The Effect of Menstrual Phases on Salivary Markers of Stress and Body Composition

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ABSTRACT

Women have been historically excluded in physiology research due to the assumption that the menstrual cycles influence physiological biomarkers. Research has shown that cortisol concentrations are higher during the follicular phase compared to the luteal phase of the menstrual cycle. In addition, morning cortisol concentrations have been shown to be significantly higher in the morning compared to evening. However, salivary α-amylase (sAA) and secretory immunoglobin-A (SIg-A) have not been researched across the menstrual cycle. sAA is an indicator of sympathetic nervous system activation and is sensitive to acute stress. SIg-A is an antibody that is also an indicator of chronic stress. Previous studies have indicated that sAA and SIg-A follow a diurnal cycle in men and women, yet research has not determined if there is a difference across the menstrual cycle. **PURPOSE:** To determine whether the phases of the menstrual cycle effect biomarkers of stress and body composition. **METHODS:** A longitudinal study design was used in which (n=23) participants were followed over the course of 2 full menstrual cycles. The first menstrual cycle established a baseline to determine the timing of the participants menstrual phases. During the second month, participants met with the researchers for one day of each phase in the morning (AM) and afternoon (PM), for 8 sessions. Blood pressure, heart rate, and saliva samples were collected during both AM and PM session. Saliva was analyzed for stress markers: sAA and SIg-A. During AM sessions InBody analysis was used to collect the following body composition data: weight, body water amount, BMI, fat mass, lean body mass. **RESULTS:** There were no significant treatment x time interactions for SIg-A, sAA, or resting heart rate (RHR) ($p> 0.05$). However, SIg-A was significantly higher in the AM ($p=0.0009$), while sAA ($p=<.0001$) and RHR ($p=0.0001$) were significantly higher in the PM. There were no main effects found from time or phase on measures of body composition or blood pressure. **CONCLUSION:** These data indicate that the time of day affects concentrations of SIg-A, sAA and RHR, but the phases of the menstrual cycle do not. Changes in concentrations of SIgA and sAA from AM to PM may be related to the circadian cycle; however more research is needed to elucidate. Based on the present data, the menstrual cycle does not affect biomarkers of stress or body composition. These findings provide implications for female participation in future studies involving these biomarkers.