



MONTHLY MEMO:

Psychological and Physical Impacts of Stress on Women

MAY IS MENTAL HEALTH AND PHYSICAL FITNESS AWARENESS MONTH

be kind to your mind and body

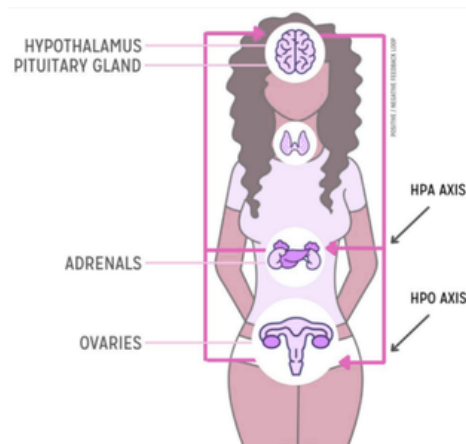
OVERVIEW

Stress, and the related hormones, have been shown to have a profound impact on women compared to men. As May is mental health and physical fitness awareness month, WRHO is highlighting some of the main ways stress impacts women in regard to both of these topics. Also included are diagrams explaining each process and potential solutions.

Hormonal Regulation of Stress

Stress can affect reproductive hormones by disrupting ovulation, menstrual changes, and cause fertility issues. Women may sometimes be more sensitive to cortisol which can cause higher rates of mood regulation issues.

Research suggests that women sometimes show a "tend-and-befriend" response rather than a "fight-or-flight" response. There are ways you can manage these stress hormones.



Hormonal Regulation of Stress

The hormonal regulation of stress in women involves the Hypothalamic-Pituitary-Adrenal, better known as the HPA axis, which is a release of cortisol to manage short-term stress.

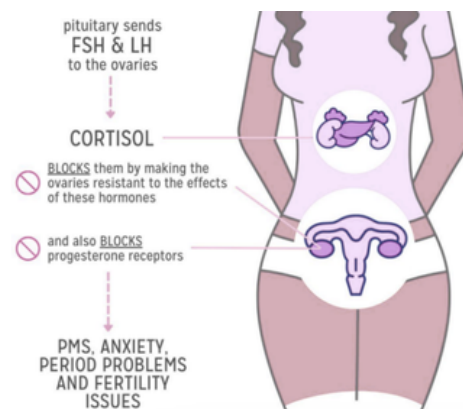
Long-term or chronic stress can keep cortisol (the stress hormone) elevated and can suppress estrogen and progesterone, which leads to irregularities in women's menstrual cycles, anxiety, and metabolic issues.

Due to this, women exhibit higher stress sensitivity because of hormone interactions with stress circuits. This impact can affect women reproductively and by sex-specific stress responses.

Potential Solutions:

There are several possible ways to find relief when experiencing a hormonal imbalance. It is first important to see a healthcare provider when experiencing chronic stress and related mood swings.

Following advice from a doctor, it can be helpful to do gentle consistent exercises like yoga to reduce stress and balance cortisol, or spend 20 minutes out in nature, which has been shown to reduce stress hormone levels, or focus on improving your sleep quality.



Deep Dive into the HPA Axis

When regulated, the HPA Axis is a necessary component in regulating stress, balancing energy, mood, and especially: immune function. Diving in-depth includes analysing the structures in the brain and their roles:

- The Hypothalamus (H): this is a small structure located at the base of the brain that specializes in detecting stress. It is responsible for releasing the corticotropin-releasing hormone (CRH) as well as arginine vasopressin. Both of these together initiate a stress response in order to regulate the next structure.
- The Pituitary Gland (P): A small, pea-sized endocrine gland located below the hypothalamus. When CRH reaches the anterior pituitary, it responds by releasing adrenocorticotropic (ACTH). This then travels through the bloodstream to the adrenal glands.
- The Adrenal Glands (A): Above the kidneys, the adrenal cortex is responsible for producing glucocorticoids (cortisol) in response to ACTH. This pushed out energy and regulated immune function, helping cope with prolonged stress.

