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DERLEME

COVID-19 Pandemi Döneminin Adet Döngüsü ve Premenstrüel Sendrom Üzerindeki Etkisine Genel Bir Bakış

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ÖZ

Yeni koranavirüs hastalığı (COVID-19) tüm dünyada önemli bir halk sağlığı sorunudur. COVID-19 pandemisi, artan dismenore, menstrüel kanama ve artan sıklık, yoğunluk, model, hacim ve Premenstrüel sendrom (PMS) dahil olmak üzere menstrual döngüsünde değişiklikler yaşayan kadınlar hakkında yaygın medya ve blog tartışmalarına yol açmıştır. Premenstrüel sendrom, üreme çağındaki kadınların genel sağlığını ve refahını etkilemektedir. Menstrual döngüsü değişiklikleriyle ilgili veri eksikliği, COVID-19'dan etkilenen kadın sayısını, uzunluklarını ve sonuçlarını sorunlu hale getirmiştir. Menstrual döngüsü, genel sağlık ve esenliğin temel bir göstergesi ve itici gücü olarak kabul ediliyor ve hayati bir işaret olarak anılmaktadır. Bu fenomen hem önemli hem de endişe vericidir. Pandemi COVID-19'un başlamasından sonraki menstrual döngüsü varyasyonları bu çalışmada tanımlanacak, özetlenecek ve eleştirel olarak değerlendirilecektir. Bu, gelecekte yapılması gereken çalışma alanlarını vurgulamaya yardımcı olacaktır. Sonuç olarak Google Scholar ve PubMed'in İngilizce ve Türkçe sürümlerine başvurmuştuk. Menstrüel sendrom, PMSve COVID-19 hakkında çokça atıfta bulunulan birkaç makale vardır.

Anahtar Kelimeler: COVID-19; Menstrual Döngü; Pandemi; Premenstrüel Sendrom

An Overview of the Effect of the COVID-19 Pandemic Period on Menstrual Cycle and Premenstrual Syndrome

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ABSTRACT

A new coronavirus illness (COVID-19) pandemic is an important public health problem across the globe. The COVID-19 pandemic has sparked widespread media and blog debate about women undergoing alterations in their menstrual cycle, including enhanced dysmenorrhea, menstrual bleeding, and increased frequency, intensity, pattern, volume, and premenstrual syndrome (PMS). Premenstrual syndrome affects the overall health and well-being of women of reproductive age. The lack of data on menstrual cycle alterations has made estimating the number of women impacted by COVID-19, its length, and its implications problematic. The menstrual cycle is becoming recognized as an essential indicator and driver of overall health and well-being and has been referred to as a vital sign. This phenomenon is both significant and alarming. Menstrual cycle variations after the commencement of the pandemic COVID-19 will be identified, summarized, and critically evaluated in this study. This will help to highlight areas of study that need to be done in the future. As a result, we consulted the English-and Turkish-language versions of Google Scholar and PubMed. There are several papers on menstrual syndrome, PMS, and COVID-19 that are highly referenced.

Keywords: COVID-19; Menstrual Cycle; Pandemic; Premenstrual syndrome

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INTRODUCTION

Menstruation, which happens every month throughout a woman's life, is viewed as a sign of wellbeing. However, the menstrual cycle and the symptoms of PMS have an unpleasant impact on the lives of the majority of women (1). Menstruation-related PMS may be identified by a woman reporting at least one of the six types of symptoms listed by the American College of Obstetricians and Gynecologists (such as irritability, anxiety, depression, edema, breast pain, and headaches) during the five days leading up to her period, as well as during the three preceding menstrual cycles (2,3).

It is worth mentioning that PMS is detected at the lowest incidence (12%) in France and at the maximum prevalence (98%) in Iran. PMS is also quite widespread in Turkey, with studies revealing that it occurs at a high frequency (66–91.8%), especially among young women (4).

Over half of menstruating women worldwide deal with this disorder and exhibit at least some of these symptoms, which include stomach pain, anxiety, shortness of breath, crying episodes, melancholy, irritability, and limb swelling. Around 5-8% of women globally suffer from moderate-to-severe symptoms that cause substantial pain or functional impairment. And roughly 20% to 30% of women are affected, while 3% to 8% of women match diagnostic criteria for premenstrual dysphoric disorder (PMDD). Obviously, living with this problem has a severe effect on a woman's quality of life (1,3,4,5).

