

Research Paper

Decoding the Excruciating Experience of Menstrual Distress: A Cognitive Psychology Based Approach

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ABSTRACT

Menstrual distress represents a complex interplay of physiological, emotional, and cognitive factors that significantly influence women's daily functioning. Although prior research has primarily examined the physical and emotional aspects of menstruation, limited attention has been given to its cognitive consequences, particularly regarding sensory and short-term memory processes. This paper adopts a cognitive psychology-based approach to decode the underlying mechanisms through which menstrual distress affects cognitive performance. The study identifies a research gap concerning the relationship between hormonal fluctuations, emotional reactivity, and cognitive efficiency across menstrual phases. It aims to analyze how variations in estrogen and progesterone levels modulate attention, perception, and memory retention, ultimately impacting sensory and short-term memory. The analysis synthesizes existing empirical findings and theoretical models, notably the Atkinson-Shiffrin model of memory (1968), alongside studies by Hampson (2018), Solís-Ortiz and Corsi-Cabrera (2008), and Farage, Osborn, and MacLean (2008). Findings suggest that reduced estrogen and increased progesterone during the luteal and menstrual phases impair neural activation in the hippocampus and prefrontal cortex, leading to weaker encoding and recall abilities. Furthermore, emotional strain and physical discomfort consume attentional resources, resulting in symptoms such as forgetfulness, fatigue, and cognitive fog. The paper concludes that menstrual distress extends beyond a biological phenomenon to a psychophysiological condition where hormonal and cognitive systems dynamically interact. Recognizing these cognitive fluctuations can promote better awareness, empathy, and support for women's mental and emotional well-being during menstruation.

Keywords: *Menstrual Distress, Short term memory, Sensory memory, Hormonal fluctuation, Emotional reactivity*

This paper examines cognitive-based approach to understanding menstrual distress, emphasizing how hormonal and emotional fluctuations influence key cognitive functions such as sensory memory and short-term memory. Menstrual cycle is a natural process in females. In Contrast to the male reproductive system, the female reproductive system undergoes a series of periodic physiological changes collectively referred to as the menstrual cycle. This cyclical process prepares the body for ovulation and

