

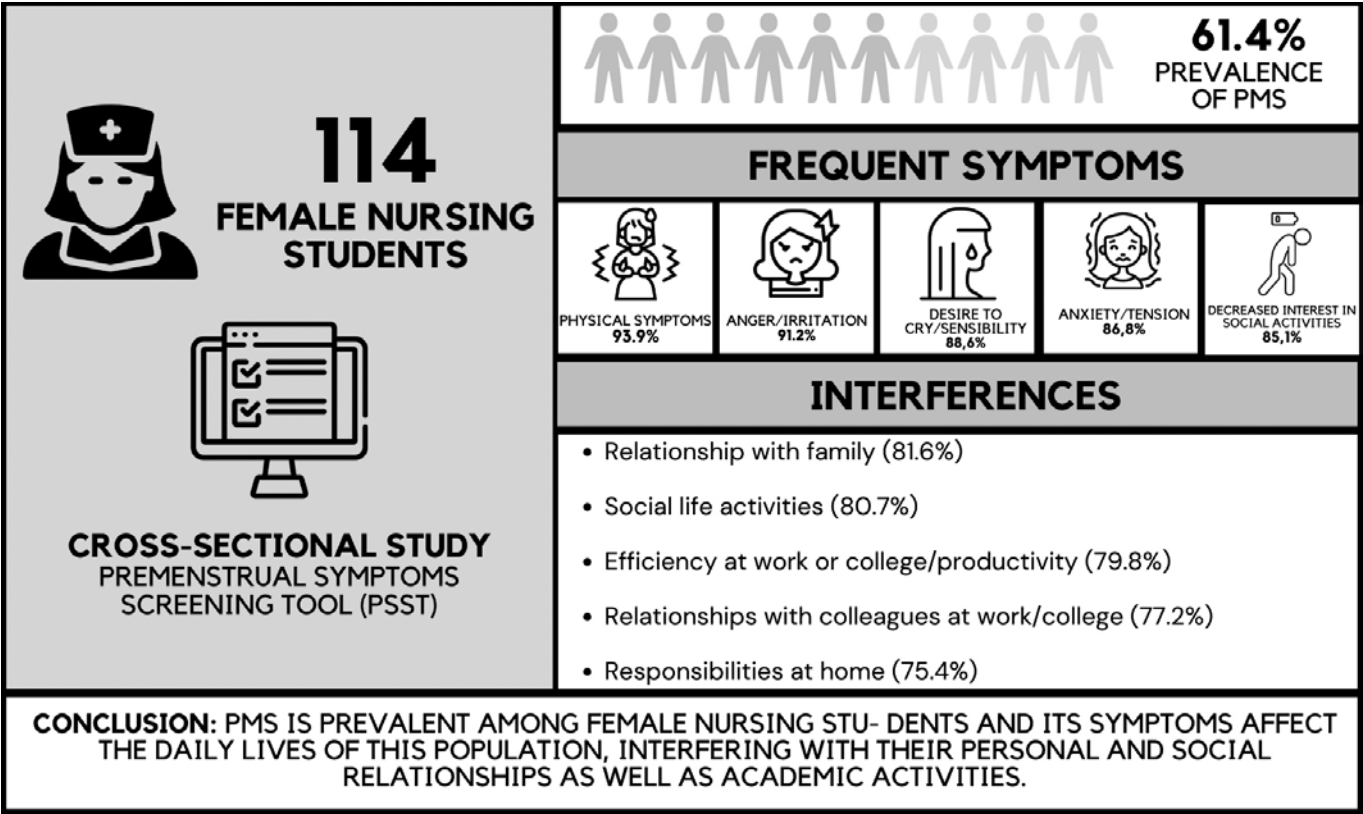
Prevalence of premenstrual syndrome in female nursing students at a public university: cross-sectional study

Prevalência da síndrome pré-menstrual em acadêmicas do curso de enfermagem de uma universidade pública: estudo transversal

Karolyne Fernandes Daronco¹, Lavinia Almeida Muller², Edson Henrique Pereira de Arruda¹

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GRAPHICAL ABSTRACT



Prevalence of premenstrual syndrome in female nursing students at a public university: cross-sectional study

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Karolyne Fernandes Daronco¹, Lavinia Almeida Muller², Edson Henrique Pereira de Arruda¹

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ABSTRACT

BACKGROUND AND OBJECTIVES: Premenstrual Syndrome (PMS) is a set of physical, mood, cognitive and behavioral changes which happens between the two weeks before menstruation, which can hinder a woman's personal, academic, and professional performance. The objective of this study was to identify the prevalence of PMS in female nursing students.