A new coronavirus illness (COVID-19) occurred in Wuhan, China in 2019, causing global alarm (7–9). COVID-19 has impacted negatively on global health systems, affecting every aspect of human existence (10) . On March 15, 2020, the (WHO 2020) declared the current COVID-19 outbreak a pandemic. Governments throughout the globe have enforced varying degrees of strict quarantine restrictions for people to preserve social isolation and prevent disease transmission (9,11).

The COVID-19 pandemic has sparked widespread media and blog debate about women undergoing alterations in their menstrual cycle, including enhanced dysmenorrhea, menstrual bleeding, and increased frequency, intensity, pattern, and volume, as well as PMS. The lack of data on

menstrual cycle alterations has made estimating the number of women impacted by COVID-19, its length, and its implications problematic (9).

PMS affects the overall health and well-being of women of reproductive age. South Asian Research found that menstrual cycle stress from COVID-19 worsens quality of life and worsens PMS symptoms (3). Lack of menstrual hygiene products, cultural taboos, and lack of understanding about menstruation all contribute to this issue in low- and middle-income countries (3).

Some women experienced heavy (menorrhagia) or frequent (metrorrhagia/ polymenorrhagia) menstrual bleeding, as well as postmenopausal hemorrhage, after getting the vaccination (12). Vaccine-induced thrombocytopenia may potentially have an impact. Women may soon go through a COVID -19 pandemic "post-traumatic" phase, extending the menstrual cycle irregularity between them (13).

Menstrual cycles are increasingly being recognized as "vital signs" of general health and well-being. Furthermore, roughly 26% of the world's population is of reproductive age, so menstruation impacts a huge number of people (14).

However, there is no sufficient evidence to suggest the effect of the COVID-19 pandemic on PMS and menstrual cycles (15).

Moreover, since the occurrence of PMS is relatively high, it is critical for women in general, and particularly nurses and healthcare professionals, to be aware of it (4).

Therefore, this study investigated an overview of the effect of the COVID-19 pandemic period on the menstrual cycle and PMS. In this study, Google Scholar and PubMed in both English and Turkish were used to explore this issue. This research also covers the most frequently cited papers on the menstrual cycle, PMS, and the COVID-19 outbreak.

Menstrual cycle and premenstrual syndrome

In women, the menstrual cycle is an essential biological pattern that is characterized by substantial periodic variations in endogenous estrogen and progesterone levels. Estrogen and progesterone change on a regular basis (and may be detected), resulting in vastly different temporal hormonal patterns, which can be used to identify distinct periods of the menstrual cycle (16).

The term premenstrual syndrome (PMS), coined by Frank in 1931, refers to the somatic, cognitive, emotional, and behavioral clinical manifestations that occur mostly during the luteal phase of the menstrual cycle and resolve quickly or throughout a few days (7 to 14 days) after the beginnings of menstruation (5,17–19). The National Institutes of Health convened a multidisciplinary consensus meeting on PMS in the mid-1980s, which resulted in criteria that were recognized by the Diagnostic and Statistical Manual III (DSM III) to identify the severe form of this condition. It was originally known as Late Luteal Phase Dysphoric Disorder (LLPD) before being renamed Premenstrual Dysphoric Disorder (PMDD) (1).

However, measuring the exact prevalence of PMS is problematic because of the large variety of treatment choices, the lack of agreement in diagnostic and treatment criteria, and the effect of unique cultural customs. Several studies in different countries suggest a potential association between PMS and stress in women with greater levels of educational accomplishment than in women without such levels of education (17).

Until recently, the origin of PMS has remained a mystery. Insulin resistance, sensitivity to endogenous hormones, inadequate hypothalamic-pituitary-adrenal axis function, dietary deficiencies, glucose metabolism instability, fluid and electrolyte insufficiency may be to blame (20).Low vitamin D and calcium levels during the luteal phase may potentially cause or exacerbate PMS symptoms. Taking calcium and vitamin D supplements may help eliminate or reduce PMS symptoms. Vitamin D and calcium-rich diets have also been demonstrated to lower PMS symptoms (20). A family history of dyslipidemia and increased cholesterol levels are all connected with PMS among incoming female university students (21). Prevalence of PMS was frequent among female college students and was also connected to excessive coffee drinking and frequent fast-food consumption and has dietary and metabolic reasons (22).

