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THE IMPACT OF STRESS ON THE MENSTRUAL CYCLE

The Impact of Stress on the Menstrual Cycle

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The Impact of Stress on the Menstrual Cycle

Abstract

Background/Purpose

Reproductive health is an important indicator of a woman's overall health; however, menstruation is often viewed negatively in modern society. Across the nation, women are suffering with issues related to hormones and menstruation. Evidence continues to surface linking high levels of stress to negative health outcomes. The purpose of this literature review is to assess the effects of stress and stress reduction of the menstrual cycle in naturally-cycling women of reproductive age.

Methods

Peer-reviewed research within the past five years was selected for this review using the U.S. National Library of Medicine National Institutes of Health. A variety of search terms were used to conduct this review and inclusion criteria were: articles published in English; a clearly evident peer review process; the authors addressed stress or determinants of stress; participants for each study were of reproductive age, non-pregnant, and pre-menopausal; and the authors related stress to menstrual characteristics. Twenty-two articles were originally selected based on the inclusion criteria, but after further investigation, only ten were selected for the full review based on their focus on the desired topic.

Results/Conclusion

Stress negatively impacts various characteristics of the menstrual cycle. While women and healthcare providers may have some understanding of the negative impacts of stress on general health, they are likely unaware of the specific negative effect on menstruation. Stress reduction and the use of prescribed coping mechanisms can reduce the occurrence of morbidity resulting from the negative impact of stress on menstruation. Health practitioners should encourage healthy self-care habits and coping mechanisms in order to promote wellness and improve quality of life for women of reproductive age. Further studies should be done to determine which habits and coping mechanisms will prove most effective in improving outcomes.

The Impact of Stress on the Menstrual Cycle

I. Introduction

Across the world, women are constantly suffering with issues related to hormones and menstruation. Dysmenorrhea is one of the most prevalent menstrual problems during the adolescent period and can drastically affect women's daily activities, even causing some women to become bed-ridden (Rafique & Al-Sheikh, 2018). Not only do issues regarding menstruation cause discomfort for women, menstrual disturbances have been associated with adverse health outcomes, including increased risks for coronary heart disease, type 2 diabetes mellitus, and cardiometabolic disease (Nillni et al., 2018).

The menstrual cycle is a very important indicator of a woman's overall health though it is often overlooked by many health practitioners. Often times, blame gets placed on hormones and menstruation when women are nearing that time of the month. Cramps, bloating, and breast tenderness are only a few of the many complaints used daily by women describing symptoms that occur as a result of menarche. Some women suffer with menstrual irregularity, while others complain of long cycles with heavy bleeding. Menarche varies drastically from person-to-person.

Evidence continues to surface linking high levels of stress to negative health outcomes. Stress can cause or exacerbate major health issues, including cardiovascular disease, obesity, sexual dysfunction, gastrointestinal problems and mental health conditions. The purpose of this literature review is to assess the effects of stress and stress reduction of the menstrual cycle in naturally-cycling women of reproductive age. There is a gap in the current literature involving cortisol and its relation to menstruation, warranting further exploration of this topic. Subjective data from participant surveys has been primarily used to evaluate the effects of stress on

menarche, therefore, additional research involving cortisol and other hormone levels is necessary in order to create a stronger case for this discussion.

II. Methods

Research was conducted through the U.S. National Library of Medicine National Institutes of Health on PubMed.gov or National Center for Biotechnology Information. A wide variety of terms were used to search for appropriate articles. The keywords used for the search include: (a) menstruation, (b) menstrual cycle, (c) menarche, (d) premenstrual dysphoric disorder, (e) premenstrual syndrome, (f) stress, (g) perceived stress, (h) psychological stress, and (i) cortisol. Boolean phrases such as “and” and “or” were used in the advance search tabs to connect each keyword and refine the results. Boolean phrases included in this literature search included: (a) menstruation OR menstrual cycle OR menarche AND perceived stress, (b) menstruation OR menstrual cycle OR menarche AND cortisol, (c) menstruation OR menstrual cycle OR menarche AND psychological stress, (d) menstruation OR menstrual cycle OR menarche AND stress, and (e) premenstrual syndrome AND stress. Articles considered for this review were produced within the past five years (2014-2019) to ensure that the most recent evidence is utilized. A search for historical, relevant data was also considered for inclusion. Articles from this search were then assessed for inclusion. Inclusion criteria were articles published in English; a clearly evident peer review process; the authors addressed stress or determinants of stress; participants for each study were of reproductive age, non-pregnant, and pre-menopausal; and the authors related stress to menstrual characteristics. Exclusion criteria was also determined based on the issue being address. Exclusion criteria included: languages other than English and non-peer reviewed articles. Twenty-two articles were originally selected based on the inclusion criteria, but after further investigation, only ten were selected for the full