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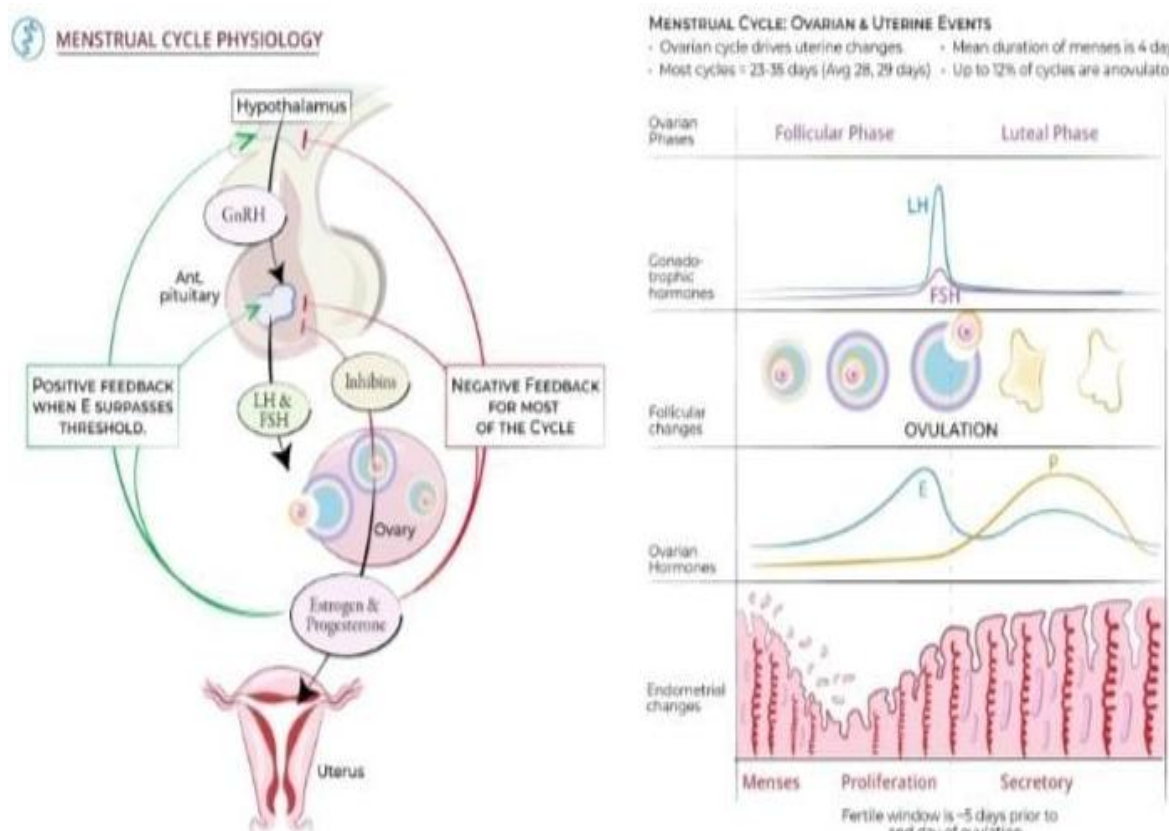
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the potential for conception. The most prominent manifestation of this cycle is menstruation, characterized by regular vaginal bleeding which occurs in conjunction with a precisely regulated sequence of hormonal fluctuations. The initial onset of menstruation, termed menarche, typically takes place during puberty, with an average age of approximately 12 years. These cycles persist throughout the reproductive lifespan and ultimately cease with the onset of menopause, generally occurring around the age of 51 (Thiyagarajan et al., 2024). The menstrual cycle comprises four phases: the menstrual phase, follicular phase, ovulation phase, and luteal phase. The menstrual phase, the first phase of the cycle, commences on the first day of menstruation and typically lasts between three to seven days. During this phase, the endometrial lining is shed due to the absence of fertilization. The second phase is the follicular phase, during which ovarian follicles mature, and estrogen levels rise in preparation for ovulation. This phase extends from the first day of menstruation until ovulation. The third phase, the ovulation phase, involves the release of an ovum from one of the ovaries and generally occurs approximately two weeks prior to the onset of the subsequent menstrual period. The final phase is the luteal phase, during which the corpus luteum forms from the ruptured follicle and secretes progesterone to thicken the endometrial lining in anticipation of a potential pregnancy. If fertilization occurs, the ovum implants in the thickened endometrium, and the corpus luteum continues to secrete hormones to sustain the pregnancy until placental takeover. In the absence of fertilization, the corpus luteum degenerates, leading to a decline in progesterone and estrogen levels. Consequently, the thickened endometrial lining is shed, initiating the subsequent menstrual cycle.