Different studies in numerous countries demonstrate that women with a higher level of education had more severe PMS symptoms, establishing a link between stress and PMS. Families of PMS patients have raised concerns

about child welfare and domestic violence. Thus, PMS may have an effect on not only the woman, but also on her family and the whole population (17).

The impact of COVID-19 on the menstrual cycle and premenstrual syndrome

In the research in Table 1, we mentioned the incidence of PMS after the onset of the pandemic, the most common symptoms of it, and how COVID-19 affects the menstrual cycle, PMS, and our daily life.

First of all, the incidence of PMS during the pandemic among 190 female nursing students was 77.9% (23). Whereas in another research done in a Japanese high school, it was discovered that the PSQ (premenstrual syndrome questionnaire score) considerably increased in the PTSS (Posttraumatic Stress) group by (32.8%) during the pandemic compared to data gathered in 2019 before the pandemic, which was (25.4%) and 49 (5.6%) (24). Women with PTSS are younger and have higher menstrual pain (24). Despite this, 46% of women experienced a change in their menstrual cycle since the pandemic began, compared to 25% before the pandemic (25). In a further experiment conducted in Jorden, 49.9% of 385 female medical students reported severe PMS during COVID-19 compared to before, which was 36.9% (26).

Many women's menstrual cycle features have changed as a result of the COVID-19 pandemic, according to anecdotal evidence shared online and a few high-quality scientific studies (15). During the lockdown, 52% of females reported a change in menstruation (27). More than half of 210 women's menstrual cycles had changed (54%) (28). 28.7% of Turkish female healthcare workers aged 18–40 had irregular menses (29). Most women (39%) said they hadn't changed their menstrual habits, although 24% said they had (30). 60% of women reported changes in their menstrual cycle, with 45% reporting irregular menstruation (35.0%) (31). In a study conducted in Mumbai, India, the results showed that more than half (78%) of the 155 respondents observed alterations in their menstrual periods (32). In another study applied in Pakistan, COVID-19 has impacted 59.75% of study participants' mental health (33). Moreover, in a study that was among students of the Faculty of Health Sciences during COVID-19, out of 500 students, 73% had severe PMS (34).

Second, the incidence of the most common PMS, according to the studies in Table 1. Below, shows that 15.3% of students experienced longer PMS symptoms and 22% had more severe symptoms (23). The students reported abdominal pain at 78.6%, mood changes at 76.3%, and abdominal bloating-tension disorders at 68.7% as the highest PMS complaint (23). Whereas in different study, PMS symptoms such as mastalgia (73,5%), fatigue (89,1%), headache (70,6%), palpitation (57,9%), emotional (95,8%) and sleep issues (76,4%), genital rash and ulcer (26,8%), itching in women (64,7%) were more common than usual during COVID-19 (26). Moreover, PMS of weakness (75%), dysmenorrhea (64%), and low back pain (57%), were the most reported symptoms by midwifery students (35).

Besides, in another study that was conducted in Japan, there was a significant difference between the PTSS (5,82%) and non-PTSS (4.62%) groups in the severity of all symptoms except “physical symptoms” and “decreased social activity”, respectively, as compared to the 2019 group at (4.63%) (24). Furthermore, out of 1031 women of reproductive age who were surveyed, 53% experienced worsened PMS, 18% new menorrhagia, and 30% new dysmenorrhea, and 9% missed periods who had not previously missed periods (25). In another study that applied in the USA (United State Of America) PMS (50%) and cycle duration (34%) were altered (28).

Finally, the impact of COVID-19 on menstruation and premenstrual syndrome, as well as how this affects our everyday lives. The amount of time spent exercising and dieting was raised by 30 minutes a week. By contrast, the deterioration of women's diets was 50%, while the improvement was just 23%. By (50 %), depression and anxiety increased; stress, loneliness, binge eating, and alcohol usage all raised (36%). More than two-thirds of respondents (48 %) reported experiencing stress at work, difficulty receiving healthcare, family illness or grief (15 %), (70%) tracked their cycles with an app or diary and (45%) reported decreased libido (25).