review based on their focus on the desired topic. Several articles met the criteria for the research conducted but were not chosen to include due to the information provided. For example, “Estradiol Levels Modulate Brain Activity and Negative Responses to Psychosocial Stress across the Menstrual Cycle” is a study that examined the effect of estradiol levels across the menstrual cycle on both the brain activity and behavioral response to a laboratory-based model of psychosocial stress (Albert et al., 2015). This article was not found to be appropriate for this review because the authors focused on menstrual cycle effects as the determinant of psychosocial stress, rather than vice versa. Nevertheless, this article supports the correlation between stress and menstruation. Another article excluded from this review is “Characteristics of Perceived Stress and Salivary Levels of Secretory Immunoglobulin A and Cortisol in Japanese Women with Premenstrual Syndrome” due to the focus on S-IgA, rather than stress as a whole (Watanabe & Shirakawa et al., 2015). “The role of emotion regulation in the experience of menstrual symptoms and perceived control over anxiety related events across the menstrual cycle” involved a small sample size and focused predominantly on emotion regulation rather than stress (Manikandan et al., 2016).

III.Results

After sifting through a large number of articles related to the menstrual cycle and significant factors, ten articles were chosen as applicable to the topic being researched. All of the articles included research from various studies and surveys that utilized detailed questionnaires involving lifestyle, menstrual cycle characteristics, and health history. Many of the articles incorporated the Perceived Stress Scale into their study to examine the thoughts and feelings of participants. Bae et al. (2018) conducted a prospective cohort study that involved data collected from the Korean National Health and Nutrition Examination Survey. The authors investigated

modifiable risk factors related to the menstrual cycle and concluded that high levels of perceived stress and chronic stress levels were associated with high probability of menstrual cycle irregularity (Bae et al., 2018). Nillni et al. (2018) examined the influence of not only perceived stress on menstrual cycle regularity and length, but also depressive symptoms and psychotropic medication. Utilizing a prospective cohort study methodology, the authors found that women with that women with severe depressive symptoms had an 80% greater prevalence of cycle irregularity than women without these symptoms; it also reiterated the prevalence of cycle irregularity with high levels of perceived stress (Nillni et al., 2018). Researchers at Abdulrahman Bin Faisal University surveyed seven hundred and thirty-eight young female students studying health sciences through an anonymous questionnaire. This cross-sectional study found strong positive correlations between stress and various menstrual irregularities, including amenorrhea, dysmenorrhea, and premenstrual syndrome (Rafique & Al-Sheikh, 2018). Schlep et al. (2015) surveyed healthy, premenopausal women and followed them for two menstrual cycles. The data revealed that high levels of stress affect various hormone levels, leading to a significant impact on menstrual cycle parameters, including ovulatory function (Schliep et al., 2015). Another article that was included in this study involved a cross-sectional survey conducted in China where participants were asked to complete a questionnaire consisting of rating scales and close ended questions. Once again, the data established a relationship between menstrual irregularities and high stress levels (Ansong et al., 2019). The findings from Mohebbi et al. (2017) found that high levels of stress contributed showed high levels of stress contributing to menstrual irregularity, but also that appropriate lifestyle can reduce the severity of the symptoms (Mohebbi et al., 2017). These findings serve as evidence that not only do stress levels contribute to menstrual problems, but that reversal of some of these issues is possible through lifestyle

modifications. Mohib et al. (2018) utilized a detailed questionnaire as well, but instead investigated the existence, knowledge, and attitude of female students towards premenstrual syndrome. The authors found the same conclusions relating stress and menstruation, and also how the majority (77.5%) of women believed that PMS was a significant issue in their life (Mohib et al., 2018). Using a case control study format, Fernández et al. (2019) found a strong association between psychological factors including perceived stress, but also neuroticism and coping strategies in relation to the occurrence of PMS/PMDD (Fernández et al., 2019). Bavi et al. (2016) analyzed results from a descriptive-comparative study and concluded that moderate and high levels of stress were more prevalent in the group with dysmenorrhea, specifically occupational stress (Bavi et al., 2016). It also concluded that appropriate lifestyle changes and reduction in stress levels can reduce the severity of dysmenorrhea. Helwa et al. (2018) involved a detailed questionnaire as the method of data collection. The authors aimed at determining the prevalence of dysmenorrhea in university students and concluded a very high prevalence of dysmenorrhea among students under a lot of academic pressure, such as medical and nursing students (Helwa et al., 2018). Although there were limitations in several of these studies, each provided significant evidence in support of the theory that stress can impact the menstrual cycle, specifically in its regularity and severity of symptoms.

IV. Discussion

Review of the available evidence yielded several significant findings. Based on the literature reviewed, a strong correlation exists between stress and issues related to menstruation. First, high levels of perceived stress are associated with a high probability of menstrual irregularity (Nillni et al., 2018; Bae et al., 2018; Rafique & Al-Sheikh, 2018). The physiological mechanism responsible for irregular menstruation and amenorrhea is unknown but could be

related to the prolonged activation of the hypothalamic-pituitary adrenal axis by stress, altering hormonal profiles and disrupting normal ovulation and menstruation (Rafique & Al-Sheikh, 2018). Schliep et al. (2016) found that high daily stress was associated with lower total and free E2, LH, luteal progesterone, higher FSH concentrations, and increased chances of sporadic anovulation in comparison with low stress (Schliep et al., 2016). Although further research should be conducted to determine the physiologic cause of menstrual irregularity, the data analyzed in this review was consistent with the theory that high stress is associated with menstrual irregularity.