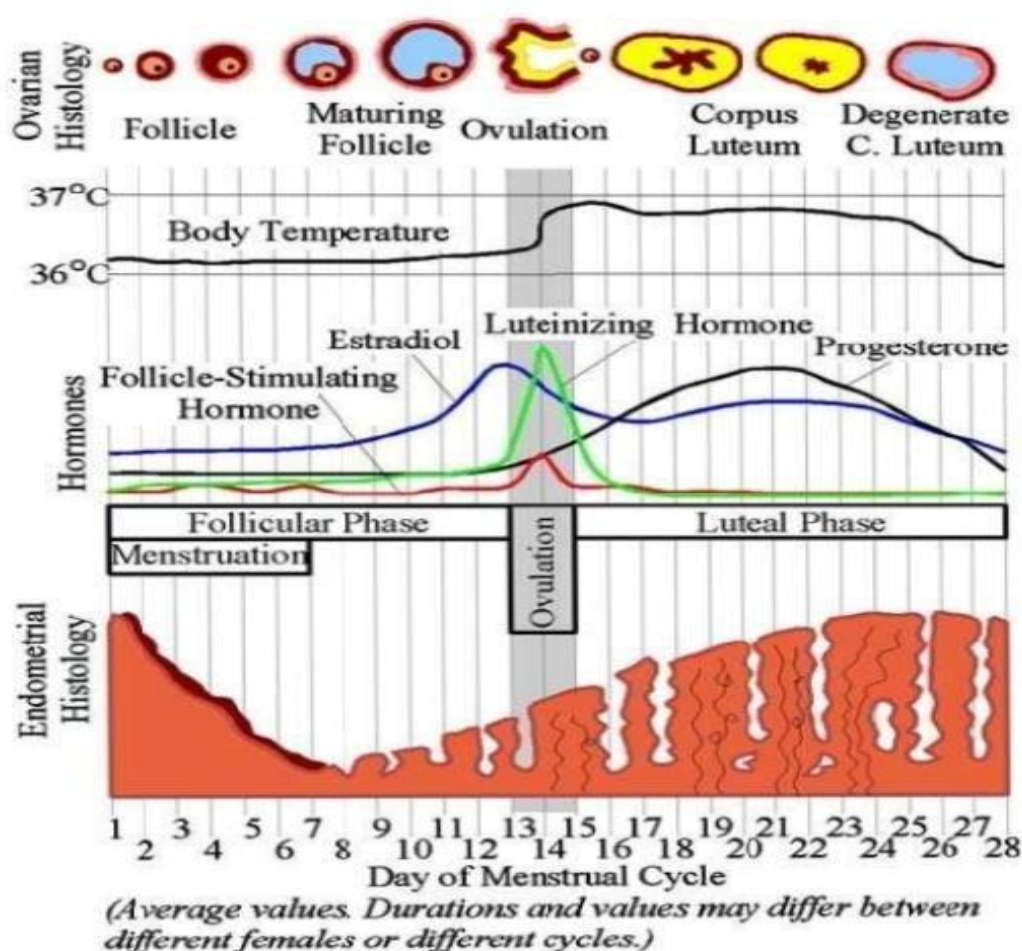


Menstrual distress refers to physical and emotional symptoms experienced by some individuals during their menstrual cycle. Menstrual-related complications carry substantial public health implications. Women experiencing menstrual difficulties should have their mental wellbeing assessed by healthcare professionals. In adolescent and young adult

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females, menstrual disorders can have profound health consequences. Those affected may miss school or work, and their cognitive, emotional, and social development may be disrupted. In adults, menstrual disturbances are often associated with conditions such as depression and anxiety. Common manifestations include abdominal cramps, fatigue, lower back pain, bloating, and mastalgia. Many research indicates that menstrual discomfort can interfere with daily functioning, as well as reproductive and psychological wellness. Menstruation is frequently accompanied by an array of distressing symptoms, including premenstrual syndrome, characterized by mild cramps and lethargy and. The intensity of these manifestations, however, varies among individuals, influenced by health status, nutrition, lifestyle, and other determinants. Many women report menstrual issues have also indicated habits such as tobacco use, alcohol consumption, and increased appetite. Young women often face emotional fluctuations, including sadness, irritability, and despondency. An absent or irregular cycle, or unusually scant bleeding, may signal an atypical menstrual pattern. Therefore, maintaining regular consultations with a gynecologist is essential to identify any notable deviations in menstrual health (Ara et al., 2022)