METHODS: A cross-sectional study using a virtual questionnaire on sociodemographic and gynecological characteristics and the Premenstrual Symptoms Screening Tool (PSST) questionnaire, which looks for physical and psychological symptoms of PMS, interference of symptoms in daily life and establishes a positive screening for PMS.

RESULTS: A total of 114 students participated in the study. The most prevalent characteristics were being between 18 and 23 years old, single and in their 5th or 6th academic year. In addition, the majority went through the menarche between 11 and 13 years of age, with menstrual flow of 3-5 days. Of these, 40.4% used hormonal contraceptive methods and 37.7% did not use any type of contraceptive method. The prevalence of PMS was 61.4%. The most frequent symptoms were physical symptoms (93.9%), anger/irritation (91.2%), urge to cry/increased sensitivity (88.6%), anxiety/tension (86.8%) and decreased interest in social activities

(85.1%). These symptoms interfere with relationships with family (81.6%), social life activities (80.7%), efficiency at work or college/productivity (79.8%), relationships with colleagues at work/college (77.2%) and responsibilities at home (75.4%).

CONCLUSION: PMS is prevalent among female nursing students and its symptoms affect the daily lives of this population, interfering with their personal and social relationships as well as academic activities.

Keywords: Menstruation disturbances, Premenstrual syndrome, Quality of life, Students, Women's health.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A síndrome pré-menstrual (SPM) é um conjunto de alterações físicas, de humor, cognitivas e comportamentais, iniciadas entre as duas semanas prévias a menstruação, que podem causar desgastes no rendimento pessoal, acadêmico e profissional da mulher. O objetivo deste estudo foi identificar a prevalência da SPM em acadêmicas do curso de enfermagem.

MÉTODOS: Estudo transversal realizado por meio de um questionário virtual sobre características sociodemográficas e ginecológicas e o questionário *Premenstrual Symptoms Screening Tool* (PSST), que busca sintomas físicos e psicológicos da SPM, interferência dos sintomas no cotidiano, e estabelece uma triagem positiva para SPM.

RESULTADOS: Foram recrutadas 114 acadêmicas da graduação em enfermagem. As características mais prevalentes foram a faixa etária entre 18 e 23 anos, solteiras e cursando o 5^o ou 6^o período do curso. Ademais, a maioria com menarca entre 11 e 13 anos, com fluxo menstrual de 3 a 5 dias. Destas, 40,4% usavam métodos contraceptivos hormonais e 37,7% não usavam nenhum tipo de método contraceptivo. A prevalência encontrada de SPM foi de 61,4%. Os sintomas mais frequentes foram sintomas físicos (93,9%), raiva/irritação (91,2%), vontade de chorar/aumento da sensibilidade (88,6%), ansiedade/tensão (86,8%) e interesse diminuído nas atividades sociais (85,1%). Estes sintomas interferem no relacionamento com a família (81,6%), nas atividades de vida social (80,7%), na eficiência no trabalho ou faculdade/productividade (79,8%), nos relacionamentos com os colegas de trabalho/faculdade (77,2%) e nas responsabilidades de casa (75,4%).

CONCLUSÃO: A SPM é prevalente entre as acadêmicas do curso de enfermagem e seus sintomas afetam o cotidiano desta po-

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HIGHLIGHTS

- Premenstrual syndrome is prevalent among female nursing students.
- The symptoms of premenstrual syndrome affect the daily lives of female nursing students.
- Physical symptoms are the most frequent among nursing students.

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pulação, interferindo nos seus relacionamentos pessoais, sociais e atividades acadêmicas.

Descritores: Distúrbios menstruais, Estudantes, Qualidade de vida, Saúde da mulher, Síndrome pré-menstrual.

INTRODUCTION

Premenstrual syndrome (PMS) is a set of physical, mood, cognitive and behavioral changes that begin between the two weeks prior to menstruation and are alleviated after the onset of menstrual flow, presenting cyclical and recurring characteristics¹⁻³. These changes can have a negative impact on a woman's life, interfering with interpersonal relationships and activities of daily living, hindering personal, academic, and professional performances^{4,5}.

The main symptoms are increase in breast size and sensitivity, edema of the extremities, weight gain, headache, abdominal distension, acne, depression, outbursts of anger, irritability, mood swings, fatigue, depreciation of self-image, altered appetite and social isolation. The intensity of the symptoms varies between women. For most women, the symptoms are mild, but some may experience intense and even disabling symptoms, characterizing the most severe form of PMS, called premenstrual dysphoric disorder (PMDD)^{2,6}.

The etiological mechanism of PMS is idiopathic, but it is known that its origin is multifactorial and may be related to endocrine, neurobiological and genetic factors, such as the susceptibility of some women to hormonal alterations that occur during ovarian cycle, because when there are ovulation inhibitors, such as in pregnancy or menopause, the symptoms of PMS improve⁷.