Brain Structure and Neural Processes of Stress

The stress response is primarily regulated by a "distributed neural circuitry" that determines what is threatening and coordinates the body's reaction:

- Amygdala: Known as the brain's "alarm system," it interprets sensory information and triggers a distress signal to the hypothalamus upon perceiving danger.
- Hypothalamus: Acts as the control center, activating the Hypothalamic-Pituitary-Adrenal (HPA) axis and the autonomic nervous system to release hormones like adrenaline and cortisol.
- Prefrontal Cortex (PFC): Responsible for "top-down" regulation, it provides executive control to inhibit the amygdala and hypothalamus once a threat has passed.
- Hippocampus: Critical for memory and context, it provides negative feedback to the hypothalamus to help turn off the stress response.

The physiological response to stress occurs in two main waves:

- Immediate (SAM Axis): The sympathetic-adreno-medullary (SAM) system triggers a rapid release of adrenaline (epinephrine), causing the "fight-or-flight" response, which increases heart rate and provides a quick burst of energy.
- Delayed (HPA Axis): Following the initial surge, the HPA axis initiates a hormonal cascade: the hypothalamus releases CRH, the pituitary gland releases ACTH, and finally, the adrenal glands release cortisol to maintain a state of high alert

*Sources & links to corresponding websites are cited at the end of this email.

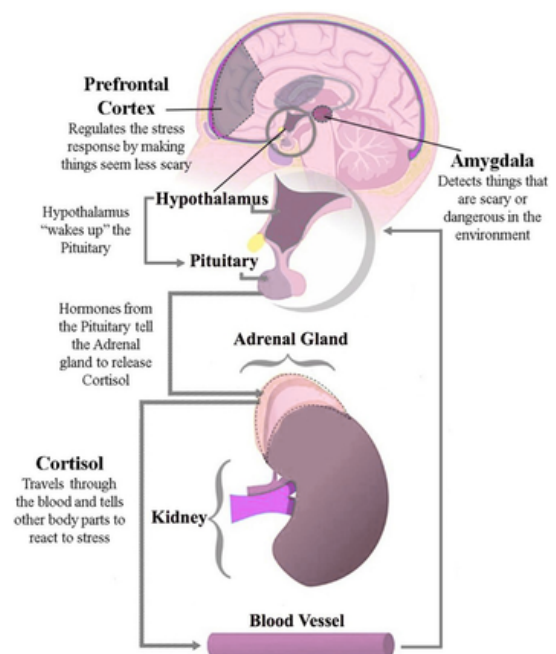
So what happens when the HPA axis is dysregulated?

This mainly happens through exposure to chronic stress, meaning the HPA axis isn't signaled to "turn off" per say.

In fact, new research has proposed that an unregulated HPA axis has major implications in dysregulating the immune system. This happens through glucocorticoid receptor resistance and cortisol dysregulations, creating a landslide effect of other regulatory processes as the persistent activation does not allow other processing to function correctly: like the immune system for instance.

Studies have found the immunological consequences to be consistent across the board, finding that a dysregulated HPA axis can contribute to a number of autoimmune disorders and overall impaired immunosuppressive effects alongside a pro-inflammatory state.

This then creates a cycle where the body that is under stress, creates more stress for itself, extending the exposure to chronic stress.



Chronic exposure to stress hormones can physically alter the brain's architecture, leading to both adaptive and maladaptive changes:

- Atrophy (Shrinkage): Prolonged cortisol exposure causes dendritic retraction (shortening of branch-like structures) and loss of synapses in the hippocampus and PFC, impairing memory and decision-making.
- Hypertrophy (Growth): Conversely, chronic stress can increase the size and activity of the amygdala, leading to a heightened fear response and a "vicious cycle" of anxiety.
- Neurogenesis: Stress significantly suppresses the production of new neurons in the hippocampus, further contributing to volume loss and cognitive decline

Chronic Stress in Relation to Mental Health

The impact of stress for women can be particularly profound compared to their male counterparts.

