

Women's Health Research During Ramadan: A Narrative Review

Marwa H. Attia ^{1,*}, Isam B. Maaz ¹, Stephanie M. Swanberg ¹ and Andrew S. Franks ^{1,2,*}

¹ Michigan School of Psychology, Farmington Hills, MI 48334, USA

² Department of Psychology, University of Michigan, Flint, MI 48502, USA

* Correspondence: mattia@msp.edu (M.H.A.); afranks@msp.edu (A.S.F.)

Abstract

The scientific study of Ramadan fasting has grown considerably in recent years, yet women remain a systematically underrepresented population within this literature. This underrepresentation points to a broader historical tendency in biomedical and psychological research to default to male-centric models, which have repeatedly demonstrated poor generalizability to women across a range of health outcomes. This narrative review argues that this gap is significant in the context of Ramadan fasting, where sex-based differences in hormonal regulation, circadian biology, metabolic and immune functioning, and psychological vulnerability may create meaningfully distinct fasting experiences for women. Although women are frequently included as participants in Ramadan research, women's health outcomes are rarely the central organizing focus. Drawing from previous empirical literature, this review synthesizes current evidence on the effects of Ramadan fasting on physiological and mental health in women, while situating these findings within the broader context of sex differences in relevant medical and psychological research. Implications for the inclusion of women-specific health considerations in fasting research are discussed.

Keywords: Ramadan; fasting; women's health; sex differences; mood; sleep; circadian rhythms; narrative review

1. Introduction

Literature examining the physiological and mental health effects of Ramadan religious practices has expanded considerably in recent years, demonstrating an important step forward in representation for Muslim populations in medical and health psychology research. Islam is currently the second-largest religion in the world, with approximately 1.6 billion Muslims accounting for nearly 23% of the global population [1]. Ramadan fasting, one of the central religious practices observed by Muslims worldwide, involves abstaining from food, drink, smoking and other over-consumptive behaviors from dawn to sunset over the course of one lunar month, while also engaging in increased prayer and religious observance (The Quran, 2:183–185) [2]. Beyond its spiritual significance, Ramadan fasting has increasingly attracted scientific attention due to its physiological, metabolic, psychological and behavioral effects [3].

In recent years, fasting more broadly has gained popularity as both a dietary and behavioral approach to weight management and eating regulation. Contemporary fasting practices are implemented in several forms, with intermittent fasting (IF) and alternate-day fasting (ADF) among the most widely examined within the scientific literature. IF generally refers to eating patterns characterized by alternating periods of food consumption and voluntary abstinence, often proposed as an alternative to traditional calorie-restriction



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approaches [4]. Similarly, ADF involves cycling between periods of unrestricted intake and periods of substantial caloric reduction or complete fasting [5]. Much of the extant literature has reported benefits of such fasting practices on physiological health [6,7] and mental health [8,9].

However, Ramadan fasting differs from many experimentally studied forms of fasting because it is accompanied by substantial behavioral and lifestyle changes that extend beyond caloric restriction alone. During Ramadan, individuals experience disruptions in meal timing, sleep schedules, nocturnal activity, and daily routines that may collectively influence mood [10,11], sleep quality [12–14], circadian regulation [3,15], and metabolic functioning [16,17]. Each of these outcomes has received attention in the context of Ramadan as interest in intermittent fasting and time-restricted eating models has expanded within the broader health literature, but the aforementioned disruptions may have effects that counteract or interact with the effects of fasting. Indeed, studies isolating the effects of sleep disruptions have shown that they negatively impact outcomes such as mood [18] and metabolic functioning [19]. Such results demonstrate the need to account for all of the changes in diet, sleep, and other relevant factors when examining the physiological and psychological effects of Ramadan practice.

It is additionally of critical importance to consider that myriad sex differences exist within interacting phenomena germane to cultural and religious practice, physiological processes, and both medical and mental health outcomes. Like many cultural and religious practices within the world's major monotheistic religions, there are sex differences in both the explicitly prescribed and implicitly communicated expectations associated with Ramadan [20]. Women are also disproportionately affected by a range of medical and mental health conditions with symptomology that can be influenced by changes in eating and sleep schedules such as those experienced during Ramadan [21,22]. These include autoimmune and inflammatory conditions that occur more frequently in women, such as systemic lupus erythematosus, primary Sjogren's disease, thyroiditis, Graves' disease, rheumatoid arthritis, and multiple sclerosis, as well as chronic pain conditions such as fibromyalgia and psychiatric conditions such as depression and anxiety disorders [21–24]. Individuals who are pregnant, nursing, menstruating, or ill are exempt from fasting (The Quran (2:183–185)) [2]. The effects of ovulatory cycles on women extend beyond the menstrual period [25], gendered expectations surrounding parenting extend beyond pregnancy and nursing [26], and ambiguity exists regarding whether and under what circumstances fasting is necessary or appropriate for individuals with chronic medical conditions and mental health conditions [27]. Given these considerations, a more women-centered framework for understanding the impacts of Ramadan fasting and broader practice is warranted.