For effective treatment, it is necessary to diagnose PMS in order to differentiate it from other diseases⁸. However, there are no well-defined universal criteria for its diagnosis, and the recommendation for its screening includes identifying most of the symptoms related to the syndrome, their severity and their pattern of appearance during the menstrual cycle, in order to be able to differentiate PMS from normal changes related to the menstrual cycle^{9,10}.

Therefore, it is important to understand the level of occurrence of PMS and how it can influence a woman's social and academic life specially because it is an issue that is rarely addressed and is associated with various taboos. The present study's objective was to identify the prevalence of PMS among female nursing students by investigating the physical and emotional symptoms related to PMS and its repercussions on daily life.

METHODS

This is a cross-sectional observational study, carried out with female nursing students at the State University of Mato Grosso (UNEMAT) - Campus *Francisco Ferreira Mendes* in the municipality of Diamantino - MT, during the months of September to November 2021. This study was submitted to and approved by UNEMAT's Research Ethics Committee under opinion No. 4.888.843.

The study included female nursing students enrolled at UNEMAT, aged between 18 and 40. The exclusion criteria were wo-

men who did not menstruate for some reason (health problems, continuous use of contraceptives, menopause, pregnant or breast-feeding), since the instrument used to measure PMS was validated for this population^{11,12}. The percentage of the total sample was obtained using a non-probabilistic sampling technique.

The study was carried out using a virtual questionnaire, made available via e-mail using a link from Google Forms, the e-mails were provided by the campus office. The form explained the nature of the study and, after signing the Free and Informed Consent Term (FICT), the participants completed two questionnaires: the structured questionnaire, used to collect data on the sample characteristics, including sociodemographic variables (age, city, religion, marital status and course period) and gynecological variables (menarche, pregnancy, period of menstruation and contraceptive use); and the Premenstrual Symptoms Screening Tool (PSST) questionnaire, validated and adapted to Portuguese by the author¹¹.

PSST is composed of 19 items subdivided into two domains: the first deals with the 14 physical and psychological manifestations of PMS and the second domain has five items that assess the functional impact of premenstrual symptoms. Each item is classified according to a 4-point Likert scale (zero = absent; 1 = mild; 2 = moderate; 3 = severe). The symptoms included in the first domain are: anger/irritation, anxiety/tension, urge to cry/increased sensitivity, depressed mood/despair, decreased interest in work activities, decreased interest in home activities, decreased interest in social activities, difficulty concentrating, fatigue/lack of energy, overeating/craving food, insomnia, hypersomnia, feeling overwhelmed or sensation of losing control and physical symptoms such as headache, bloating, weight gain and joint pain. The second domain relates the impact of these symptoms on efficiency or productivity at work or college, relationships with colleagues at work or college, family, social life activities and responsibilities at home¹¹.

Based on the PSST questionnaire, it was possible to establish a positive screening for PMS using the following criteria: 1) at least five of the premenstrual symptoms from the first domain, classified as moderate to severe; 2) at least one of the first four symptoms from the first domain, which are considered core symptoms, classified as moderate or severe; and 3) at least one item from the second domain, classified as moderate or severe. Participants who did not meet any of these three criteria were classified as having none or mild PMS¹¹.

The information was stored in a special Excel database and descriptive statistics (frequencies and percentages) were used to represent the variables.

RESULTS

The total study population initially consisted of 324 female students duly enrolled on the course. The researchers obtained 127 responses and based on the exclusion criteria, 114 participants were analyzed (Figure 1), characterizing 35.2% of the total population.

Table 1 shows the sociodemographic characteristics of the participants, showing that the most prevalent characteristics were: age

between 18 and 23 (68.4%), single marital status (79.8%) and in their 5th or 6th academic year (26.3%).

Table 2 shows the gynecological characteristics of the participants, showing that most went through their menarche between the ages of 11 and 13 (70.2%) and a higher prevalence of menstrual flow duration of 3 to 5 days (53.5%). As for the use of contraceptive methods, 40.4% used hormonal contraceptives and 37.7% did not use any type of contraceptive method.

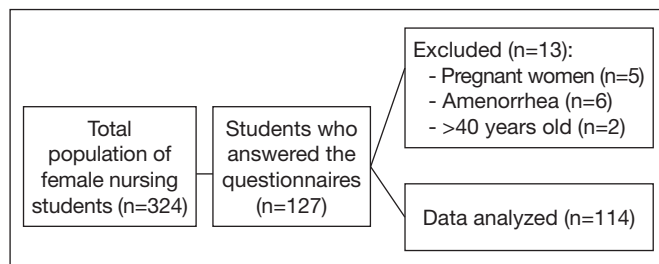


Figure 1. Flowchart of the participant selection process

Table 1. Distribution of the frequency (n) and percentage (%) of the sociodemographic variables of the female students. Diamantino, MT, Brazil, 2021.