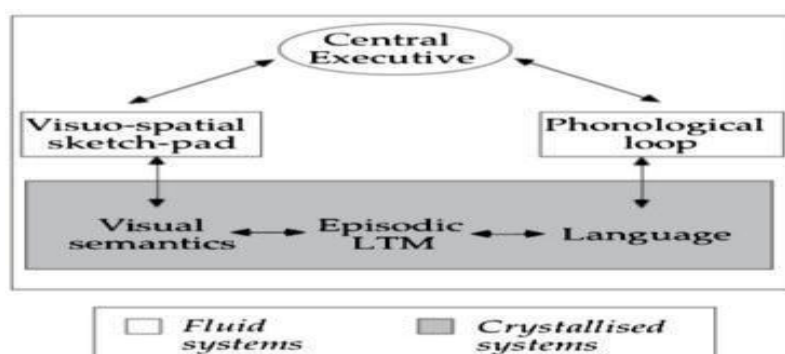
Menstrual distress go beyond physical discomfort to include subtle yet significant cognitive disturbances, particularly in sensory and short-term memory processes. During the menstrual phase, fluctuating levels of estrogen and progesterone influence neural activity within the hippocampus and prefrontal cortex regions critical for attention, perception, and working memory (Hampson, 2018). According to the Atkinson-Shiffrin model, sensory memory serves as the initial gateway for information processing, briefly registering external stimuli before transferring them to short-term memory (Atkinson & Shiffrin, 1968).



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However, the heightened pain sensitivity, fatigue, and emotional instability accompanying menstrual distress can overload sensory channels, leading to reduced attentional capacity and weaker sensory encoding (Farage, Osborn, & MacLean, 2008). As a result, fewer stimuli progress to short-term memory, impairing immediate recall and concentration. Empirical studies have reported temporary cognitive inefficiencies during menstruation, often described as “mental fog” or “forgetfulness,” reflecting disruptions in the normal flow of cognitive information (Solís-Ortiz & Corsi-Cabrera, 2019). These findings indicate that menstrual distress should be interpreted not solely as a physiological condition but as a psychophysiological experience in which hormonal fluctuations, emotional stress, and cognitive processing interact dynamically. Understanding these interconnections can enhance awareness of the cognitive dimension of menstrual health and guide the development of more holistic approaches to menstrual well-being.

Memory is a fundamental cognitive function that enables the encoding, storage, and retrieval of information essential for learning, decision-making, and daily functioning (Baddeley, 2012). It operates through several stages and systems that interact dynamically with emotional and physiological states. In the context of menstrual distress, memory performance may fluctuate due to hormonal variations, mood changes, and physical discomfort that affect attention and cognitive efficiency. Sensory memory refers to the brief and automatic registration of sensory stimuli such as sights, sounds, or touch immediately after exposure (Atkinson & Shiffrin, 1968). It acts as the first gateway of cognitive processing, holding information for a few seconds before it either decays or transfers to short-term memory. During menstrual distress, increased pain perception, fatigue, and emotional fluctuations can disrupt attentional focus, resulting in weaker sensory encoding and reduced responsiveness to environmental stimuli (Farage, Osborn, & MacLean, 2008). Short-term memory (STM), often termed working memory, temporarily holds and manipulates information for reasoning and task performance (Baddeley, 2012). Hormonal fluctuations, particularly the decline in estrogen and rise in progesterone during the luteal and menstrual phases, can impair neurotransmission in brain regions associated with working memory, such as the prefrontal cortex (Solís-Ortiz & Corsi-Cabrera, 2008). Individuals experiencing menstrual distress may report forgetfulness, slower recall, and difficulty concentrating, reflecting transient inefficiencies in short-term memory processing.



 Baddeley A. 2012.
Annu. Rev. Psychol. 63:1–29

Annual
Reviews

REVIEW OF LITERATURE

In the review titled “Reproductive Health of Women: Implications and attributes” by Irfat Ara, Mudasir Maqbool, and Imran Gani (2022) highlighted that menstrual-related problems have significant public health implications and can affect both mental and cognitive well-being. They emphasized that psychological symptoms such as mood instability, irritability, and poor concentration frequently accompany menstrual distress, suggesting a link between hormonal regulation and cognitive performance. Their review calls for broader research on the neuropsychological aspects of menstruation to better understand how hormonal changes influence mental efficiency.