Accordingly, the present narrative review synthesizes the current literature examining the effects of relevant Ramadan-related factors on physiological and psychological outcomes while situating these findings within the broader context of sex differences in physiology and psychological functioning. The aforementioned concerns regarding sex differences are further exacerbated within the context of longstanding male-centric biases in both the medical and mental health literature [28] as well as by gendered sociocultural and religious expectations. Thus, the review will start by contextualizing the historical exclusion of women from biomedical research and the resultant misuse of male-centric models on women and then discuss relevant sociocultural gendered influences. The review will then be organized into sections that discuss a range of physiological and psychological conditions and characteristics on which systematic sex differences exist. These sections will include, in order, discussions of hormones and psychophysiology; body composition and metabolic functioning; sleep and circadian rhythms (as outcomes); and medical and psychiatric vulnerabilities. Within each section, the review will present a summary of the

extant research on the effects of Ramadan religious practice—as well as fasting and sleep disruptions more broadly—on those characteristics and conditions. The review will then conclude by identifying gaps in the current literature and suggesting directions for future research and clinical practice.

2. Literature Search

This manuscript constitutes a narrative review of contemporary literature (predominantly 2019–2026, with use of some sources from as early as 2011 when necessary to the narrative) relating to the specific effects of Ramadan religious practice on a range of medical and psychological outcomes and conditions that disproportionately impact women. Literature examining the impact of fasting and sleep disruption more broadly as well as sex differences on such outcomes and conditions was also included. There were no inclusion or exclusion criteria related to methodologies of previous sources, though books, chapters, and dissertations were excluded. Search strategies were highly variable as the narrative required documenting evidence relating to broad gender biases and exclusion in medical and psychological research as well as research relating to the aforementioned relationships that Ramadan practice, fasting and sleep disruptions generally, and gender have with a range of medical and psychological outcomes and conditions.

Examples of search terms included stems such as “Ramadan”, “Ramadan fasting”, “fasting”, “intermittent fasting”, “Muslim”, “Islam”, “sleep”, “circadian rhythm”, “gender”, “women”, “female”, and other terms related to relevant independent variables paired with outcomes such as “depression”, “mood disorders”, “anxiety”, autoimmune disease”, etc. More specially, these terms were organized by topic: gender bias and exclusion of women in research (“sex differences”, “gender bias”, “sex as a biological variable”); Ramadan and fasting practices (“Ramadan”, “fasting”, “intermittent fasting”, “Muslim”, “Islam”); sleep and circadian functioning (“sleep”, “circadian rhythm”, “sleep quality,”) mood and psychiatric outcomes (“depression”, “anxiety”, “mood disorders”, “mental health”) hormonal and reproductive factors (“cortisol”, “menstrual cycle”, “reproductive hormones”, “PCOS”); body composition and metabolic functioning (“body composition”, “metabolic health”, “BMI”); autoimmune and chronic conditions (autoimmune disease, “lupus”, “rheumatoid arthritis”, “fibromyalgia”); sociocultural and gender (“caregiving”, “domestic labor”, “gender roles”).

Searched databases included PsycINFO, PsycARTICLES, ProQuest Psychology Collection, ProQuest Social Science Collection, MEDLINE (PubMed), Google Scholar, and Directory of Open Access Journals (DOAJ). Due to the conceptual complexity of the topic and the emerging nature of the literature regarding sex differences in health and mental health outcomes during Ramadan, the review was not designed as a systematic review or meta-analysis, and we do not claim full compliance with the PRISMA 2020 reporting framework [29]. The objective was not to engage in quantitative synthesis but rather to engage in critical interpretation and integration of evidence across several heterogeneous bodies of literature.

3. Women in Biomedical and Fasting Research

3.1. Historical Exclusion of Women in Research

The marginalization of women within Ramadan fasting research reflects an older pattern in which male physiology has been treated as the default model of human health [30]. For much of the twentieth century, investigators favored male participants and male animals on the assumption that findings would generalize across sexes and regarded the hormonal variability of the female reproductive cycle as a source of random error rather than a phenomenon worthy of study [31]. Regulatory efforts to correct this imbalance

emerged in the 1990s when the National Institutes of Health Revitalization Act of 1993 required the inclusion of women in federally funded research [32], but evidence of continued gender bias was found across the majority of surveyed biological fields in reviews of published literature from as recently as 2009 [28]. In 2016, a designation of sex as a biological variable (SABV) mandated that investigators account for sex in design, analysis, and reporting [33], with scholars offering interpretations for both research [34,35] and clinical practice [36]. Despite these reforms, enrollment has largely remained disproportionate, and even when both sexes are enrolled, results are frequently pooled, leaving sex-specific effects unclear [28,37].

