



Major outcomes of premenstrual syndrome associated with food: a prospective observational cross-sectional study

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Abstract

The present study developed a cross-sectional observational research, in which eating habits and behaviors of women were collected, focusing on changes present during periods of the menstrual cycle, such as the follicular and luteal phases. The correlations present in the literature with subsequent hormonal variations and their outcomes (estrogen, progesterone, cortisol, serotonin, and endorphin) were also described. The variations mentioned above are correlated with emotional and concomitant eating disorders, in general these disorders are developed due to the lowering of serotonin levels and the increase in cortisol; Thus, eating sweet and high-calorie foods is done in search of "pleasure", due to the release of endorphins and consequently the reduction of cortisol. To this end, information on habits and lifestyle was collected from 50 women, aged between 18 and 45 years, through a questionnaire validated by the reliability of Cronbach's alpha coefficient and developed on the Google Forms platform, to evaluate the perception of these about the association of food according to the phase of the menstrual cycle in which they are. As a result, there was a reduction in the consumption of foods such as citrus fruits, meat, eggs, milk, and proteins in general, and vegetables during the luteal phase. The interviewees were asked about the symptoms noticeable during the luteal phase of the menstrual cycle, including increased appetite, depression, cramps, edema, satisfaction with appearance, emotional instability, anxiety, irritability, difficulty concentrating, insomnia, excessive sleep, constipation, and headache. All interviewees reported having at least one of the symptoms described above. It was concluded that premenstrual syndrome is

characterized by symptoms that cover the physical, behavioral, and emotional spheres. In this way, the intensification of consumption of foods from groups such as fats, processed foods, fried foods, chocolates, candies, ice cream, and sweets in general during the Premenstrual Syndrome phase is visible, in addition to the various behavioral changes that involve emotional and perception changes. of the corporeal image. Thus, it confirms the need for nutritional monitoring of these women, to provide dietary adjustments during the menstrual cycle and, therefore, reducing drastic changes that directly impact their behavior.

Keywords: Menstrual cycle. Premenstrual syndrome. Eating habits. Luteal phase. Follicular phase. Behavioral changes.

Introduction

The menstrual cycle is a biological phenomenon that occurs in healthy women, has an average duration of 28 to 40 days, and is cyclical due to hormonal fluctuations coordinated by the hypothalamic-pituitary-gonadal axis [1-3]. Didactically, the menstrual cycle can be divided into two phases, the follicular phase, which goes from the first day of bleeding to the day of ovulation, and the luteal phase, which begins shortly after the follicular phase and continues until new bleeding occurs [4].

The premenstrual period, corresponding to the luteal phase, is a period of vulnerability in which women are subject to a set of physical, psychological, and behavioral changes that are called premenstrual syndrome (PMS) [5]. The main symptoms during PMS are headache, abdominal dyssyndrome, back pain,

irritability, fatigue, weight changes, and changes in eating patterns [6]. Research relates changes in eating habits during the phases of the menstrual cycle, especially during the luteal phase, where the preference for sugars and fats tends to increase [7].

Based on this information, the justification for the present study consisted of analyzing the eating behavior of women during the menstrual period and, therefore, inferring the propagation of this information/results succinctly and efficiently for the target audience and, at the same time, a theoretical-practical complementation for students in the health areas, especially medicine. Possible paradigms on the subject were elucidated and also provided a viable theoretical framework to promote dietary behavioral adjustments for the public, to improve the quality of life of these individuals.

The main hypothesis raised by this study is that phases of the menstrual cycle interfere with women's eating behavior and that around these changes there is an increase in the consumption of sweet, industrialized/processed, and high-calorie foods, subsequently with an increase in daily caloric intake, especially in the phase known as Premenstrual Syndrome (PMS).

In this sense, the present work aims to identify the eating habits of female medical students at the Faculty of Catanduva during the phases of the menstrual cycle. In this way, we intend to contribute to studies in this area and propose improvements in the nutritional approach to female patients.

Methods

Study Design

The present study followed a prospective observational and cross-sectional model, following the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) rules. Available at: <https://www.strobe-statement.org/checklists/>. Accessed on: 07/20/2023.