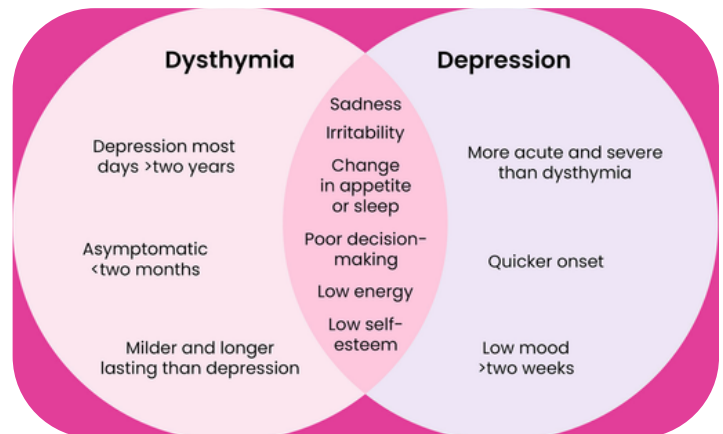
Modern causes of stress for women can include:

- Relationships
- Children
- Financial pressure
- Societal expectations for how they look/speak/act

These stresses are not often fleeting, they become chronic very easily. This means they often affect sleep, mood, digestion, appetite, and keep cortisol levels elevated.

This puts women at a higher risk of many mental health disorders such as: anxiety, eating disorders, and depression.

Women are also more likely to experience dysthymia: a persistent type of depression that doesn't always turn into major episodes. This can last years, in some cases decades.

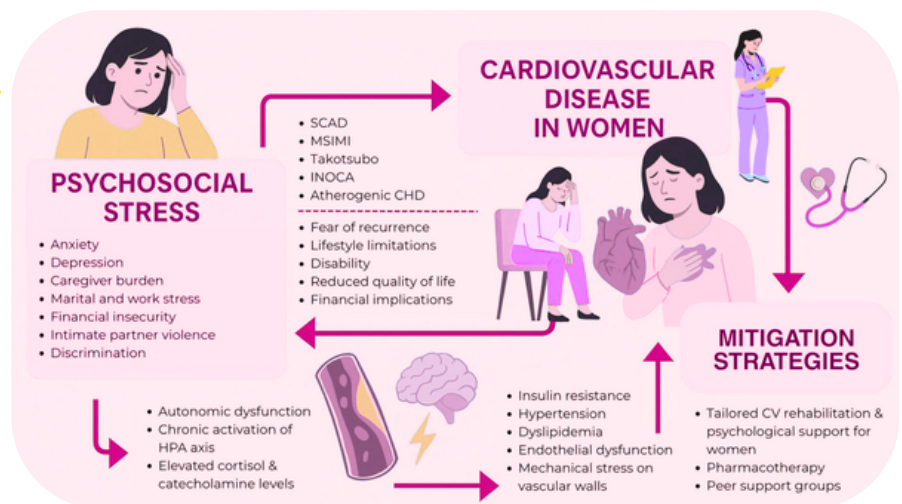


These symptoms and disorders become especially hard to navigate in situations like post-partum or menopause. In fact, research has shown that traumatic stress from childhood often stays with women throughout a lifetime, making milestones and transitional periods more difficult.

Also, because of a lack in research for menopause, women continue to experience heightened anxiety, mood swings, etc... without little help from healthcare providers.

Physical Health Outcomes of Stress

During times of stress, women are more likely to internalize the stressor, causing muscle tension. This makes women more prone to headaches, migraines, and general body aches as a result of stress. Constant stress can cause many diseases, some of which disproportionately affect women. Chronic stress can lead to irritable bowel syndrome (IBS), which affects women twice as much as men.



It also suppresses the immune system, contributing to autoimmune disorders which predominantly affect women. Women are more likely to gain weight due to stress. Additionally, stress can cause cardiovascular issues. Estrogen helps blood vessels cope with tension. While men are more likely to manifest stress through high blood pressure and cardiovascular disease, post-menopausal women are especially susceptible to heart disease due to their low levels of estrogen.

Finally, chronic stress has been known to cause reproductive issues in women because of hormonal shifts. These changes can cause irregular menstrual cycles, decreased libido, worsened symptoms of premenstrual syndrome (PMS), and fertility issues. High stress has negative effects on women's ability to conceive, prenatal health, and even postpartum adjustment. Exercising, sleeping well, or even just stretching can help subside the physical components of stress.

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