3.2. Consequences for Generalizability

The consequences of this male-centric tradition extend beyond equity. When interventions are validated predominantly in men, their generalizability to women cannot be assumed because disease presentation, pathophysiology, and therapeutic response can all be influenced by sex [38]. This limitation is especially consequential in fasting research, where the metabolic, endocrine, and circadian systems most directly engaged by fasting are precisely those that differ between the sexes. Reviews of Ramadan and intermittent fasting have repeatedly noted that sex is rarely treated as a primary determinant of outcome, and that women, when included, are analyzed as a subgroup rather than as a central focus [39]. A recent longitudinal study illustrates movement toward sex-specific analysis, but it does not resolve the broader shortage of women-centered evidence [20]. The existing literature therefore offers an incomplete account of how fasting affects women, and the assumption that male-derived findings extend to women remains largely untested, which is a gap that motivates the women-centered framework this review advances. Subsequent sections of this review unpack the consequences of male-centric medical and psychological research in the context of Ramadan and provide evidence for the way that women's Ramadan experiences are shaped by biological factors, such as reproductive hormones and immune function. Additionally, women may also experience differing outcomes during Ramadan due to factors that extend beyond biological sex and into gendered sociocultural expectations, such as caregiving roles, food preparation, and household labor.

4. Sociocultural and Gendered Experiences

The psychological experience of Ramadan is also embedded within a sociocultural context that frequently allocates additional labor to women. In many households, women assume primary responsibility for preparing the pre-dawn suhoor and evening iftar meals, often alongside caregiving and occupational obligations [20]. Food-related responsibilities may also shape women's fasting experience. Hosseini et al. (2024) note that Ramadan eating behaviors differ from usual patterns because fasting is followed by nighttime eating, altered sleep cycles, and changes in hunger across the month and suggest that involvement in food preparation and exposure to food environments may influence hunger during Ramadan [40]. This concentration of domestic and emotional labor during a month that simultaneously shortens and fragments sleep can intensify role strain and limit recovery, amplifying the fatigue associated with fasting even as the same activities confer meaning and spiritual satisfaction. The literature on Ramadan mental health suggests that psychological outcomes during Ramadan may be shaped not only by fasting itself but also by increased spirituality, communal meals, prayer, family connection, emotional regulation, and reduced loneliness [13,20]. Despite the salience of these gendered dynamics, their specific contribution to women's mental well-being during Ramadan remains insufficiently examined.

5. Mood, Hormones, and Psychophysiology in Women During Ramadan

5.1. Mood and Emotional Functioning

Research on mood during Ramadan reflects the coexistence of psychological benefit and emotional strain. Multiple studies report reductions in depression, anxiety, and stress, alongside enhanced subjective happiness and life satisfaction [10,41,42]. These benefits are frequently attributed to the spiritual structure of the month and its strengthening of emotional regulation [14,20]. However, emerging research also reveals evidence of increased stress during Ramadan [14,20]. Jandali et al. (2024) found that the physiological demands of fasting and shortened sleep can produce irritability, tension, and reduced day-time alertness [14]. In addition, Sindiani & Korman (2026) provide preliminary longitudinal evidence for sex differences in distress during Ramadan [20]. Specifically, women reported a temporary increase in global distress between the first and fourth weeks of Ramadan that was not observed in men [20]. Poor sleep quality during Ramadan has also been associated with elevated stress among women specifically, highlighting the entanglement of mood, sleep, and sex [14].

Recent review evidence supports this mixed interpretation [13,43]. Ahmed et al. (2025) found that many studies on Ramadan fasting reported improvements in depression, anxiety, stress, and well-being, but the same review found mixed effects on sleep quality and cognitive functioning [13]. Therefore, fasting during Ramadan should not be framed as uniformly beneficial or harmful for mental health; rather, psychological outcomes appear to vary by study design, population, sleep disruption, and broader Ramadan-related lifestyle changes. Broader fasting intervention literature also suggests possible reductions in anxiety and depressive symptoms. In a systematic review and meta-analysis, Berthelot et al. (2021) found lower anxiety and depression levels in fasting groups compared with controls when analyses were limited to randomized controlled trials with low risk of bias [43]. However, the authors emphasized that the evidence remains preliminary and that no study was conducted specifically in psychiatric populations.

Taken together, the evidence suggests that Ramadan-related mood outcomes are best understood as mixed and context-dependent rather than uniformly beneficial or harmful. For women specifically, psychological benefits linked to spirituality and social connection may coexist with increasing distress, sleep-related stress, fatigue, and other fasting-related demands, underscoring the need for sex-specific, women-centered research on mood across the month of Ramadan.

5.2. Hormonal and Psychophysiological Considerations

Mood changes are plausibly mediated by alterations in the neuroendocrine stress response. Cortisol follows a diurnal rhythm sensitive to the disrupted sleep, dehydration, and shifted meal timing of the fasting month, and its dysregulation can heighten irritability and anxiety [44]. The empirical picture is not uniform, however, as some studies report cortisol mostly unchanged while melatonin, ghrelin, and leptin decline [44]. In another controlled study of women with what is now known as polyendocrine metabolic ovarian syndrome (PMOS; formerly “polycystic ovary syndrome”, PCOS), Zangeneh et al. (2015) found cortisol and noradrenaline decreased over Ramadan [45]. Sex-specific endocrine factors add further complexity, as fluctuations in reproductive hormones across the menstrual cycle interact with circadian regulation to shape sleep and emotional reactivity in women [46]. Recent women-centered Ramadan evidence reinforces the importance of measuring menstrual cycle experiences directly. In a mixed-methods study of Lebanese women, Yared et al. (2026) found that 60.9% of participants reported fatigue and cramps during menstruation, 54.3% reported menstrual periods lasting 6–7 days, and 27.8% reported irregular cycles during Ramadan, which carry psychosocial and spiritual dimensions [47].