Participants and Instruments and Procedures

Information was collected from 50 women, aged between 16 and 45 years, to evaluate their perception of the association of food according to the phase of the menstrual cycle in which they are. The results were statistically evaluated according to the Google Forms platform and such data were discussed promptly during this work.

Questionnaire Validation

The form applied consisted of a questionnaire validated by the reliability of Cronbach's alpha coefficient [8]. Subsequently, the collected data were analyzed using descriptive statistics.

Eligibility Criteria

The individual must be female. She must have already gone through Menarche and must not have reached menopause, that is, she still has active menstruation. Those surveyed must be between 18 and 45 years old. The exclusion criteria are primarily that the individual is not female. Being female, she cannot present herself without the occurrence of menarche or present herself during menopause; be she under 18 or over 45.

Critical Analysis of Risks and Benefits

The risks presented by the research regarding Premenstrual Syndrome and the association with eating according to the phases of the menstrual cycle are related to the time spent by patients filling out the online form and sharing their data, which were restricted to the use of students participating in nutrology research. The benefits contained in this research regarding Premenstrual Syndrome and the association with eating according to the phases of the menstrual cycle were mainly the use of this research as a way of helping not only the participating woman, but others who can use the results obtained in favor of your health. Furthermore, the questions asked during the research can help the participant to notice any changes in their diet due to the menstrual cycle that previously went unnoticed, and this could help them in some way, such as changing a related eating habit cycle, or "police" yourself more to food.

Ethical Aspects

The present study was carried out with approval from the Research Ethics Committee (CEP) of UNIFIPA (Padre Albino Foundation) under number 5.466.445. The research protected the secrecy and confidentiality of the data and the name preservation of the participants in this research, with only the data stipulated and described in this study being characterized and used jointly.

Statistical Analysis

After data collection, they were spreadsheeted in Excel and exported to the statistical software StataBe17. Descriptive statistical analysis was performed based on calculations of central tendency and dispersion measures and frequency counts, presenting numerical and percentage values. Furthermore, the validation of the questionnaire proposed in this study was determined using the statistical technique of Cronbach's alpha (α), to know the reliability and measure of internal consistency. The calculation of Cronbach's alpha coefficient (α) required the administration of just one test to provide a single estimate of the reliability of the

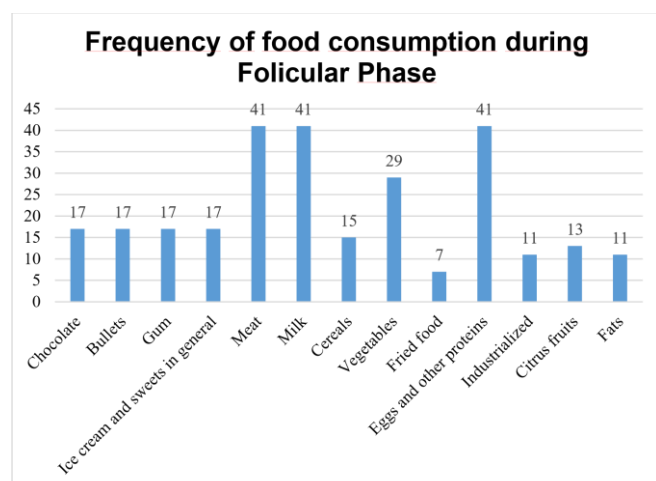
entire survey. The reliability of Cronbach's alpha coefficient varies between 0 and 1 as standard. The Cronbach's alpha coefficient reliability classification obeyed the following limits: A. $\alpha \leq 0.30$ – Very low; B. $0.30 < \alpha \leq 0.60$ – Low; C. $0.60 < \alpha \leq 0.75$ – Moderate; D. $0.75 < \alpha \leq 0.90$ – High; E. $\alpha > 0.90$ – Very high [8].

Results

The present study had a total of 54 responses. The Cronbach's alpha coefficient result was 0.85, therefore high. Women were predominantly between 18 and 23 years old (64.8%). Among the 54 participants, 59.3% reported their menstrual flow as regular and always on the same day of the month, the others reported irregular flow. Both smoking and alcohol consumption were insignificant.