Variables	n	%
Age (years)		
18-23	78	68.4
24-29	27	23.7
30-35	7	6.1
36-40	2	1.8
Marital status		
Single	91	79.8
Married	17	14.9
Stable union	5	4.4
Widowed	0	0.0
Divorced	1	0.9
Course period		
1 st - 2 nd semester	26	22.8
3 rd - 4 th semester	16	14.0
5 th - 6 th semester	30	26.3
7 th - 8 th semester	19	16.7
9 th - 10 th semester	23	20.2

Through positive screening for PMS, the prevalence of PMS among the students was 61.4%, as shown in table 3.

Table 4 shows the prevalence and intensity of symptoms reported in the PSST by the participants. The most frequent symptoms were physical symptoms (93.9%), anger/irritation (91.2%), urge to cry/increased sensitivity (88.6%), anxiety/tension (86.8%) and decreased interest in social activities (85.1%), all of which were more than 50.0% moderate or severe.

Table 5 shows the prevalence of interference in daily life caused by the symptoms reported in the PSST, showing high interference in relationships with family (81.6%), social life activities (80.7%), efficiency at work or college/productivity (79.8%), relationships with colleagues at work/college (77.2%) and responsibilities at home (75.4%). Severe and moderate intensity interferences were most frequently reported in relationships with family (19.3%) and social activities (41.2%), respectively.

Table 2. Distribution of the frequency (n) and percentage (%) of gynecological variables of the students. Diamantino, MT, Brazil, 2021.

Variables	n	%
Menarch ages (years)		
8-10	17	14.9
11-13	80	70.2
>14	17	14.9
Menstrual flow (days)		
<3	1	0.9
3-5	61	53.5
5-7	44	38.6
>7	8	7.0
Contraceptive method		
Hormonal	46	40.4
Non hormonal	25	21.9
None	43	37.7

Table 3. Frequency (n) and percentage (%) distribution of the premenstrual symptom screening tool (PSST) among female students. Diamantino, MT, Brazil, 2021.

Variables	n	%
Presence of PMS	70	61.4
Absence of PMS	44	38.6

Table 4. Distribution of frequency (n) and percentage (%) of symptoms reported in the premenstrual symptom screening tool (PSST) by female academics. Diamantino, MT, Brazil, 2021.

Variables	Absent n (%)	Mild n (%)	Moderate n (%)	Severe n (%)
Anger/irritation	10 (8.8)	26 (22.8)	51 (44.7)	27 (23.7)
Anxiety/tension	13 (11.4)	33 (29.0)	39 (34.2)	29 (25.4)
Urge to cry/increased sensitivity	13 (11.4)	23 (20.2)	36 (31.6)	42 (36.8)
Depressed mood/despair	26 (22.8)	31 (27.2)	34 (29.8)	23 (20.2)
Decreased interest in work activities	24 (21.1)	38 (33.3)	36 (31.6)	16 (14.0)

Continue...

Table 4. Distribution of frequency (n) and percentage (%) of symptoms reported in the premenstrual symptom screening tool (PSST) by female academics. Diamantino, MT, Brazil, 2021 – continuation.

Variables	Absent n (%)	Mild n (%)	Moderate n (%)	Severe n (%)
Decreased interest in home activities	28 (24.6)	35 (30.7)	35 (30.7)	16 (14.0)
Decreased interest in social activities	17 (14.9)	39 (34.2)	33 (29.0)	25 (21.9)
Difficulty concentrating	29 (25.4)	37 (32.5)	30 (26.3)	18 (15.8)
Fatigue/lack of energy	26 (22.8)	33 (28.9)	31 (27.2)	24 (21.1)
Overeating/craving for food	25 (21.9)	22 (19.3)	27 (23.7)	40 (35.1)
Insomnia	65 (57.0)	22 (19.3)	18 (15.8)	9 (7.9)
Hypersomnia	36 (31.6)	22 (19.3)	25 (21.9)	31 (27.2)
Feeling overwhelmed or sensation of losing control	23 (20.2)	38 (33.3)	29 (25.%)	24 (21.1)
Physical symptoms (headache, swelling, weight gain, joint pain)	7 (6.1)	20 (17.5)	41 (36.0)	46 (40.4)

Table 5. Distribution of the frequency (n) and percentage (%) of the interference of symptoms reported in the premenstrual symptom screening tool (PSST) by female academics. Diamantino, MT, Brazil, 2021.