In the article the “*Regulation of cognitive function by androgens and estrogens*” by Elizabeth Hampson (2018) discussed the regulatory role of estrogen and progesterone in modulating neural pathways linked to learning, memory, and attention. Estrogen enhances synaptic connectivity and promotes cognitive flexibility, particularly during the follicular and ovulatory phases when its levels peak. Conversely, progesterone, predominant during the luteal phase, is associated with sedative and mood-stabilizing effects that may impede cognitive alertness and working memory. This neuroendocrine variability explains the cyclical nature of cognitive changes observed during menstruation.

In the study titled, “Sustained attention is favored by progesterone during early luteal phase and visuo-spatial memory by estrogens during ovulatory phase in young women” by S. Solís-Ortiz and M. Corsi-Cabrera (2008) demonstrated that progesterone supports sustained attention during the early luteal phase, whereas estrogen enhances visuo-spatial memory during ovulation. Their findings revealed that hormonal fluctuations not only regulate mood but also distinctly influence cognitive domains, including memory, attention, and perceptual processing. This underscores the importance of considering phase-specific hormonal influences when examining cognition in menstruating individuals.

In the review titled, “Cognitive, sensory, and emotional changes associated with the menstrual cycle: a review” by Miranda A. Farage, Thomas W. Osborn, and Allan B. MacLean (2008) examined the relationship between hormonal shifts and cognitive, sensory, and emotional changes during the menstrual cycle. Drawing on multiple empirical studies, they reported that women often experience temporary cognitive inefficiencies such as forgetfulness, reduced concentration, and mental fatigue during the premenstrual and menstrual phases. These cognitive fluctuations were attributed to hormonal variation, emotional strain, and pain-related distractions, all of which can interfere with normal cognitive processing.

In their study titled, “Fear recognition across the menstrual cycle” by Rebecca Pearson and Michael B. Lewis (2005) explored emotional recognition across menstrual phases and found that hormonal changes can modulate affective processing, leading to increased emotional reactivity and reduced attentional control. Such findings align with the view that menstrual distress operates as a psychophysiological phenomenon rather than a purely physical one.

In the article titled, “Human Memory: A Proposed System and Its Control Processes” by R.C. Atkinson and R.M. Shiffrin (1968) model of memory, sensory input briefly enters sensory memory before transferring to short-term memory. However, under conditions of distress or fatigue, common during menstruation; the efficiency of sensory registration decreases, resulting in diminished attentional capacity and reduced cognitive flow. These

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disruptions mirror reports of “mental fog” or transient memory lapses among menstruating individuals.

In article titled, “Young Adolescents’ Beliefs Concerning Menstruation” by Anne E. Clarke and Diane N. Ruble, examined how socialization shapes adolescents’ perceptions of menstruation among pre- and postmenarcheal girls and boys. The results showed that even before menstruation, adolescents held mostly negative attitudes, linking it to discomfort and mood changes. Pre-menarcheal girls viewed it less negatively than others, indicating early influence of cultural beliefs. Participants expected others to experience stronger symptoms, reflecting societal stereotypes. Mothers and peers were key sources of menstrual knowledge, highlighting the social roots of these perceptions.

In review titled, “The Psychological Impact of Menarche on Early Adolescent Females: A Review of the Literature” by Esther Blank Greif and Kathleen J. Ulman, emphasized that menarche can be experienced as either distressing or positive, depending on personal and contextual factors. Many girls initially react negatively, but adequate preparation and support can improve adjustment. The experience is shaped by age, knowledge, family influence, and individual traits. The authors noted methodological gaps in past studies and urged more comprehensive approaches. They proposed an interactionist model that considers both personal and environmental factors to promote positive menstrual experiences.

In article titled, “Psychological Stress and Neuroendocrine Function in Humans: The Last Two Decades of Research” by M. Boondi and A. Picardi, extensively examined how emotional stress influences hormonal activity in healthy individuals. Laboratory experiments using controlled stressors such as mental arithmetic, speech tasks, or the Stroop test have revealed that stress triggers activation of various endocrine axes, particularly the hypothalamic-pituitary-adrenal (HPA) axis. Real-life stressors like bereavement, examinations, or work pressures produce similar physiological responses, though with greater variability. Findings emphasize that subjective perception plays a major role in determining hormonal responses, as individuals react differently to the same stressor. Factors such as age, gender, personality, coping style, and social support significantly modulate stress reactivity. Scholars highlight that psychological and biological processes interact reciprocally rather than functioning separately. This integrative view promotes understanding stress as a systemic phenomenon involving continuous mind-body feedback.