Specifically, 70.5% reported psychological or spiritual difficulty when not fasting during menstruation, nearly one-third reported shyness or judgment when not fasting, and 18.5% reported medication use to delay menstruation for religious continuity [47]. This is relevant to psychophysiology because menstrual symptoms and irregularity occur within the same Ramadan context of altered sleep, shifted feeding schedules, hydration changes, spiritual obligations, and social expectations. However, because Yared et al. did not measure hormonal biomarkers, the study should not be interpreted as evidence that Ramadan fasting directly changes cortisol, leptin, gonadotropins, or reproductive hormones; rather, it provides preliminary women-centered evidence that future studies should assess menstrual phase, reproductive hormones, sleep, hydration, mood, and psychosocial stress together. The psychophysiological impact of fasting may therefore vary by menstrual phase and psychosocial context, an interaction the Ramadan literature has only begun to examine, and these factors may have further reciprocal interactions with body composition and metabolic response.

5.3. Body Composition and Metabolic Responses in Women During Ramadan

Ramadan fasting has been associated with several short-term changes in body composition and metabolic functioning. Existing literature suggests that Ramadan fasting may contribute to modest reductions in body weight, body fat percentage, waist circumference, and visceral adiposity [39,48,49]. However, findings remain variable across populations and study designs. These changes are influenced not only by fasting itself, but also by alterations in dietary intake, hydration status, sleep patterns, physical activity, and meal timing during Ramadan.

Elsahoryi et al. (2025) reported significant reductions in body weight, body mass index (BMI), body fat percentage, and visceral fat during Ramadan fasting among university students [48]. The study also observed concurrent declines in sleep quality and physical activity levels, suggesting that body composition changes during Ramadan may occur alongside broader behavioral and lifestyle alterations. Similar findings have been reported in systematic reviews examining intermittent fasting and Ramadan-specific fasting models, which generally demonstrate temporary reductions in body weight and fat mass during the fasting month [39,49].

Faris et al. (2020) and Obaideen et al. (2022) further noted that Ramadan fasting may improve several metabolic markers, including adiposity-related measures and inflammatory parameters [39,49]. Women-specific evidence supports this interpretation while also showing that these effects are not uniform across all markers [50]. In a cohort of 62 healthy Saudi women, including 31 pre-menopausal and 31 post-menopausal participants, Al Zunaidy et al. (2024) measured anthropometric, lipid, hormonal, inflammatory, and oxidative-stress markers before Ramadan and near the end of the fasting month [50]. The authors found significant reductions in body weight, BMI, waist circumference, waist-to-height ratio, percent body fat, fat mass, fat mass index, and triglycerides in both groups, along with significant increases in HDL-C, superoxide dismutase, glutathione peroxidase, and IL-10. However, fasting glucose, total cholesterol, LDL-C, fat-free mass, total body water, systolic blood pressure, progesterone, total antioxidant capacity, malondialdehyde, and IGF-1 did not significantly change, and qualitative CRP findings differed by menopausal group [50]. Proposed mechanisms include reduced caloric intake, shifts in substrate utilization, increased reliance on fat metabolism during fasting periods, and possible modulation of inflammatory and oxidative-stress pathways [3,50]. However, these physiological responses may differ substantially based on age, sex, baseline metabolic health, dietary habits, and physical activity levels.

Additional literature specifically studied the impact of fasting on athletic performance [51,52]. In a review of relevant literature, Ghaffar et al. (2025) concluded that negative impacts exist across a broad range of competitive sports [51]. Female athlete data provide a useful example of how physical activity and training context may shape Ramadan-related body composition findings. Similarly, Memari et al. (2011) prospectively followed 12 female taekwondo athletes aged 15–27 years who continued training during Ramadan and were assessed one week before Ramadan, during the second and fourth weeks of Ramadan, and two weeks after Ramadan [52]. The authors found significant reductions in weight and BMI by the second week of Ramadan, with further reductions by the fourth week, while calorie intake decreased significantly by the fourth week and increased again after Ramadan. Waist-to-hip ratio also varied over time, although the authors noted that weight reduction during Ramadan may reflect reduced fluid intake and hypohydration rather than meaningful fat loss. Physical performance findings were more limited; agility showed a significant time effect, whereas vertical jump and balance did not. The authors concluded that Ramadan fasting affected body composition indices but did not clearly impair physical performance in these female athletes who were not menstruating during test sessions [52]. This limits generalizability to broader populations of female athletes or women fasting during Ramadan.

While reviews of relevant literature suggest overall positive impacts of fasting on metabolic health [7], sex-specific metabolic responses may also influence women's experiences during Ramadan fasting. Hormonal fluctuations and endocrine regulation may alter energy utilization, fat metabolism, and appetite regulation in women compared to men. Some evidence suggests that women may demonstrate distinct adaptive responses to intermittent fasting due to differences in body composition, reproductive hormones, and energy conservation mechanisms [38,46]. Despite these potential differences, women remain underrepresented in Ramadan fasting research, limiting the ability to draw definitive conclusions regarding female specific metabolic outcomes.