Period duration before COVID-19 was (6.3%), compared to (5.9%) during the pandemic, and pad usage per day prior to the epidemic was (3.7%), compared to (3.2 %) during the pandemic. Thus, during the COVID-19 pandemic, period duration

and pad usage dropped. Menstrual cycle timing was unaffected by the pandemic (before it was 28.2 whereas during it was 27.9), and the severity of dysmenorrhea was similar before and during (5,3 %) (36).

Domestic abuse increased 20% among 200 women during the COVID-19 pandemic. 38 women (19%) had gynecological infection symptoms, compared to 51 prior to that (25.5%). Also, calls (8.5% vs. 17.5%) and medical visits for period discomfort and birth canal infections diminished (5.5 % versus 23%). Contraception usage has been falling sharply (59.5%) (37).

46.3 % of the population was depressed, anxious, or under stress. More than half of females with moderate depression (68.25%) reported menstrual dysmenorrhea. 65% had early or late periods, 11.25% suffered oligomenorrhea, whereas 15% had polymenorrhagia as a result of COVID-19 (33). Moreover, 37.8% of students increased their appetites, while 39.2% increased their tea and coffee intake, while 44.1 reduced their physical activity. 56.4 % gained or lost weight. PMS increased by (57.3%) and sleep patterns changed by (84.8%) (35). After the outbreak, fewer individuals used contraception (37), in another study show that out of 1031 about 23% used hormonal contraception (25).

In a study conducted in May 2020, it was found that painkiller usage or quantity (before was 1.4 whereas during it was 1.5), which means that there was no noticeable change. (36). Whereas another study found that the usage of herbal treatment before COVID-19 was 96%, where after it was 73% and NSAID (Non-steroidal anti-inflammatory) drug usage before COVID-19 was 58%, where after it was 67%, this suggests that dysmenorrhea treatment was decreased compared with before the pandemic (26)

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Table 1. Summary of studies regarding to COVID 19, menstrual cycle and premenstrual syndrome

Study authors	Tittle	Design	Data collection and sample characteristics	Main findings
Yüksekol, Zelal, and Nazik 2021 (23).	Investigation of The Relationship Between Premenstrual Syndrome Symptoms and COVID-19 Psychological Distress in Nursing Students	cross-sectional descriptive	On April 10-20, 190 female nursing students from the Faculty of Health Sciences in Turkey took part in the study. The survey contains three parts: Gençdogan established the PMS scale to measure premenstrual symptoms and intensity.	77.9% of the students had PMS. During the pandemic, 15.3% of students experienced longer PMS symptoms and 22% had more severe symptoms. The students reported abdominal pain at 78.6%, mood changes at 76.3%, and abdominal bloating-tension disorders at 68.7% as the highest PMS complaint.
Sharp et al. 2021 (15).	The COVID-19 pandemic and the menstrual cycle: research gaps and opportunities	A list of outstanding research questions and potential approaches to address them	This study assesses the scientific literature and recommends further research. For the COVID-19 outbreak, they discovered seven small papers. Periodicals containing menstrual cycle content were assessed pre- and post-	Many women's menstrual cycle features have changed as a result of the COVID-19 pandemic, according to anecdotal evidence shared online and a few high-quality scientific studies. These changes could be the result of stress and behavioral changes associated with the pandemic or the actual COVID-19 illness.

			pandemic. Last search: 8 May 2021.	
Takeda, Kai, and Yoshimi 2021 (24).	Association between Premenstrual Symptoms and Posttraumatic Stress Symptoms by COVID-19: A Cross-Sectional Study with Japanese High School Students	cross-sectional type	1351 female high school students from Sendai, northern Japan, were questioned in December 2020. Female students (871) completed the survey. The selection criteria included COVID-19 and the Impact of Event Scale-Revised. It was 25 or fewer for each category. Was 49 students PTSS (Posttraumatic Stress) (5.6%) and 822 (94.4%) non-PTSS (Non-Posttraumatic Stress).	49 (5.6%) Women with PTSS are younger and have higher menstrual pain. PSQ score stayed the same in non PTSS (24.8 %) group, it respectively increased in PTSS (32.8%) group compared to data uploaded in 2019 (before pandemic) (25.4 %). There was a significant difference between the PTSS 5,82 % and non-PTSS 4.62 % groups in the severity of the majority of the symptoms.
Phelan, Behan, and Owens 2021 (25).	The Impact of the COVID-19 Pandemic on Women's Reproductive Health	This was an anonymous observational study	They created a digital survey (www.typeform.com). All women of reproductive age were invited through social media (Facebook, Twitter).	70% used a cycling-tracking app or a diary. 23% used hormonal contraceptive. The pandemic altered women's menstrual periods by 46%. PMS (53%) became worse, new menorrhagia (18%), and dysmenorrhea (30%) got worse. 9% missed periods 45 % had less libido. Diet and exercise increased