Variables	Absent n (%)	Mild n (%)	Moderate n (%)	Severe n (%)
Efficiency at work or college/productivity	23 (20,2)	37 (32,5)	46 (40,3)	8 (7,0)
Relationships with work/college colleagues	26 (22,8)	41 (36,0)	35 (30,7)	12 (10,5)
Your relationship with your family	21 (18,5)	29 (25,4)	42 (36,8)	22 (19,3)
Your social life activities	22 (19,3)	29 (25,4)	47 (41,2)	16 (14,1)
Your responsibilities at home	28 (24,6)	37 (32,5)	38 (33,3)	11 (9,6)

DISCUSSION

Many women have to deal with symptoms of PMS. This study found a high prevalence of PMS (61.4%) among female nursing students. When exploring the symptoms associated with this phase of the menstrual cycle reported by the students, the following were found: physical symptoms and emotional symptoms, such as anger/irritation, anxiety/tension, urge to cry/increased sensitivity and decreased interest in social activities. These symptoms interfere with their relationships with family, social life activities, efficiency at work or college/productivity, relationships with work/college colleagues and responsibilities at home.

The most frequent symptoms of PMS found in this study are consistent with the literature. Among 1115 university students at a university in central-western Brazil, the main symptoms of PMS were: physical symptoms, urge to cry/increased sensitivity, anxiety/tension and anger/irritation¹³. It was also found that 86.0% of the university students complained of anger/irritation, similarly to the outcomes of the present study (91.2%), and it was the second most reported symptom among the students¹⁴.

In the UK, a study found that more than 90.0% of participants reported symptoms in the period prior to menstruation, such as anxiety, depression, mood, or physical alterations. The duration, frequency and severity of these symptoms varied between the women, pointing out that some of these women may have little or no disruption to their daily activities, while others experience symptoms that intensely hinder them¹⁵.

The impact of symptoms can be quite considerable for women, their families and society, considering that women can

experience around 3000 days of difficult or problematic premenstrual symptoms over the course of their reproductive years¹⁶. Furthermore, women with PMS have a higher risk of depression¹⁶.

Physical symptoms were the most frequent in this study (93.9%), including headache, bloating, weight gain and joint pain. Bloating is a common complaint in 92.0% of women in the second phase of the menstrual cycle¹⁷. One study looked at the common symptoms among university students during the week before menstruation and found that 45.5% reported headaches, 34.4% reported feeling weight gain and 38.1% reported swelling in some part of the body, which shows that physical symptoms are common in this phase of the menstrual cycle¹⁸.

Emotional symptoms can be explained by the hormonal variations that occur during the menstrual cycle, especially estrogen and progesterone during the premenstrual period. Estrogen, which is high in the follicular phase, has an antidepressant action and causes an improvement in mood, while progesterone, which shows an increase in the luteal phase, is associated with a decrease in serotonin, causing a depressive effect, showing that PMS occurs in the luteal phase, when progesterone levels are altered, justifying such behavior changes in the studied population^{19,20}.

These hormonal variations affect neural circuits related to emotional processing, resulting in alterations in emotional responses and the perception of emotional stimuli, contributing to the intensification of anger/irritation and the urge to cry/increased sensitivity during this phase^{21,22}. In addition, these hormonal variations can interact with psychosocial stress factors, which exacerbates the response to anxiety/tension, as well

as affect the release of dopamine, a neurotransmitter associated with motivation and pleasure, which explains the decreased interest in social activities²³.

A symptom that, despite not being among the most frequently mentioned, but which is also important, showed a high frequency: overeating/craving food (78.1%). These changes in eating behavior are common during PMS, as the interest in ultra-processed food rich in sugars and fats is intensified, which can have negative consequences for women's health²⁴.

The high prevalence of the symptom of overeating/food cravings found is a reason for concern due to the association between excessive consumption of sweets, fast food, fried meals and low intake of vegetables and fruit with the prevalence of PMS^{16,25-27}. In addition, university students with healthy eating habits tended to be less likely to have PMS¹³. This demonstrates the need to better monitor the diet of university students in order to prevent overweight and chronic diseases associated with obesity.

The prevalence of PMS among university students was 61.4%, similarly to other studies which have indicated a prevalence of between 37.0% and 87.5% among university students^{13,16,25,28-30}. It is worth pointing out that this indicates a positive screening for PMS, which does not confirm the diagnosis, but is useful for a possible more detailed investigation of the symptoms.

What differentiates this syndrome from the common symptoms of the premenstrual period would be its significant impact on women's conceptions of daily life, causing suffering and loss of quality of life. Another aspect is that the symptoms are evident in at least two consecutive cycles, cease within four days of the start of menstruation and do not appear after the 12th day of the cycle³¹.