Behavioral and cultural factors also play an important role in shaping body composition changes during Ramadan. Altered meal timing, nocturnal eating, communal meals, and increased consumption of calorie-dense foods during iftar may influence energy balance and metabolic regulation. In many households, women also assume substantial meal preparation and caregiving responsibilities during Ramadan, which may affect physical activity patterns, sleep quality, and eating behaviors [20,40]. These sociocultural factors may contribute to variability in metabolic outcomes observed across studies.

Although many studies report weight reduction during Ramadan, evidence suggests that these effects are often temporary. BaHammam and Almeneessier (2020) noted that post-Ramadan rebound effects are common, with body weight and metabolic markers frequently returning toward baseline levels after the conclusion of the month of Ramadan [3]. This suggests that sustained metabolic benefits may depend on long-term behavioral changes rather than short-term fasting alone. Furthermore, hydration changes during prolonged daily fasting may temporarily influence body weight measurements, complicating interpretation of body composition outcomes.

Overall, current evidence suggests that Ramadan fasting may produce modest short-term improvements in body composition and metabolic health. However, findings remain heterogeneous, and women-centered analyses are limited. Hosseini et al. (2024) note that the effects of fasting diets on eating behavior, sleep, mood, and well-being remain incompletely understood and inconsistently studied across fasting regimens [40]. Therefore, women's body composition changes during Ramadan should be interpreted alongside changes in sleep, appetite, meal timing, hydration, physical activity, and sociocultural responsibilities. Additional research focusing specifically on female metabolic responses,

hormonal influences, and sociocultural factors is necessary to better understand the effects of Ramadan fasting on women's body composition and long-term metabolic health.

6. Sleep and Circadian Rhythm Alterations in Women During Ramadan

Ramadan fasting is associated with significant alterations in sleep patterns and circadian functioning that may differentially influence women's physical and psychological well-being due to sex-based differences in neurobiological sleep regulation, reproductive hormone fluctuations, and metabolic functioning [38,46]. Changes in meal timing, nighttime social activities, pre-dawn awakening for suhoor, and delayed sleep schedules contribute to disruptions in normal sleep architecture during the fasting month. Existing research consistently reports reductions in sleep duration, delayed sleep timing, fragmented sleep, and increased daytime fatigue during Ramadan fasting [13,49].

A systematic review and meta-analysis conducted by Faris et al. (2020) found that total sleep time decreased from approximately 7.2 h before Ramadan to 6.4 h during Ramadan, indicating an average reduction of nearly one hour of sleep per night [49]. The review included 24 studies conducted across multiple countries and concluded that Ramadan fasting moderately reduced total sleep time while slightly increasing daytime sleepiness. These findings are consistent with Ahmed et al. (2025), who concluded that Ramadan fasting studies show more consistent evidence for mental health benefits than for sleep benefits, with sleep quality findings remaining mixed [13]. This distinction is important because Ramadan may improve some aspects of well-being while simultaneously worsening sleep quality, fatigue, or daytime functioning in some groups.

Additional evidence suggests that sleep and circadian disturbances during Ramadan may also influence metabolic functioning. Anwardeen et al. (2025) reported that disrupted circadian rhythms and poor sleep patterns were associated with increased inflammation, oxidative stress, and metabolic dysregulation during Ramadan fasting [15]. In contrast, Al Zunaidy et al. (2024) found that Ramadan intermittent fasting was generally associated with improved anthropometric, metabolic, inflammatory, and oxidative-stress markers in both pre-menopausal and post-menopausal women [50]. The authors proposed that sleep disruption may attenuate some of the potential metabolic benefits associated with fasting. However, findings regarding oxidative stress remain inconsistent. BaHamam and Almeneessier (2020) noted that current evidence does not provide definitive conclusions regarding the effects of Ramadan fasting on oxidative stress markers, highlighting the complexity of isolating fasting-related physiological effects from broader behavioral and lifestyle changes during Ramadan [3].

Women may be particularly vulnerable to the sleep disruptions associated with Ramadan due to the higher prevalence of medical and psychiatric conditions that disproportionately affect women and that are known to have reciprocal effects on sleep quality, fatigue, and circadian functioning [18,53]. Depression and anxiety disorders occur at significantly higher rates in women than in men across populations [22,54], and sleep fragmentation during Ramadan may exacerbate these conditions by disrupting mood regulation and increasing psychological distress. These factors relating to sleep disruption and mood may further interact with and reciprocally affect medical conditions that disproportionately impact women.

7. Medical and Psychiatric Vulnerability in Women During Ramadan

Medical and psychiatric vulnerability should be considered in women-centered Ramadan fasting research because women are disproportionately affected by numerous medical and psychological conditions, including several autoimmune and inflammatory disorders as well as anxiety and mood disorders. Many autoimmune diseases occur more

frequently in women than in men, including systemic lupus erythematosus, primary Sjögren's disease, thyroiditis, Graves' disease, rheumatoid arthritis, and multiple sclerosis [21]. These sex differences may be shaped by biological mechanisms such as sex hormones, x-chromosome-related immune genes, epigenetic regulation, environmental factors, and microRNAs [21].