			Diet, fitness, and work habits were mostly discussed. 1031 women of reproductive age were surveyed. Amenorrhoeic women or mothers were excluded.	by 30 minutes weekly. Women's diets deteriorated by 50% while by other improved 23%. Depression, anxiety increased by (50%), stress, loneliness, binge eating, and alcohol use increased (36%). Work stress (48%), problem obtaining healthcare and family sickness or bereavement (15%) increased.
Bruinvels et al. 2021 (27).	How lifestyle changes within the COVID-19 global pandemic have affected the pattern and symptoms of the menstrual cycle	cross-sectional descriptive	The Nottingham Trent University's institution's ethics committee. 749 Participants were requested from May 27 through June 17, 2020.	During the lockdown, 52% of females reported a change in menstruation.
Demir, Sal, and Comba 2021 (36).	Triangle of COVID, anxiety and menstrual cycle	cross-sectional online survey study	During the Covid-19 pandemic in May 2020, reproductive-age women's menstrual cycle characteristics were examined for links to anxiety and stress. Using paired sample t-tests and chi-square tests to compare before and after COVID-19. The Pearson	Period duration before COVID-19 was 6.3% whereas during pandemic was 5.9% and pad use per day before pandemic was 3.7% whereas during pandemic was 3.2%. So, period duration and pad use decreased during the COVID-19 pandemic. The pandemic had no effect on menstrual cycle timing (before was 28.2 whereas during was 27.9), dysmenorrhea severity was the same before and during (5,3%), or

			correlation test was used to show the relationships.	painkiller usage or quantity (before was 1.4 whereas during was 1.5).
Ozimek et al. 2021 (28).	Impact of Stress on Menstrual Cyclicity During the Coronavirus Disease 2019 Pandemic: A Survey Study	A survey study	An online survey (Qualtrics, Provo, UT, USA) was distributed between July and August 2020. All responders were biologically female, aged 18–45, and living in America.	More over half of 210 women's menstrual cycles had changed (54%) Premenstrual symptoms (50%) and cycle duration (34%) altered.
Aolymat, khasawneh, and Al-Tamimi 2022 (26).	COVID-19-Associated Mental Health Impact on Menstrual Function Aspects: Dysmenorrhea and Premenstrual Syndrome, and Genitourinary Tract Health	A cross-sectional study	This survey study began when the COVID-19 pandemic reached Jordan (after a 10-months duration). The study exclusively covered single, 18+ female medical students.	49.9% of 385 of female medical student reported severe dysmenorrhea during COVID-19 compared to before COVID-19 which was 36.9%. PMS symptoms such mastalgia (73,5%), fatigue (89,1%), headache (70,6%), palpitation (57,9%), emotional (95,8%) and sleep issues (76,4%), genital rash and ulcer (26,8%), itching in women (64,7%) were more common than usual during COVID-19. Herbal treatment before COVID-19 was 96% where is after it was 73% and NSAID (Non-steroidal anti-inflammatory) drug usage before