To date, there have been no reports of a laboratory diagnosis for PMS. For this reason, diagnostic criteria for PMS have been created through interviews and questionnaires, such as the one used in this study, the validated PSST questionnaire, which is considered easy and quick to apply, and is effective in screening diagnoses for possible investigation of PMS, even without a diagnosis itself³².

In addition, the American College of Obstetricians and Gynecologists diagnoses PMS when a woman develops physical symptoms (change in appetite, mastalgia, headaches, fatigue, cramps, joint or muscle pain) and emotional symptoms (bouts of anger, sadness, loneliness, anxiety, insomnia, hypersomnia, depressed mood, marked affective lability, libidinal alterations, sensation of losing control, mental confusion and lack of concentration) in the luteal phase of the period. At least one of these symptoms must be present in the five days prior to menstruation and for at least three consecutive menstrual cycles³³. The World Health Organization defines health as "the state of complete physical, mental and social well-being and not merely the absence of disease"³⁴. Therefore, if PMS affects the quality of life of a woman, she is not in a complete state of health. PMS can cause discomfort and difficulties in relationships during this period. For this reason, there is a need to focus on women during this phase.

Treatment for PMS is mainly aimed at relieving symptoms and can be non-pharmacological, pharmacological, or surgical. The

main pharmacological methods include a combination of oral contraceptives, the use of selective serotonin reuptake inhibitors and gonadotropin-releasing hormone analogues. Non-pharmacological methods include changes in lifestyle, cognitive-behavioral therapy and diet supplements³⁵.

Around 80.0% of women suffering from PMS seek complementary and alternative therapies. Vitamin D and calcium have recently received special attention for the treatment/relief of PMS symptoms. The role of vitamin D in reducing the risk of PMS continues to be studied and seems to be mainly related to the modulation of calcium concentrations, certain neurotransmitters, and sex steroids³⁶.

Another approach, sometimes overlooked, is health education and counseling services, as part of the general health service through guidance, for example, on the need to practice physical activity and maintain a healthy diet. It is important for health professionals to invest in the process of making patients aware of the symptoms and behavioral alterations present in the premenstrual period, encouraging self-knowledge and empowerment of women, as well as quality of life³⁷.

The limitations of this study include not investigating risk factors for PMS, such as lifestyle habits, including alcohol consumption, eating habits, smoking, and physical activity, as well as not investigating the diagnosis of depression, which is also a risk factor for PMS³⁷.

Future studies should investigate PMS among university students recruiting a larger sample and including investigations into factors that may be associated with PMS. In addition, it would be important to use a method for diagnosing and excluding participants with depression or other psychiatric disorders.

One of the strengths of the present study is that it made it possible to identify that a significant proportion of female college students reported some kind of symptom in the period before menstruation, i.e. possible outcomes for screening for PMS. Research in this area is needed due to the low number of studies on the topic. There is a need to contribute to the research of the etiology of PMS, as well as to encourage and contribute to health professionals to identify PMS and thus devise strategies for its management with a comprehensive view to the health of university students.

CONCLUSION

The study showed that PMS was prevalent among female nursing students and that its symptoms affect the daily lives of this population, interfering with their relationships with family, social life activities, efficiency at work or college/productivity, relationships with colleagues at work/college and responsibilities at home. Thus, measures for a more accurate diagnosis and health interventions are needed for this population.

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AUTHORS' CONTRIBUTIONS

Karolyne Fernandes Daronco

Statistical analysis, Data Collection, Conceptualization, Resource Management, Research, Methodology, Writing - Preparation of the original, Software, Validation

Lavinia Almeida Muller

Statistical analysis, Writing - Preparation of the original, Writing - Review and Editing, Supervision, Visualization

Edson Henrique Pereira de Arruda

Statistical analysis, Resource Management, Project Management, Writing - Preparation of the original, Writing - Review and Editing, Software, Supervision, Visualization

