Analysis of the Natural Variation of Women's Depressive Mood Across the Menstrual Cycle*

In Han SONG*

Yonsei University Graduate School of Social Welfare

Despite the widely known assumption that women's mood fluctuates across the menstrual cycle, the assumption has been poorly supported by empirical evidence, and the effect of the menstrual cycle on women's depressive symptoms remains controversial and unknown. One of the main reasons for the paucity of evidence is the lack of scientific research devoted to a systematic examination of this phenomenon in a representative community-based sample of women. The purpose of this study is to examine if women's depressive mood is associated with their menstrual cycles in a community-based sample that is systematically and randomly collected. Daily mood and symptom data and urine specimens data were derived from the Women's Wellness Study (WWS). 1,246 participants in the Midwestern United States between the ages of 13 to 55 who have menstruations were included in the analysis. After controlling for age, marital status, income, education, employment status, and oral contraceptive use, a linear mixed model analysis was used to analyze cyclic changes of depressive moods across the menstrual cycle. Statistically significant changes were found for women's depressive symptoms across the menstrual cycle, and the symptom level during the premenstrual (late luteal) phase was significantly higher than that of the postmenstrual phase. The findings suggest that there is a statistically significant depressive mood change across the menstrual cycle even though further studies need to investigate the clinical significance of this mood change. The results imply that information on the menstrual cycle needs to be considered for research and clinical purposes in promoting women's mental health when measuring women's mental health parameters. Assessments of women's mental health without considering menstrual cycle information may result in inappropriate diagnostic decisions.

Key words: Women's mental health, Depressive mood, Menstrual cycle

* This article is based on a part of the author's Ph.D. dissertation, Biological and Social Factors Associated with Women's Mood, completed at the University of Chicago. The author wishes to acknowledge the valuable support and guidance by Dr. S. Gehierr, and thank her for allowing the author to use the Women's Wellness Study data.

† Address correspondence to: In Han SONG, Assistant Professor, Yonsei University Graduate School of Social Welfare, Seoul 120-749, Korea. Email: i.song@yonsei.ac.kr
Human life is associated with various temporal cycles (Song, 2008). Circadian cycles occur in the secretion and excretion of hormones and in daily behaviors such as sleeping and waking (Rossi & Rossi, 1977; Song, 2008; Travis, 1988). Seasonal cycles modulate human physiological and psychological changes (Kasper, Wehr, Borko, Gaist, & Rosenthal, 1989), and social cycles such as a 7-day week and a 12-month calendar year regulate human social behaviors (Rossi & Rossi, 1977). Among such cycles, the human menstrual cycle, a naturally occurring biological cycle, is an integral part of women's lives during the reproductive ages and a naturally occurring biological process involving a complex interaction among the hypothalamus-pituitary-ovary axis (Song, 2008), and menstrual experiences are closely linked with women's lives in many ways (Asso, 1983; Gehlert et al., 2009; Gold, 2006; Song, 2008; Usher, 2004a; Walker, 1997).

Throughout history, an enormous amount of discourse about the menstrual cycle-related mood changes has been accumulated. Because the menstrual cycle is regulated by female hormones such as estrogen and progesterone (Gruhn & Kazer, 1989), extensive biomedical research from the biological perspective has been documented on the cyclic change of mood symptoms associated with the hormonal changes over the menstrual cycle (Hardie, 1997). In modern medicine, the origin of the biomedical model of menstrual cycle-related mood changes is credited to Frank (Walker, 1995). When he coined the term Premenstrual Tension (PMT) in 1931 and introduced the concept of mood changes during the premenstrual phase, he attributed the cause of the problem to abnormal secretions of the female hormones (Adesso, Reddy, & Fleming, 1994; Frank, 1931; Lee, 1998; Walker, 1995). Since then, there has been an extensive body of research based on the basic assumption that biological changes, especially hormonal changes, over the menstrual cycle affect women's mood. A biomedical theory is currently dominant in explaining the mechanism of this menstrual cycle research (Steiner & Born, 2002a). Biological models explain menstrual cycle-related mood changes as a consequence of brain's biochemical changes to the changing levels of female hormones, such as estrogen, progesterone, follicle stimulating hormone, and luteinizing hormone (Kohen, 2000), or a consequence of changes in neurotransmitter over the menstrual cycle (Eriksson et al., 2006; Steiner, 1996; Steiner, 1998; Steiner & Born, 2000).

While the biomedical perspective generally explains menstrual cycle-related mood changes as a result of the cyclic fluctuations in hormones during the menstrual cycle, psychological theories have to do with how women perceive and attribute the negative mood to the menstrual cycle. Some investigators suggest that this premenstrual-related mood change may be "a monthly excuse for stress reactions" (Thayer, 1996, p.44) and that it may be used to