				COVID-19 was 58% where is after it was 67%.
Takmaz et al. 2021 (29).	The impact of COVID-19-related mental health issues on menstrual cycle characteristics of female healthcare providers	A cross-sectional study	A questionnaire was sent to Turkish healthcare women aged 18–40 who had regular periods for over a year previous to the epidemic.	28.7% of Turkish female healthcare workers aged 18–40 had irregular menses.
Aolymat 2021 (37).	Impact of COVID-19 on Domestic Violence, Menstruation, Genital Tract Health, and Contraception Use among Women in Jordan	Cross-sectional study	Jordan, 1-8 September 2020. It was 200 ladies. The data came from an online survey. It was compared to 6-months before the pandemic in terms of kind contraceptive usage, source, and replacement.	Out of 200 women 20% rise in domestic violence was reported during the COVID-19 pandemic. A total of 38 (19%) women reported symptoms of gynecological infections during the COVID-19 pandemic while before was 51 (25.5%). Total lockdown boosted phone calls by (8.5% versus 17.5%). Doctor visits for period cramps and birth canal infections dropped by (5.5% versus 23%). contraceptive use is decreasing significantly (59.5%).
Buran and Gerçek Öter 2021 (30).	Impact of the awareness and fear of COVID-19 on menstrual symptoms in	cross-sectional study	125 women, data were obtained by visual analog scale, menstruation symptoms scale,	Most women (39%) said they hadn't changed their menstrual habits, although 24% said they had.

	women: a cross-sectional study		awareness and fear of COVID-19 scales.	
Khan et al.2022 (31).	SARS-CoV-2 infection and subsequent changes in the menstrual cycle among participants in the Arizona Cohort study	Prospective cohort study	An investigation involving several Arizona health agencies and testing institutes revealed SARS-CoV-2-positive individuals in May 2020.	60% of women reported changes in their menstrual cycle, with 45% reporting irregular menstruation (35.0%).
Chavan et al. 2021 (32).	A survey on the impact of COVID-19 infection on menstrual cycle following second wave of COVID infection in a tertiary care center in Mumbai	An online survey	From 22 April to 24 September 2021 at Lokmanya Tilak Municipal Medical College (155) and General Hospital, Mumbai.	Of the 155 respondents, more than half (78%) of women observed alterations in their menstrual periods.
Samo et al. 2021 (33).	Association of COVID19-affected Mental Health with Menstrual Abnormalities Among University Students: A Cross	Across sectional study	University of Sindh Jamshoro, July-August 2021. A pre-tested questionnaire gathered the data. The study comprised single female students. The DAS (Depression	46.3 % of the population was depressed, anxious, or under stress. More than half of females with moderate depression (68.25%) reported menstrual dysmenorrhea. 65 % had early or late periods, and 11.25 % suffered oligomenorrhea as a result of COVID-19. 15% had polymenorrhagia.

	sectional study from Pakistan.		Anxiety Stress) Scale assessed mental health.	
Koyucu and Ölmez 2021 (34).	Determination of premenstrual syndrome in students of the Faculty of Health Sciences during COVID 19	Descriptive cross-sectional type research	This study involved 500 students from a foundation institution. The PMS Scale was used to collect data. The data were analyzed using Cronbach Alpha, mean, and SD.	The study's students were aged 21 to 22 and lived with their families in 66.8% of cases. They said they didn't smoke or drink (85,3%). 19-24.9 BMI, normal weight 61.4 During the pandemic, 40.73% had severe PMS
Kartal and Kaykısız 2020 (35).	Investigation of the relationship between the eating behaviors and the symptoms of the premenstrual syndrome in midwife students during covid 19 pandemic	Descriptive and correlational design	An online survey of 204 first, second, third, and fourth-year midwifery students at a public university found. The "Google Forms" questionnaire link was given with people who agreed to participate. The Personal Information Form, PMSS, and DEBQ (Dutch Eating Behavior Questionnaire) were utilized to collect data.	Midwifery students experienced PMS of weakness (75%), dysmenorrhea (64%) and low back pain (57%). 37.8% increased appetite, 39.2% increased tea and coffee intake, and 44.1% reduced physical activity. 56.4 % gained or lost weight. PMS increased (57.3%), and sleep habits changed (84.8%). PMS included poor mood (77%), exhaustion (73%), nervousness (69.1%), and agitation (59.8%).

CONCLUSION AND SUGGESTION

The COVID-19 pandemic impacted all aspects of our lives, not only our general health but also had a negative effect on the reproductive health of woman and our daily life. According to the findings, COVID-19 has a significant negative impact on menstrual cycle characteristic and premenstrual syndrome (PMS). Also, premenstrual syndrome not only has a negative impact on women's physical well-being but also on their overall quality of life. So, any change ordinary can boost the premenstrual symptoms and as a result, this may have an effect on our work and productivity throughout the day. Consequently, it is critical that women be aware of this issue and understand how they may cope with it, both in their regular lives and in a situation like COVID-19.

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