In article titled, “Physical Characteristics of the Menstrual Cycle and Premenstrual Depressive Symptoms” by Jeff Kiesner, show a strong association between physical symptoms and premenstrual depressive symptoms, influenced by hormonal and neurochemical changes. Neuro active steroids like estrogen and progesterone affect serotonin and GABA receptors, impacting mood regulation. Hormonal fluctuations may also alter immune responses, causing inflammation and symptom exacerbation. It shows mixed results for treatments like SSRIs, emphasizing the need to study physical symptoms more precisely. Overall menstrual-related physical symptoms are key to understanding PMS, PMDD, and women’s mental health.

The study titled, "Mood and the Menstrual Cycle" by Sarah E. Romans, David Kreindler, Eriola Asllani, Gillian Einstein, Sheila Laredo, Anthony Levitt, Kathryn Morgan, Michele Petrovic, Brenda Toner, and Donna E. Stewart (2012), challenges the widespread belief in

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premenstrual dysphoria by analyzing daily mood data from Canadian women over six months. Findings revealed that mood changes were more associated with the menses phase than the premenstrual phase, suggesting a perimenstrual rather than purely premenstrual mood variation. Physical health, perceived stress, and social support were found to be stronger predictors of mood than menstrual cycle phases. Using real-time smartphone telemetry improved data reliability compared to retrospective self-reports. The study emphasizes that mood variability in women is better explained through a biopsychosocial framework rather than reproductive function alone. Overall, it argues that cultural beliefs, rather than biological inevitability, often shape perceptions of premenstrual mood changes.

In article titled, “Premenstrual syndrome, body fat and bitter taste receptor gene TAS2R38 among adult Kullu females of Himachal Pradesh, India” by Krishan Sharma, Ankita Kansal, and Shruti Chopra, indicates that hormonal fluctuations, particularly in the luteal phase, contribute to emotional, behavioral, and physical symptoms such as mood swings, irritability, and pain (Yonkers et al., 2008; Roca et al., 1996). While PMS is common and often mild, around 6% of women experience severe symptoms that affect daily functioning. Studies have categorized PMS into subtypes- PMS-A (anxiety-related) and PMS-D (depressive) with high prevalence among reproductive-age women. Genetic factors, such as variations in the TAS2R38 bitter receptor gene, have been linked to PMS susceptibility and severity. Despite historical debates, contemporary research supports a biopsychosocial understanding of PMS, emphasizing hormonal, genetic, and psychological influences on symptom expression.

DISCUSSION

The cognitive interpretation of menstrual distress reveals an intricate interaction between hormonal changes, emotional reactivity, and neural functioning. Drawing upon the works of Hampson (2018), Solís-Ortiz and Corsi-Cabrera (2008), and Farage, Osborn, and MacLean (2008), it becomes evident that menstrual distress extends beyond a physiological phenomenon, encompassing profound psychophysiological and cognitive dimensions. Each of these studies contributes distinct insights into how hormonal fluctuations influence memory, attention, and information processing, particularly in the domains of sensory and short-term memory.

Hampson (2018) emphasizes the neuroendocrine modulation of cognition through fluctuating levels of estrogen and progesterone. Estrogen, which peaks during the follicular and ovulatory phases, enhances synaptic plasticity and neural connectivity in regions associated with learning and memory such as the hippocampus and prefrontal cortex. This hormonal elevation facilitates efficient sensory registration and improves short-term memory performance. Conversely, the dominance of progesterone in the luteal phase exerts sedative effects on neural activity, leading to reduced cognitive alertness and attentional flexibility. Such hormonal shifts explain the cyclical variations in mental clarity and focus that many women report during different menstrual phases. From a cognitive psychological lens, Hampson’s findings support the notion that hormonal modulation directly influences executive control processes, thereby validating the hormonal basis for temporary cognitive inefficiencies during menstruation.