REFERENCES

- Ministério da Saúde. Protocolos da Atenção Básica: Saúde das Mulheres. Instituto Sírio-Libanês de Ensino e Pesquisa. Brasília: Ministério da Saúde. 2016. 231p. Disponível em: chrome-extension://efaidnbmnnnibpajpglclefindmkaj/https://bvsm.sau.de.gov.br/bvs/publicacoes/protocolos_atencao_basica_saude_mulheres.pdf. Acesso em: 11/10/2023.
- Valadares GC, Ferreira LV, Correa Filho H, Romano-Silva MA. Transtorno disfórico pré-menstrual - revisão - conceito, história, epidemiologia e etiologia. *Rev Psiquiatr Clín*. 2006;33(3):117-23.
- Marván ML, Cortés-Iniestra S. Women's beliefs about the prevalence of pre-menstrual syndrome and biases in recall of pre-menstrual changes. *Health Psychol*. 2001;20(4):276-80.
- Azevedo MRD. Influências dos fatores individuais e sócio-culturais na ocorrência da síndrome pré-menstrual (SPM) em adolescentes. Tese (Doutorado) - Faculdade de Medicina da Universidade de São Paulo, São Paulo, 2005.
- Mohebbi M, Akbari SAA, Mahmodi Z, Nasiri M. Comparison between the lifestyles of university student with and without premenstrual syndromes. *Electron Physician*. 2017;9(6):4489-96.
- Federação Brasileira das Associações de Ginecologia e Obstetrícia (FEBRASGO); Sociedade Brasileira de Medicina da Família e Comunidade (SBMFC). Tensão Pré-Menstrual. 2011. 14p. Disponível em: chrome-extension://efaidnbmnnnibpajpglclefindmkaj/https://amb.org.br/files/_BibliotecaAntiga/tensao_pre_menstrual.pdf. Acesso em: 11/10/2023.
- Ryu A, Kim TH. Premenstrual syndrome: a mini review. *Maturitas*. 2015;82(4):436-40.
- Freeman EW. Premenstrual syndrome and premenstrual dysphoric disorder: definitions and diagnosis. *Psychoneuroendocrinology*. 2003;28(Suppl 3):25-37.
- Ismaili E, Walsh S, O'Brien PMS, Bäckström T, Brown C, Dennerstein L, Eriksson E, Freeman EW, Ismail KMK, Panay N, Pearlstein T, Rapkin A, Steiner M, Studd J, Sundström-Paromma I, Endicott J, Epperson CN, Halbreich U, Reid R, Rubinow D, Schmidt P, Yonkers K; Consensus Group of the International Society for Premenstrual Disorders. Fourth consensus of the International Society for Premenstrual Disorders (ISPM): auditable standards for diagnosis and management of premenstrual disorder. *Arch Womens Ment Health*. 2016;19(6):953-8.
- O'Brien PM, Bäckström T, Brown C, Dennerstein L, Endicott J, Epperson CN, Eriksson E, Freeman E, Halbreich U, Ismail KM, Panay N, Pearlstein T, Rapkin A, Reid R, Schmidt P, Steiner M, Studd J, Yonkers K. Towards a consensus on diagnostic criteria, measurement and trial design of the premenstrual disorders: the ISPM Montreal consensus. *Arch Womens Ment Health*. 2011;14(1):13-21.
- Câmara RA, Kohler CA, Frey BN, Hyphantis TN, Carvalho AF. Validação da versão em português do Brasil do Premenstrual Symptoms Screening Tool (PSST) e associação dos escores do PSST com a qualidade de vida relacionada à saúde. *Rev Bras Psiquiatr*. 2017;39(2):140-6.
- Steiner M, Macdougall M, Brown E. The premenstrual symptoms screening tool (PSST) for clinicians. *Arch Womens Ment Health*. 2003;6(3):203-9.
- Rezende APR, Alvarenga FR, Ramos M, Franken DL, Costa JSD, Pattussi MP, Paniz VMV. Prevalência de síndrome pré-menstrual e fatores associados entre acadêmicas de uma Universidade no Centro-Oeste do Brasil. *Rev Bras Ginecol Obstet*. 2022;44(2):133-41.
- Diniz MS, Lima ACS, Pereira H, Ferreira G. Prevalência da síndrome pré-menstrual e seus principais sintomas observados em acadêmicas do curso de medicina de uma Faculdade do Sul de Minas Gerais. *Rev Ciê Saúde*. 2013;3(2):43-59.
- Hardy C, Hunder MS. Premenstrual symptoms and work: exploring female staff experiences and recommendations for workplaces. *Int J Environ Res Public Health*. 2021;18(7):3647.
- Acikgoz A, Dayi A, Binbay T. Prevalence of premenstrual syndrome and its relationship to depressive symptoms in first-year university students. *Saudi Med J*. 2017;38(11):1125-31.
