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REVIEW ARTICLE

A scoping review of influence of lifestyle factors on menstrual disorders in menstruating women

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Abstract

Menstruation is a natural occurrence for every female, starting from adolescence to menopausal age. Menstrual irregularities can eventually have an impact on one's physical and mental health, which lowers women's quality of life. The objective of this study was to explore the different lifestyle factors affecting menstrual disorders. Therefore, this scoping review aims to provide a comprehensive overview of the current state of menstrual disorders and lifestyle factors like physical activity, diet, sleep, water intake, nutrition, addictions, caffeine intake, stress affecting menses and the importance of modifying the lifestyle. An extensive search was conducted using keywords in PubMed, MEDLINE, Scopus, Science Direct and Google Scholar.

Conclusion: Menstrual disorders were significantly associated with an increase in BMI, sedentary lifestyle, exposure to passive smoking, excessive coffee drinking, perceived stress and frequent consumption of fast food, non-vegetarian food, less water intake, inadequate sleep, physical inactivity, and diet. Healthy dietary habits, physical activity, and various other modifications to one's lifestyle can significantly lower the risk of menstruation disorders and reduce the severity of more serious health issues.

Keywords: Menstrual cycle, Menstrual disorders, Lifestyle factors.

Introduction

Physiological changes in a woman›s body are referred to as menstruation. Every female is affected by the biological phenomenon known as menstruation, which a woman experiences for one-fifth of her reproductive life (Dhar *et al*., 2023). Reproductive hormones influence the regularity of menstruation. A woman's reproductive organs may be operating at peak efficiency if her menstrual cycle is regular; on the other hand, irregular periods may indicate ovarian function alterations and a heightened risk of conditions such as ovarian cancer, fractures, diabetes, breast cancer, and cardiovascular disease (Sousa Rodrigues Guedes *et al*., 2022). The age of menarche is less than 16 years, the menstrual cycle lasts 24 to 32 days, the flow lasts 3 to 7 days, and the flow volume is less than 80 mL (Esimai and Esan, 2010). Any alterations in a woman's menstrual cycle have the potential to be adverse to both her mental and physical health and her quality of life. Numerous factors, such as genetics and lifestyle modifications, adversely affect normal menstrual cycles. Menstrual abnormalities include a variety of causes as age, hormonal imbalances, pregnancy, cancer, infections, illnesses, trauma, and the use of specific medications (Ansong *et al*., 2019). Environmental factors and new lifestyle trends like caffeine consumption, physical activity, stress, smoking, age, weight gain and diet have also been closely correlated with menstrual disorders. Menstrual disorders, the most common cause of gynecological visits, include oligomenorrhea, hypomenorrhea, menorrhagia, metrorrhagia, dysmenorrhea, premenstrual syndrome (PMS), amenorrhea, and polymenorrhea. Dysmenorrhea, often known as painful menstruation, is characterized by intense, spasmodic cramping in the lower abdomen that is frequently accompanied by additional symptoms such as sweating, headaches, nausea, vomiting, diarrhea, and trembling. A greater prevalence was generally observed in young women, with estimates ranging from 67 to 90% for those aged 17 to 24 years. Oligomenorrhea is the medical term for a woman with irregular, inconsistent menstrual

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blood flow. A woman is said to have oligomenorrhea if her menstrual cycle lasts longer than 35 days or if she has four to nine cycles annually. The prevalence of oligomenorrhea is 13.5% in the general population. A menstrual period with excessively heavy flow is referred to as heavy menstrual bleeding (HMB), with more than 80 mL flow per cycle and bleeding for more than 5 days, sometimes known as menorrhagia or hypermenorrhea. Amenorrhea is the absence of menstruation in females between the ages of 12 and 49 when they are reproductively active. The most prevalent endocrine disorder in females of reproductive age is polycystic ovarian syndrome (PCOS). Depending on the diagnostic criteria used, the prevalence ranges between 5 and 15%. Polymenorrhea is frequent episodes of menstruation occurring at intervals of 21 days or less. Premenstrual syndrome (PMS) includes physical and psychological symptoms that are clinically significant and occur during the luteal phase of the menstrual cycle (Gudipally and Sharma, 2024).