Since Ramadan involves concurrent changes in sleep, meal timing, daily routine, social obligations, and spiritual practices that may influence depression, anxiety, and stress, it is important to examine psychiatric vulnerabilities in relation to Ramadan, which is particularly important for women who experience higher prevalence of mood and anxiety disorders in comparison to men [54]. In a study of 163 Muslim adults during Ramadan in the United States, most of whom were women, Jandali et al. (2024) found that depression, anxiety, and stress scores generally remained within normal ranges, while sleep scores indicated significant sleep disturbance [14]. In the female subsample, sleep duration, use of sleep medication, and global sleep-quality score were significant contributors to stress, while life satisfaction and subjective happiness were associated with lower depression scores [14]. This suggests that Ramadan may include psychologically protective elements, such as life satisfaction and happiness, while sleep disruption may still contribute to distress in some women.

The notion that the fasting aspect of Ramadan practice may promote mental health is further supported in the empirical literature. In addition to the previously mentioned meta-analysis by Berthelot et al. (2021) that linked experimental assignment to fasting with reductions in mood and anxiety symptoms in non-clinical populations [43], an earlier review by Fond et al. (2013) concluded that fasting is beneficial for reducing symptoms in individuals with mood disorders [55]. Work by Ahmed et al. (2025) and Hosseini et al. (2024) also supports the conclusion that the fasting component of Ramadan fasting may be beneficial to mental health, perhaps especially for women who tend to suffer from anxiety and depressive symptoms at higher rates than men [13,40]. It is, however, important to note that Ramadan fasting occurs in a broader context that simultaneously positions Muslim women in sociocultural contexts where they encounter gender-specific stressors, which may counteract the salubrious mental health impacts of fasting. Indeed, a large-scale ($N = 8609$) study of the long-term impact of Ramadan fasting found no overall effect of the practice on depression [56].

Although psychological conditions warrant separate discussion, autoimmune conditions are also relevant to psychological well-being. In a systematic review and meta-analysis of 58 studies including 87,756 people with multiple sclerosis, Boeschoten et al. (2016) found pooled prevalence rates of 30.5% for depression and 22.1% for anxiety [57]. Similarly, in a sample of 72 patients with systemic lupus erythematosus, Figueiredo-Braga et al. (2018) found that 41.7% had depression and that depression was positively associated with pain, body mass index, fatigue, and anxiety [58]. While these studies do not examine Ramadan fasting directly, they support the need to study the effects of Ramadan among women with autoimmune disease because fasting-related changes in sleep, hydration, medication timing, fatigue, and daily routine may interact with pre-existing disease burden and psychiatric vulnerability.

Women with autoimmune conditions such as systemic lupus erythematosus, rheumatoid arthritis, multiple sclerosis, and fibromyalgia, all of which predominantly affect women [21], may experience heightened symptom burden during Ramadan due to the interaction of fasting-related sleep disruption, altered hydration, and fatigue with pre-existing disease activity [21,23]. Hormonal fluctuations across the menstrual cycle further add to these vulnerabilities, as reproductive hormones directly modulate sleep architecture, circadian timing, and stress reactivity in women [46].

Psychological stress may also be relevant to autoimmune vulnerability, although the relationship should be framed cautiously. Ilchmann-Diounou and Menard (2020) explain that psychological stress has been suggested to precede autoimmune disorder occurrence and exacerbate symptoms, but they also emphasize that a direct causal role has not been established [59]. This is relevant to Ramadan research because sleep disruption, fatigue, caregiving expectations, and role strain may be important psychosocial variables to examine in women with autoimmune conditions.

Ramadan specific evidence in rheumatic disease suggests possible benefits, although findings remain limited [60,61]. Ben Nessib et al. (2021) reviewed evidence indicating that Ramadan intermittent fasting may attenuate inflammatory status by reducing pro-inflammatory cytokine expression, body fat, and circulating leukocyte levels, and that many patients with rheumatoid arthritis or spondyloarthritis report symptom relief during Ramadan [60]. In a multicenter study of 37 patients with psoriatic arthritis, including 23 women and 14 men, Adawi et al. (2019) found improvements in several disease activity measures after one month of Ramadan fasting [61]. However, the study was not designed as a women-specific analysis, and pregnancy and breastfeeding were exclusion criteria.

Fibromyalgia and chronic pain are also relevant to women's Ramadan health because fibromyalgia is characterized by chronic widespread pain, sleep disturbance, fatigue, and cognitive symptoms, all of which could interact with Ramadan-related sleep disruption and daytime functioning [23]. However, fibromyalgia should not be simplistically described as an exclusively female disorder. Wolfe et al. (2018) found that although more than 90% of referred clinical fibromyalgia patients were women, women represented approximately 59% to 60% of fibromyalgia cases in less biased samples [24]. Meester et al. (2020) hypothesized that immune system sex differences may help explain fibromyalgia's female predominance [23].

Taken together, the available evidence suggests that medical and psychiatric vulnerability during Ramadan should be understood as heterogeneous and condition-specific rather than uniformly harmful or beneficial. Some women may experience stable symptoms or even improvement, whereas others may be more vulnerable to distress, fatigue, pain, medication-timing challenges, or disease-related burden depending on psychiatric history, autoimmune or rheumatic disease, chronic pain, menstrual cycle factors, sleep disruption, hydration, and caregiving demands.