Building upon this neuroendocrine foundation, the study by Solís-Ortiz and Corsi-Cabrera (2008) provides empirical evidence linking phase-specific hormonal changes to alterations in attentional and memory performance. Their research demonstrates that progesterone

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supports sustained attention during the early luteal phase, while elevated estrogen levels during ovulation enhance visuo-spatial and short-term memory. This bidirectional relationship between hormones and cognition underscores the dynamic nature of cognitive functioning across menstrual phases. The Atkinson-Shiffrin model of memory (1968) offers a theoretical framework to interpret these findings, menstrual distress may disrupt the transition of information from sensory to short-term memory by interfering with attentional mechanisms necessary for encoding. The physiological discomfort, fatigue, and mood fluctuations that accompany menstrual distress likely compete for cognitive resources, thereby reducing working memory efficiency and attentional precision.

Complementing these neurocognitive insights, the review by Farage, Osborn, and MacLean (2008) broadens the understanding of menstrual distress by integrating sensory, emotional, and cognitive perspectives. Their synthesis of multiple empirical studies reveals that women frequently experience “mental fog,” forgetfulness, and reduced concentration during the premenstrual and menstrual phases. These symptoms stem from hormonal variability compounded by emotional strain and pain-related distraction, all of which interfere with attentional focus and cognitive flow. Farage et al. highlight that emotional and sensory overload during menstruation can temporarily diminish the brain’s ability to filter and prioritize stimuli, leading to inefficient information processing and decreased short-term recall. This finding resonates with cognitive load theory, which posits that excessive internal or external demands on attention can impair memory performance.

Integrating these three perspectives reveals a cohesive pattern: hormonal fluctuations (Hampson, 2018), phase-dependent cognitive shifts (Solís-Ortiz & Corsi-Cabrera, 2008), and emotional-sensory interference (Farage et al., 2008) converge to form a multidimensional explanation of menstrual distress. Collectively, they demonstrate that menstrual distress is not merely a physical experience but a cognitive phenomenon characterized by transient disruptions in attentional control and memory processing. Such impairments are adaptive and reversible, reflecting the brain’s ongoing negotiation between physiological demands and cognitive stability. From a broader psychological standpoint, these findings advocate for a holistic understanding of menstrual distress within cognitive and emotional frameworks. Recognizing how hormonal and emotional variables influence cognition can help destigmatize menstrual-related cognitive fluctuations and foster supportive environments in educational and occupational settings. Future research should employ neurocognitive assessments across menstrual phases to map specific cognitive patterns associated with hormonal variations and develop strategies to mitigate the cognitive strain associated with menstrual distress.

In summary it can be said that despite extensive research on the hormonal, emotional, and sociocultural aspects of menstruation, limited attention has been given to its direct impact on core cognitive processes, particularly short-term and sensory memory. Most studies (Hampson, 2018; Solís-Ortiz & Corsi-Cabrera, 2008; Farage et al., 2008) emphasize general cognitive variations like attention and working memory but rarely isolate how menstrual distress influences the early stages of information processing. Although Atkinson and Shiffrin’s (1968) model suggests that stress and fatigue can impair sensory registration and short-term memory, empirical evidence validating this relationship in the context of menstrual distress remains scarce. Moreover, while sociocultural research (Clarke & Ruble; Greif & Ulman) highlights the role of beliefs and emotions in shaping menstrual experiences, these insights are seldom integrated with cognitive findings. This gap calls for

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an interdisciplinary approach that examines how hormonal and emotional fluctuations during menstruation affect memory efficiency from a cognitive psychology perspective.