Numerous risk factors for menstrual disorders have been found in the literature however many of them have shown conflicting results. Body mass index- fat is one of the compounds in the body that has an influence in the production of androgens and estrogens, where one of the dominant factors causing menstrual disorders is the hormone estrogen. Estrogen levels that continue to increase indirectly can cause androgen hormones to increase. An increase in the androgen hormone level can interfere with follicular development so that follicular maturation cannot occur. A limited mass of fat in the body can also cause levels of the androgen hormone to be aromatized into the hormone estrogen to decrease, thereby causing irregular menstrual cycles (Sawitri *et al*., 2020). Physical activity- In order to be ready for menstruation, estrogen and progesterone hormone levels are low during the late luteal phase of the menstrual cycle. These low levels appear to play a role in the development of menstrual disorders. Aerobic activity temporarily raises estrogen and progesterone levels, which could improve mood and reduce stress levels without significantly changing the menstrual cycle (Pearce *et al*., n.d.).

It has been discovered that a surplus or deficiency of some nutrients may result in a neurotransmitter and hormonal imbalance that causes menstrual disorders. Excessive consumption of junk food, sweets, fried meat, alcohol, and coffee, as well as decreased consumption of vegetables and fruits, are linked to a higher risk of developing menstrual disorders (Deligeoroglou and Creatsas, 2012). Poor sleep can exacerbate stress, a known risk factor for dysmenorrhea and menstrual disorders (Jeong *et al*., 2023). Water intake could decrease the duration of menstrual bleeding, the amount of pain relievers consumed, and the severity of pelvic pain among young women suffering from primary dysmenorrhea (Torkan *et al*., 2021). Psychosocial stress may affect the severity of premenstrual symptoms (premenstrual/menstrual weeks) through stimulation of the sympathetic nervous system, which affects levels of neurotransmitters and other brain functions, or activation of the hypothalamic-pituitary-ovarian (HPO) axis, which affects ovarian hormone levels (Gollenberg *et al*., 2010). Nicotine alters neurocircuitry in a way that makes people more vulnerable to environmental stimuli. As we embark on this journey through menstrual disorders, this scoping review aims to provide a comprehensive understanding of the present lifestyle factors affecting on menstrual disorders and hence, modifying the lifestyle for a better quality of life (Choi and Hamidovic, 2020).

Methodology

Literature Search Strategy

A comprehensive literature search was conducted to identify relevant studies on the influence of lifestyle factors on menstrual disorders in menstruating females. Multiple electronic databases, including PubMed, MEDLINE, Scopus, Science Direct and Google Scholar, were systematically queried. The search was performed with a combination of keywords and Medical Subject Headings (MeSH) terms, such as "menstrual cycle", "menstrual disorders", "lifestyle factors", and "lifestyle modification". Boolean operators (AND, OR) were used to refine the search results.

Inclusion and Exclusion Criteria

Inclusion criteria encompassed peer-reviewed research articles, systematic reviews, meta-analyses, clinical trials, case studies, and observational studies published in English up to the time span of 10 years (2014–2024). Studies involved females of ages 18 to 51 and with various menstrual disorders. Exclusion criteria involved articles that were not directly related to menstrual health or the subjects who have taken medical management for the same.

Study Selection

Two independent reviewers screened the titles and abstracts of the identified articles for relevance and eligibility. In cases of disagreement, a third reviewer was consulted to reach a consensus. Selected studies were then subjected to a full-text review, with reasons for exclusion documented.

Data Extraction

Data from the selected studies were extracted using a standardized data extraction form. The following information was collected: Title, authors, publication year.

Study design and methodology population characteristics (e.g., age, medical condition, lifestyle factors) lifestyle factors observed (BMI, sleep, stress, caffeine, diet, physical activity, addictions, water intake), lifestyle modification and objectives outcomes measured (e.g., IPAQ, PSQI, PSI, BMI scale).

Data Synthesis

Extracted data were synthesized and organized thematically based on the main objectives of this scoping review. Studies were categorized according to their focus on menstrual disorders and lifestyle factors that influenced the menstrual cycle and the lifestyle modification for it.

Quality Assessment

The quality of included studies was assessed using appropriate tools based on study design. The Newcastle-Ottawa scale for observational studies was used. Quality assessment was conducted independently by two reviewers, and discrepancies were resolved through discussion.

Data Analysis

Given the scoping nature of this review, a narrative synthesis approach was used to summarize and present the findings of the included studies. Findings were synthesized based on the identified thematic categories and discussed in the context of influence of lifestyle factors on menstrual disorders in menstruating females.