8. Methodological Gaps and Limitations in the Literature

Despite the growing scientific literature on fasting during Ramadan, several methodological limitations restrict the conclusions that can be drawn about women's health. A central limitation is that women are frequently treated as a subgroup rather than as the primary population of interest, which is problematic because sex-based differences have been reported across dietary, biochemical, and metabolic outcomes during Ramadan fasting, suggesting that findings derived from mixed or male-dominant samples may not fully generalize to women [16].

Another limitation is the inconsistent use of sex-stratified analysis. Many Ramadan fasting studies either combine male and female participants in the same analysis or statistically adjust for sex without examining whether fasting effects differ by sex. This approach can obscure meaningful differences in sleep, mood, metabolism, and body composition. For example, the sleep meta-analysis by Faris et al. (2020) included a predominantly male sample, limiting the extent to which its conclusions can be interpreted as equally applicable to women [49]. Previous mentioned longitudinal research has started to address this gap by examining sex-specific psychological trajectories across Ramadan [20]. However, a single sample cannot establish a general trajectory for women across ages, countries, migration

contexts, or clinical and reproductive groups. Replication across contexts and cultures is needed before the reported temporary within Ramadan increase in women's global distress can be treated as a broader pattern. Consequently, the literature still lacks a clear understanding of whether women experience the timing, intensity, and recovery from Ramadan-related changes differently than men.

Another important gap is the limited attention given to menstrual cycle phase, reproductive hormones, and reproductive status. This omission is relevant because ovarian hormones are closely involved in women's sleep regulation and may influence circadian timing, mood, and stress reactivity [46]. Sex differences in energy metabolism and substrate use may also shape fasting responses, particularly across reproductive life stages such as pre-menopause, pregnancy, peri-menopause, and menopause [38]. To the credit of medical researchers, there is a strong and growing body of research on the impact of Ramadan fasting on pregnant and lactating women [62], but pregnancy and lactation status is largely held constant in those studies [63–65], making it difficult to draw comparisons between women who are pregnant or lactating and those who are not. Without considering variability in menstrual cycle phase, hormonal contraceptive use, pregnancy or lactation status, menopausal status, and the number of fasting days missed or made up, studies may misattribute variation in mood, sleep, or body composition to Ramadan fasting alone.

Pregnancy and lactation constitute a substantial and methodologically distinct body of Ramadan research. Witte et al. (2025) examined the impact of healthcare provision on immigrant pregnancy behaviors in the context of Ramadan fasting in Germany [66]. This study is relevant to both reproductive health and host-country healthcare context. However, the present narrative review does not attempt a comprehensive synthesis of maternal, fetal, neonatal, or longer-term offspring outcomes. Pregnancy and lactation are therefore considered here as important contextual and methodological variables, while a dedicated review is needed to synthesize the broader perinatal literature.

Sample size and the composition of samples also limit generalizability. Many studies rely on convenience sampling, such as university students, athletes, or specific clinical populations. Emerging women-focused studies among female university students provide important preliminary evidence, but their findings should not be generalized to all women without caution [12]. Similarly, clinical studies of women with specific endocrine disorders, such as polyendocrine metabolic ovarian syndrome, offer useful insights into subgroups but cannot establish broad conclusions about women's fasting responses overall [45].

Methodological inconsistency across studies further complicates interpretation. Bahammam and Almeneessier (2020) emphasized that lifestyle changes during Ramadan can affect cardiometabolic outcomes and that better methodological designs are needed to isolate fasting-related effects [3]. Studies also vary in their measurement tools, including whether sleep is assessed subjectively or objectively, whether dietary intake and hydration are measured, whether physical activity is controlled, and whether assessments occur before, during, immediately after, or weeks after Ramadan. This heterogeneity makes it difficult to compare findings across studies or determine whether observed effects are due to fasting, altered sleep, dietary changes, or broader Ramadan-related routines.

Host-country context is another area requiring greater attention, particularly given evidence that healthcare teams in non-Muslim-majority settings do not always understand or accommodate Ramadan observance [67,68]. Hillier et al. (2024) reviewed healthcare professionals' knowledge, attitudes, practices, and perspectives when providing care to Muslims who fast during Ramadan in Western countries [67]. Saherwala et al. (2021), writing specifically on culturally competent mental healthcare for Muslim women, describes case vignettes in which providers unfamiliar with Ramadan practice misattributed religious observance to psychiatric symptoms and failed to adjust medication timing to accommodate

fasting hours, highlighting the need for staff training and community dialogues within healthcare settings [68]. Hillier et al. emphasized care of Muslims generally rather than women specifically, and the evidence synthesized in the present review does not permit women-centered conclusions about healthcare experiences in host countries. It also does not permit direct comparisons between immigrant women and women in their (predominantly Muslim) countries of origin, or between immigrant women from different Muslim-majority countries of origin. These gaps limit understanding of how migration and healthcare systems may shape women's Ramadan experiences.