CONCLUSION

The present study underscores the intricate relationship between menstrual distress and cognitive functioning, particularly in the domains of sensory and short-term memory. By adopting a cognitive psychology-based perspective, it becomes evident that menstrual distress is not merely a physiological experience, but a psychophysiological and neurocognitive phenomenon shaped by the interplay of hormonal fluctuations, emotional regulation, and cognitive load. The hormonal variability that defines the menstrual cycle, marked by oscillations in estrogen and progesterone, profoundly influences brain regions such as the hippocampus and prefrontal cortex, which are essential for attention, perception, and memory processing. These neuroendocrine changes can temporarily disrupt the balance of neural activation, leading to altered sensory registration, diminished attentional focus, and reduced short-term recall. From a broader standpoint, recognizing menstrual distress as a multidimensional cognitive challenge has both scientific and social implications. It challenges the long-standing tendency to compartmentalize menstruation as a purely biological or reproductive issue, instead situating it within the framework of human cognition and mental well-being. Such a perspective encourages greater empathy in educational and occupational settings, where temporary lapses in focus or performance may be misinterpreted as disinterest or inefficiency rather than natural cognitive variation. Menstrual distress exerts a transient yet measurable impact on sensory and short-term memory, mediated through hormonal, emotional, and cognitive pathways. Understanding these mechanisms through a cognitive psychology lens provides valuable insight into how biological rhythms interact with mental processes. Future research should employ longitudinal neurocognitive studies, hormonal assays, and experimental paradigms to systematically assess the extent and variability of cognitive changes across menstrual phases. This integrative approach would not only advance theoretical models of memory and attention but also contribute to more inclusive health and educational policies that acknowledge women's cognitive rhythms as a vital component of overall well-being.

Limitations and Implications

While this term paper offers a comprehensive cognitive psychology-based perspective on menstrual distress, several limitations emerge upon critical examination. Firstly, the paper relies predominantly on secondary sources and theoretical frameworks without incorporating original empirical data or experimental validation. This limits the ability to establish direct causal relationships between hormonal fluctuations and cognitive performance. Secondly, the discussion generalizes the menstrual experience across all individuals, overlooking the vast inter-individual variability in hormonal sensitivity, emotional reactivity, and sociocultural context. Such generalizations may obscure the unique cognitive and psychological patterns that differ from person to person. Additionally, the study focuses primarily on sensory and short-term memory, neglecting other vital cognitive domains such as long-term memory, executive functioning, and decision-making, which may also be influenced by menstrual distress. The paper also simplifies the complex interaction between hormones, cognition, and emotion, treating them as linear rather than multidimensional processes influenced by external factors such as stress, nutrition, sleep, and lifestyle. Moreover, while the review briefly acknowledges sociocultural and psychological influences, it does not fully explore how societal stigma, cultural taboos, or gendered perceptions shape the subjective experience of menstrual distress and its cognitive

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consequences. Another limitation lies in the reliance on cross-sectional or phase-specific research cited from previous studies, which may not accurately capture dynamic hormonal-cognitive interactions over time. The lack of intersectional analysis further restricts the applicability of findings across diverse populations, as the reviewed literature primarily reflects Western research contexts. Lastly, the paper's theoretical emphasis, though insightful, lacks a practical or applied dimension such as suggesting interventions, coping strategies, or neurocognitive therapies that could translate these findings into real-world benefits. Therefore, while the paper successfully highlights the cognitive dimension of menstrual distress, future studies should address these limitations through empirical research, longitudinal designs, cultural inclusivity, and applied psychological approaches to provide a more nuanced and comprehensive understanding of this psychophysiological phenomenon.

Future research should incorporate neurocognitive and longitudinal methods to explore how hormonal fluctuations influence sensory and short-term memory across menstrual phases. Integrating psychological, neurological, and hormonal perspectives can offer a more comprehensive understanding of cognitive variations during menstruation. Additionally, practical interventions such as mindfulness training and stress management may help mitigate cognitive disruptions. These insights can guide educators and employers in creating more empathetic and flexible environments that support women's cognitive well-being during menstrual distress.

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Conflict of Interest

The author(s) declared no conflict of interest.

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