An Overview

In a study of menstrual disorders in Medical Students and their correlation with biological variables" aimed to evaluate the prevalence of menstrual abnormalities among the female medical students and their association with lifestyle, psychological stress and college absenteeism. Increase in BMI was significantly associated with oligomenorrhoea. Consumption of junk food was associated with oligomenorrhoea, hypomenorrhoea, dysmenorrhea and PMS. Infrequent cycles were reported by students on dieting. Dysmenorrhea and PMS were highly prevalent among students not on regular exercise. Stress during the examination was associated with an increased prevalence of dysmenorrhoea, irregular cycles and premenstrual syndrome among the medical students. Students with higher BMI and those consuming junk food revealed a higher incidence of irregular menstruation. A highly significant correlation was found between a lack of exercise and the consumption of junk food with dysmenorrhea and PMS (Rajipet *et al*., 2021). Yohannes Moges Mittiku in 2019 "Menstrual irregularity and its associated factors among college students in Ethiopia, 2021" aimed to assess the magnitude of menstrual irregularity and associated factors among college students in Debre Berhan Town, North Shewa, Amhara Regional State, Ethiopia, in 2021. This study shows that more than one-third of the college students in Debre Berhan town have experienced menstrual irregularity. Being less than 20 years old, having a history of early menarche, being overweight, and perceived stress were a variable significantly associated with menstrual irregularity (Mittiku *et al*., 2022). A study in 2022 "Influence of lifestyle factors with the outcome of menstrual disorders among adolescents and young women in West Bengal," conducted a cross-sectional random survey from January 2020 to January 2022 in various schools and colleges. In the overall study population, the prevalence of PCOS, dysmenorrhea, menorrhagia, polymenorrhea, hypomenorrhea and the irregular menstrual cycle was found at 14.14, 15.14, 6.29, 3.70, 5.16 and 44.83%, respectively. Increased BMI, short sleep, and sedentary and vigorous physical activity can contribute to the risk of developing menstrual disorders. Unhealthy food habits are a major risk factor for menstrual disorders (Negi *et al*., 2018). Emmanuel Ansong in 2019, "Menstrual characteristics, disorders and associated risk factors among female international students in Zhejiang Province, China: a cross-sectional survey" aimed to ascertain the menstrual characteristics and address the menstrual problems together with their associated risk factors among international students in China. Menstrual disorders are high among international students in China. We established premenstrual symptoms as the most common menstrual disorder. High levels of stress (PSS > 20) emanating from factors including the language barrier, diet and loneliness were significantly related to the disruptions in their menstruation (Mitsuhashi *et al*., 2023).

Amany Edward Seedhom in 2013 "Life Style Factors Associated with Premenstrual Syndrome among El-Minia University Students, Egypt" aimed to determine the score and frequency of premenstrual syndrome (PMS) among female college students and to detect the possible risk factors of PMS. The study revealed that 80.2% of the participants experienced various degrees of PMS symptoms, which were significantly associated with a family history of PMS, physical inactivity, habitual excess consumption of coffee, BMI, frequent consumption of fast food, and smoking, but these factors explained only 52% of the variability in the logistic regression model (Seedhom *et al*., 2013).

Limitations

Many studies were conducted during the COVID-19 global pandemic, which may have contributed to the students' elevated stress levels, which are a significant risk factor for irregular menstruation. Additionally, only one research location was used for the investigation. Subjective bias pertaining to recollection and recall of all past experiences can affect the self-reported data regarding menstrual cycles and lifestyle factors. Since the entire survey was based on self-reporting, there is a possibility that inaccurate information will continue (perhaps as a result of unwillingness or ignorance).

Future scope and Strategies

Validated questionnaires/scales for quantifying the lifestyle factors and clinical signs of menstruation problems may be used in future research with a multicentric and larger sample size of similar age groups.

Conclusion

We conclude that menstrual disorders were significantly associated with an increase of BMI, sedentary life style, exposure to passive smoking, excessive coffee drinking, perceived stress and frequent consumption of fast food, non-vegetarian food, less water intake, inadequate sleep, physical inactivity, and diet. It is recommended that the introduction of a reproductive health component into school and college health education programs could help in providing correct and current information on menstrual health, lifestyle factors affecting it and the need for modifying it. It is imperative to encourage female adolescents to adopt a healthy lifestyle, which includes appropriate healthy nutrition, and increasing the vitamin intake in their food by increasing the vegetables and fruits. Cutting off the added salt in their food, as well as eliminating caffeine-containing beverages, particularly coffee, from their diet, would be essential for those who have troublesome menses.

Reporting

The preferred reporting items for systematic reviews and meta-analyses extension for scoping reviews (PRISMA-ScR) guidelines were followed to ensure the transparent reporting of the scoping review process.

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