Food places were presented in 74.1% of cases as at home, 18.5% in college or workplace trays, and 7.4% in self-service or à la carte restaurants. Participants were asked about their consumption of the following food groups such as cereals, citrus fruits, vegetables, fried foods, chocolates, candies, ice cream and sweets in general, processed foods, fats and meats, eggs, milk, and other proteins, as well as the frequency of consumption in a certain period of the menstrual cycle, luteal and follicular phase daily, sometimes and not consumption (Figure 1).

Figure 1. Frequency of food consumption during the Follicular Phase.

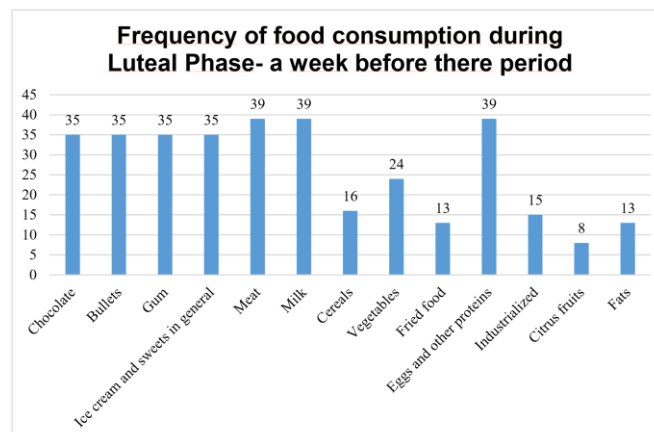


Source: Own Authorship

There was an increase in the consumption of foods from groups such as fats, processed foods, fried foods, chocolates, candies, ice cream, and sweets in general during the luteal phase (PMS). On the other hand, there was a reduction in the consumption of foods such as citrus fruits, meat, eggs, milk, proteins in general, and vegetables during the luteal phase (PMS). In addition to the increase in the frequency of consumption of certain

food groups during the luteal phase, an increase in the frequency of their consumption was also observed (Figure 2).

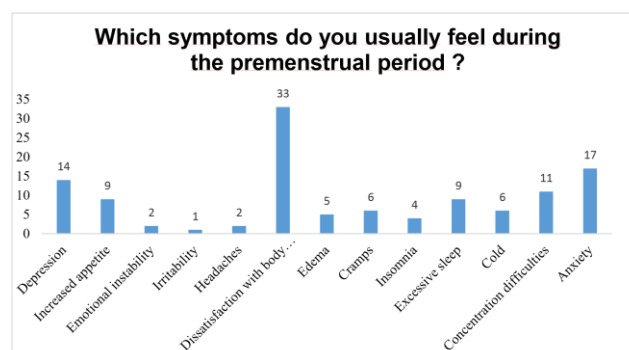
Figure 2. Frequency of food consumption during the Luteal Phase- a week before their period.



Source: Own Authorship

In addition to dietary patterns, participants were also asked about symptoms noticeable during the luteal phase of the menstrual cycle, including increased appetite, depression, cramps, edema, satisfaction with appearance, emotional instability, anxiety, irritability, and difficulty concentrating, insomnia, excessive sleep, constipation, and headache. The interviewees responded to the symptoms as, no, yes, mild, or not felt and moderate to intense. All interviewees reported having at least one of the symptoms described above. The increase in appetite during the phase characterized as PMS was notable among a considerable number of interviewees (Figure 3).

Figure 3. Which symptoms do you usually feel during the premenstrual period?



Source: Own Authorship

Discussion

According to the results of the present study, premenstrual syndrome (PMS) is one of the most common disorders faced by women of reproductive age. More than 200 symptoms of varying severity associated

with PMS have been identified. Diet is an essential modulating factor in reducing and controlling PMS symptoms. However, research into the actual effect of foods and nutrients on PMS is scarce and studied with insufficient scientific rigor [1,2].