- Ferreira JJ, Machado AFP, Tacani R, Saldanha MES, Tacani PM, Liebano RE. Manual lymphatic drainage for premenstrual syndrome symptoms: a pilot study. *Fisioter Pesq*. 2010;17(1):75-80.
- Lopes CC, Cota LHT, Ribeiro LHMS, Silva MC, Orsi PME, Esteves AMSD, Cerdeira CD, Barros GBS. Avaliação de sintomas e consequências da tensão pré-menstrual em acadêmicas de uma universidade de Minas Gerais (Brasil). *Rev Eletr Acervo Saúde*. 2019;11(14).
- Silva ACJSR, Sá MFS. Efeitos dos esteroides sexuais sobre o humor e a cognição. *Rev Psiq Clín*. 2006;33(2):60-7.
- Silva SMCS. A influência da tensão pré-menstrual sobre os sintomas emocionais e o consumo alimentar. *Nutrire Rev Soc Bras Aliment Nutr*. 2012;37(1):13-21.
- Mehta PH, Josephs RA. Testosterone change after losing predicts the decision to compete again. *Horm Behav*. 2006;50(5):684-92.
- Schiller CE, Johnson SL, Abate AC, Schidt PJ, Rubinow DR. Reproductive steroid regulation of mood and behavior. *Compr Physiol*. 2016;6(3):1135-60.
- Freeman EW. Associations of depression with the transition to menopause. *Menopause*. 2010;17(4):723-7.
- Silva FKC, Vasconcelos MIL, Soares IC, Brito LL, Tavares JED, Sousa NIC, Nascimento LA, Araújo FBS, Bezerra YDP. Nutrition and premenstrual tension: food preferences and physiological aspects involved. *Res Soc Develop*. 2021;10(17):e42101724158.
- Cheng SH, Shih CC, Yang YK, Chen KT, Chang YH, Yang YC. Factors associated with premenstrual syndrome - a survey of new female university students. *Kaohsiung J Med Sci*. 2013;29(2):100-5.
- Farasati N, Siasi F, Koohdani F, Qorbani M, Abashzadeh K, Sotoudeh G. Western dietary pattern is related to premenstrual syndrome: a case-control study. *Br J Nutr*. 2015;114(12):2016-21.
- Rad M, Sabzevari MT, Dehnavi ZM. Factors associated with premenstrual syndrome in Female High School Students. *J Educ Health Promot*. 2018;37(64):1-5.
- Teixeira ALD, Oliveira ECM, Dias MRC. Relação entre o nível de atividade física e a incidência da síndrome pré-menstrual. *Rev Bras Ginecol Obstet*. 2013;35(5):210-4.
- Alves HF, Ribeiro GO, Vitorino GS, Andrade AA, Uchôa EPBL, Carvalho VCP. Prevalência da tensão pré-menstrual entre universitárias. *Fisioter Brasil*. 2019;20(3):392-9.
- Tolossa FW, Bekele ML. Prevalence, impacts and medical managements of premenstrual syndrome among female students: cross-sectional study in College of Health Sciences, Mekelle University, Mekelle, northern Ethiopia. *BMC Womens Health*. 2014;14:52.
- Guvenc G, Kilic A, Akyuz A, Ustunsoz A. Premenstrual syndrome and attitudes toward menstruation in a sample of nursing students. *J Psychosom Obstet Gynaecol*. 2012;33(3):106-11.
- Henz A, Ferreira CF, Oderich CL, Gallon CW, Castro JRS, Conzatti M, Fleck MPA, Wender MCO. Premenstrual syndrome diagnosis: a comparative study between the Daily Record of Severity of Problems (DRSP) and the Premenstrual Symptoms Screening Tool (PSST). *Rev Bras Ginecol Obstet*. 2018;40(1):20-5.
- Victor FF, Souza AI, Barreiros CDT, Barros JLN, Silva FACD, Ferreira ALCG. Quality of life among university students with premenstrual syndrome. *Rev Bras Ginecol Obstet*. 2019;41(5):312-7.
- Organização Mundial de Saúde. Conferência Internacional sobre Cuidados Primários de Saúde: Declaração de Alma-Ata. 1978. 3p. Disponível em: chrome-extension://efaidnbmnnnibpajpglclefindmkaj/https://bvsm.sau.de.gov.br/bvs/publicacoes/declaracao_alma_ata.pdf. Acesso em: 11/10/2023.
- Pokharel P, Rana J, Moutchia J, Uchai S, Kerri A, Luna Gutiérrez PL, Islam RM. Effect of exercise on symptoms of premenstrual syndrome in low and middle-income countries: a protocol for systematic review and meta-analysis. *BMJ Open*. 2020;10(9):e039274.
- Abdi F, Ozgoli G, Rahnamaie FS. A systematic review of the role of vitamin D and calcium in premenstrual syndrome. *Obstet Gynecol Sci*. 2019;62(2):73-86. Erratum in: *Obstet Gynecol Sci*. 2020;63(2):213.
- Lanza di Scalea T, Pearlstein T. Premenstrual dysphoric disorder. *Med Clin North Am*. 2019;103(4):613-28.