devices can influence the central nervous system, including by reducing the production of melatonin, a hormone essential for regulating the sleep cycle. A decrease in melatonin levels may lead to insomnia, headaches, and fatigue. The habit of using smartphones before sleeping, especially while in bed, further exacerbates this condition due to the combined exposure to screen light and EMF radiation, which disrupts the body's circadian rhythm (49). The safe level of radiation exposure is below 1 W/kg; therefore, it is recommended to maintain a minimum distance of 90 cm between the smartphone and the body while sleeping (48).

Externally, environmental factors also contribute to sleep disturbances among adolescents (12). Gasril et al. (2024) noted that sleep disorders among university students are frequently associated with mental health issues, such as chronic fatigue, depression, stress, low optimism, anxiety, and decreased quality of life (50). This is supported by Sasy and Imamah (2023), who indicated that stress is one of the most common but often unrecognized causes of sleep disturbances (51). Furthermore, Kamila (2024) explained that academic pressure and other external

stressors may trigger and exacerbate sleep problems among university students (52).

According to Haniyah (2024), sleep physiologically affects the nervous system and other bodily structures. During sleep, the body restores neural function and supports essential processes such as protein synthesis. This synthesis is closely related to hormonal regulation, which also influences PMS symptoms. PMS is caused by hormonal imbalance, particularly when estrogen levels exceed progesterone levels. This imbalance affects the function of neurotransmitters such as serotonin, which plays a crucial role in ovulation and the menstrual cycle. Serotonin also influences mood and sleep quality. Therefore, low levels of serotonin can worsen PMS symptoms. Conversely, good sleep quality may help alleviate PMS, whereas poor sleep quality may exacerbate it (34).

CONCLUSION AND RECOMMENDATION

This study concludes that social media addiction and sleep disturbances are contributing factors to the increased risk of premenstrual syndrome (PMS) among female university students. These findings may serve as a foundation for future research involving a broader and more diverse population. Subsequent studies are recommended to include additional variables potentially related to PMS, such as dietary patterns, physical activity, stress levels, and various psychological and social factors. Furthermore, the use of more

advanced analytical methods is recommended to provide a more comprehensive understanding of the factors influencing PMS.

The limitations of this study include challenges encountered during the data collection process, particularly difficulties in coordinating with the academic program and schedule incompatibility between the researcher and respondents, resulting in portions of the questionnaire being completed online. This may have affected consistency in the respondents' understanding of the instructions.

Female adolescents are advised to manage social media use more wisely to prevent addictive usage patterns. Additionally, maintaining healthy sleep habits and avoiding factors that may disrupt sleep quality are important for helping reduce the risk of PMS symptoms.

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