In the present study, a reduction in the consumption of foods such as citrus fruits, meat, eggs, milk, and proteins in general and vegetables was observed during the luteal phase (PMS). The interviewees were asked about the symptoms noticeable during the luteal phase of the menstrual cycle, including increased appetite, depression, cramps, edema, satisfaction with appearance, emotional instability, anxiety, irritability, difficulty concentrating, insomnia, excessive sleep, constipation, and headache. All interviewees reported having at least one of the symptoms described above.

Authors state that the evidence is insufficient and limited to support its use as an effective treatment, however, evidence-based decisions need to be made regarding premenstrual health and the adoption of dietary and nutritional therapies [9].

Furthermore, vitamin D plays a crucial role in female reproduction, possibly through its effects on calcium homeostasis, cyclical fluctuations in sex steroid hormones, or the function of neurotransmitters. In this regard, a study evaluated the effects of vitamin D supplementation on dysmenorrhea and premenstrual syndrome (PMS) in adolescents. In this study, 897 adolescent girls living in Mashhad and Sabzevar, Iran, received nine high-dose vitamin D supplements (50,000 IU/week of cholecalciferol) and were followed for 9 weeks. The prevalence of PMS after the intervention fell from 14.9% to 4.8% ($p < 0.001$). Similar results were also found for the prevalence of individuals with dysmenorrhea (35.9% reduced to 32.4%) and in individuals with PMS and dysmenorrhea (32.7% reduced to 25.7%). Vitamin D supplementation was associated with a reduction in the incidence of several PMS symptoms, such as back pain and a tendency to cry easily, as well as a decrease in the intensity of dysmenorrhea pain ($p < 0.05$). Therefore, supplementation with high doses of vitamin D can reduce the prevalence of PMS and dysmenorrhea, in addition to having positive effects on the physical and psychological symptoms of PMS [10].

In this context, the range of symptoms associated with PMS is extensive, with varying severity, extending to most aspects of women's lives and requiring knowledge, monitoring, and a personalized approach to the diagnosis of psychological and physical conditions. The best-known hypotheses that explain the causes of PMS are associated with hormonal fluctuations and

nutritional deficiencies, mainly vitamin B6, magnesium, and calcium. To date, no treatment is universally recognized as effective, and many women seeking relief often turn to therapeutic approaches outside of conventional medicine. Diet is an essential modulating factor in reducing and controlling PMS symptoms. However, research into the actual effect of foods and nutrients on PMS is scarce, sporadic, and studied with insufficient scientific rigor [1,11].

Studies have demonstrated the effectiveness of micronutrients, especially calcium, magnesium, vitamin D, B vitamins, and herbal supplements, in reducing PMS. However, researchers agree that the evidence is insufficient and limited to support its use as an effective treatment. Lifestyle, nutrition, and general health considerations appear to be essential strategies in reducing or managing menstrual symptoms, but it is recommended that they be promoted more for their apparent health benefits than as conclusive evidence for reducing negative PMS experiences [2,12].

Finally, raising awareness among health and nutrition professionals to inform the public about the complexity of factors that influence PMS and the need for training/education regarding self-care practices for managing PMS is current and necessary. At the same time, nutrition service providers must approach and adapt dietary-nutritional therapy in a personalized way to reduce PMS. Additionally, provides quality information to help women, including young/teen women, make evidence-based decisions about premenstrual health and dietary, nutrient, or supplement adoption [1,2,10].

Conclusion

It was concluded that premenstrual syndrome is characterized by symptoms that cover the physical, behavioral, and emotional spheres. In this way, the intensification of consumption of foods from groups such as fats, processed foods, fried foods, chocolates, candies, ice cream, and sweets in general during the Premenstrual Syndrome phase is visible, in addition to the various behavioral changes that involve emotional and perception changes of the corporeal image. Thus, it confirms the need for nutritional monitoring of these women, to provide dietary adjustments during the menstrual cycle and, therefore, reducing drastic changes that directly impact their behavior.

Acknowledgement

Not applicable.

Ethical Approval

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Albino Foundation) under number 5.466.445. The research protected the secrecy and confidentiality of the data and the name preservation of the participants in this research, with only the data stipulated and described in this study being characterized and used jointly.

Informed consent

Not applicable.

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Data sharing statement

No additional data are available.

Conflict of interest

The authors declare no conflict of interest.

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It was applied.

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