Finally, the literature remains limited by an overreliance on cross-sectional or simple pre-post designs. Such designs are useful for identifying broad changes but are less able to capture the dynamic nature of Ramadan, which may involve an early adjustment phase, a later adaptation phase, and a post-Ramadan recovery period. Overall, these limitations do not invalidate the existing literature, but they show that women's Ramadan fasting experiences remain only partially understood because biological, behavioral, psychological, and sociocultural variables are often intertwined but not systematically measured.

9. Future Directions

Addressing the treatment of women as a peripheral subgroup will require fasting-related research designed around women's physiology from the outset. Future studies should recruit female-only samples or ensure adequate power for sex-stratified analysis, and should systematically incorporate menstrual cycle phase, since reproductive hormones modulate sleep, stress reactivity, and metabolism, and menstruation itself alters the fasting pattern observed during Ramadan [16,46]. Longitudinal designs spanning the pre-Ramadan, fasting, and post-Ramadan periods, framed within culturally informed models that account for caregiving and food-preparation demands, would move the field beyond its reliance on cross-sectional comparisons [20,39].

Future studies should also examine Ramadan fasting among women with conditions that disproportionately, predominantly, or uniquely affect biological women. These include systemic lupus erythematosus, primary Sjogren's disease, thyroid disease, rheumatoid arthritis, multiple sclerosis, pregnancy-related cardiovascular risk markers, fibromyalgia or chronic pain, and pre-existing mood or anxiety disorder [21,23,57,58,69]. These populations may experience Ramadan-related changes in sleep, hydration, medication timing, fatigue, inflammation, and daily functioning differently from healthy mixed sex samples. Pregnancy-related complications should also be considered in future Ramadan fasting research because preeclampsia and gestational hypertension may serve as early markers of long-term microvascular dysfunction and cardiovascular disease risk in women [69]. A dedicated review should comprehensively examine maternal, fetal, neonatal, and longer-term offspring outcomes associated with Ramadan fasting, including the ways that healthcare communication and migration context may influence fasting-related decisions during pregnancy and lactation.

Future research should use migration-informed and cross-national designs to compare women fasting in Muslim-majority countries with immigrant or diaspora women in non-Muslim-majority settings. In addition, future studies should compare immigrant women from different countries of origin. Studies should measure healthcare communication, workplace scheduling and accommodation, local fasting duration, socioeconomic context, reproductive status, and caregiving demands. These designs would help distinguish fasting-related changes from the influences of migration, healthcare systems, workplace conditions, and other institutional contexts.

10. Suggestions for Clinical Practice

For clinicians caring for Muslim women, the evidence carries several practical implications. Given the documented reductions in sleep duration and circadian disruption during Ramadan, counseling on sleep hygiene and the timing of rest may help mitigate daytime fatigue [49]. The gender-specific intensification of distress toward the end of the fasting month suggests that mental health screening is particularly valuable for women, especially those with pre-existing mood or anxiety disorders [20].

Clinicians should also consider whether women have chronic autoimmune, rheumatic, metabolic, cardiovascular, or psychiatric conditions that could be affected by Ramadan-related changes in sleep, hydration, fatigue, diet, and medication timing. Bhuiyan et al. (2024) further emphasize the importance of pre-Ramadan assessment, including asking whether patients plan to fast, discussing beliefs about what constitutes breaking the fast, reviewing medical and religious exemptions, and using shared decision making for patients with chronic conditions who may choose to fast [70]. Because some patients avoid taking medications during fasting hours, clinicians should review medication timing, dosing schedules, and possible alternatives such as daily, combined, or sustained-release formulations when appropriate [70].

Counseling may also include hydration planning during non-fasting hours, moderation of strenuous physical activity, risk stratification based on comorbidities, and interval check-ins for high-risk patients who choose to fast despite clinical concerns [70]. Available Ramadan rheumatology literature suggests that fasting does not necessarily impair medication tolerance or compliance in all patients, but the evidence remains limited and condition-specific counseling is still needed [60]. More broadly, culturally competent care requires appreciating both the spiritual significance of fasting and the gendered distribution of domestic labor that may amplify its burden, so that guidance respects patients' religious commitments while safeguarding their well-being [14].

11. Conclusions

Ramadan fasting is a complex religious and behavioral practice that involves changes in food and fluid intake, meal timing, sleep, activity, and circadian rhythms. Current evidence suggests that Ramadan may be associated with psychological benefits for some individuals, while also contributing to sleep disruption, fatigue, and gender-specific distress in some women [14]. One longitudinal study reported a temporary within Ramadan increase in women's global distress, but this finding requires replication before it can be treated as a general pattern [20]. Studies also report short-term changes in body weight and body composition, although these outcomes are difficult to isolate from changes in hydration, diet, sleep, and physical activity [3,48].

Overall, this review highlights the need for Ramadan fasting research that treats women as a central population rather than a secondary subgroup. Sex-based differences in sleep, hormonal regulation, metabolism, and psychological vulnerability suggest that findings from mixed-sex or male-dominant samples should not automatically be generalized to women [16,38,46]. A women-centered Ramadan fasting framework should therefore include not only mood, sleep, circadian rhythm, and body composition, but also clinical subgroups such as women with autoimmune disease, chronic pain, pregnancy-related vascular risk, and pre-existing psychiatric vulnerability.

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