Evidence also suggests that high levels of stress are associated with increased negative cycle symptoms. Many researchers concluded that increases in the severity of PMS symptoms were positively and significantly correlated with increases in stress score, as well as participants reporting that PMS symptoms were exacerbated by stress (Mohebbi, et al., 2017; Mohib, et al., 2018; Fernández et al., 2019). Stress causes anxiety and creates mental pressures that exacerbate dysmenorrhea (Bavil et al., 2016). Once again, the physiologic mechanism is unknown, but theorized to be related to the complex interactions of hormonal, neural, and behavioral factors associated with PMS (Fernández et al., 2019). When the corticotrophin-releasing hormone system is activated as a physiological response to stress, menstrual function can be consequently disrupted (Ansong et al., 2019).

Lastly, stress reduction techniques and coping mechanisms correlate to an improvement in the severity of symptoms related to menstruation (Bavil et al., 2016; Fernández et al., 2019; Helwa et al., 2018; Mohebbi et al., 2017; Mohib et al., 2018; Rafique & Al-Sheikh, 2018). Appropriate lifestyle modifications, including self-care and reduction in stress levels, can be utilized to avoid symptoms of premenstrual syndrome and reduce severity of pain associated

with dysmenorrhea. As stated previously, stress inhibits the release of follicle-stimulating hormone and luteinizing hormone, impairing the development of the follicle and altering progesterone synthesis. Other stress hormones, such as adrenaline and cortisol, also influence the synthesis of prostaglandin and the binding in the myometrium, which may explain the role of stress in dysmenorrhea (Ansong et al., 2019). Avoiding the stressors that trigger this activation allow the body to release appropriate levels of hormones and develop follicles that promote menstrual regularity.

Although the data conducted for each study analyzed in this review varied slightly, the results were conclusive to the issue being addressed. Many of the researchers evaluated perceived stress levels along with an assessment of menstrual cycle characteristics, coming to very similar conclusions in that high perceived stress levels are associated with irregular menstrual cycles and severe menstrual symptoms. Multiple researchers also addressed how menstrual disorders are decreasing many women's quality of life.

V.Limitations

Several limitations became evident during the literature review. First, many of the articles utilized in this review consisted of other literature reviews, questionnaires, and surveys. The subjective nature of questionnaires and surveys presents an issue as to the validity of the data. Although limitations and barriers were addressed by each of the authors, involvement of both objective and subjective data would provide stronger evidence. The original focus of this literature review was to involve cortisol levels and its correlation with menstruation, however little research has been conducted involving this data. There is major gap in the current reproductive literature, warranting further research to explore.

Another limitation of this review was that few of the studies analyzed were conducted in the United States (U.S.). This is not an issue involving the validity of the research, but it makes it harder to implement in the U.S. due to the difference in health care systems. Primary prevention is current gap in our nation's healthcare, making it more difficult to implement these practices in healthcare organizations and communities across the United States. This review provides sufficient data for providers to consider the implementation of a more holistic viewpoint when treating women's health conditions.

The last limitation of this review was the common theme of cross-sectional surveys as the current research of stress and its impact on the menstrual cycle. Although the outcomes were analyzed to create new research and theories, these surveys were not able to analyze the behavior over a period of time and the timing was not guaranteed to be representative. Once again, this does not present a threat to the data, because the data found was consistent and reliable. The limitations of this review overall were based on the lack of data surrounding menstruation concerns and presents implications for more research to be conducted in this area.

VI.Implication for Practice

Overall, these findings reinforce the need for practitioners to conduct comprehensive health histories when treating people in all stages of life. It is important that the patients' concerns are always addressed in order provide the best treatment as possible. Often times, the business of health care can cause practitioners to neglect or overlook lifestyle related to the health of an individual. In order to provide the best quality care and lower overall health care costs across the nation, it is vital that healthcare professionals look at all aspects of an individual's life and provide holistic care. Encouraging healthy self-care habits and coping mechanisms could significantly impact and potentially improve symptoms related to

reproductive health. Lifestyle and stress have a key impact on quality of life, and in order to maintain adequate health, managing lifestyle factors must be a focus. To prevent and reduce the incidence of primary dysmenorrhea, knowledge and awareness should be raised in young women through proper lifestyle education and health promotion (Bavil, et al, 2016).

VII. Conclusion

Menstrual disorders are pervasive among young women and can severely impact quality of life. Although further research should be conducted, this review is a resource to support that high levels of stress are associated with cycle irregularity and increased severity of symptoms associated with menstruation. Techniques to reduce stress have also been shown to improve the severity of PMS/PMDD symptoms and dysmenorrhea. In order improve the quality of life of many women struggling with these symptoms, women should be educated on the positive impact lifestyle modifications can produce.

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