

Menstrual-Related Problems and Psychological Distress among Women in the United States

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ABSTRACT

Objective: To examine the associations of menstrual-related problems with mental health and health behaviors in a U.S. population-based study.

Methods: We analyzed data obtained from women aged 18–55 years ($n = 11,648$) who participated in the 2002 National Health Interview Survey, an ongoing, computer-assisted personal interview of the noninstitutionalized U.S. population.

Results: Approximately 19% of women aged 18–55 years reported experiencing menstrual-related problems (e.g., heavy bleeding, bothersome cramping, or premenstrual syndrome [PMS]). These women were significantly more likely than those without menstrual-related problems to report frequent anxiety and depression, insomnia, excessive sleepiness, and pain over the past 12 months. Women with menstrual-related problems were also significantly more likely to report feeling sad, nervous, restless, hopeless, or worthless and that everything was an effort all or most of the time during the past 30 days. Cigarette smoking, drinking heavily, and being overweight or obese were also more frequently reported among women with menstrual-related problems than those without.

Conclusions: Menstrual-related problems pose substantial implications for public health. Healthcare providers should examine mental health concerns in women reporting menstrual-related problems.

INTRODUCTION

THE MENSTRUAL CYCLE IS MULTIFACETED, comprising the premenstrual phase, which may include both somatic complaints (e.g., breast tenderness and abdominal bloating) and psychological distress (e.g., tension, irritability, dysphoria),¹ and the menses, which may include such symptoms as heavy bleeding and bothersome cramping. Premenstrual symptoms characteristically occur in a cyclical fashion during the luteal phase of the menstrual cycle and diminish rapidly after the onset of menses.² These symptoms, which

vary in number, type, and severity, have been classified into three categories.¹ Premenstrual molimina³ consists of premenstrual symptoms not associated with functional impairment or significant distress. Premenstrual syndrome (PMS) is characterized by symptoms that are severe enough for afflicted women to seek treatment. These symptoms can encompass distressing behaviors, such as fatigue, insomnia, or decreased sexual interest; psychological symptoms, such as irritability, impaired concentration, or restlessness; and physical symptoms, such as headaches, back pain, water retention, and muscle or joint

pain.²⁻⁴ Women with PMS have a higher prevalence of major depressive disorder (MDD) and anxiety disorders and a greater risk of subsequent development of incident affective disorders than do women without PMS.⁵ Premenstrual dysphoric disorder (PMDD), which affects 3%–8% of women,^{6,7} is characterized by anger outbursts, depressed mood, anxiety, affective lability, and disturbances in functioning at home and work.^{2,7-9}

Although the etiologies of PMS and PMDD are largely unknown, studies have identified several correlates, including hormonal irregularities, vitamin deficiencies, prostaglandin and neurotransmitter dysregulation, psychosocial factors,¹⁰ and atypical responses to changes during the menstrual cycle.^{11,12} Additionally, the psychological distress often accompanying the luteal phase of the menstrual cycle, particularly in women with serotonin dysregulation,² may be related to altered sensitivity to progesterone or its metabolites, which alters concentrations of neuroamines, such as serotonin, dopamine, and norepinephrine.¹³

Although some experts have questioned the legitimacy of premenstrual symptoms as indicators of illness,¹ recent research suggests that the burden of PMS/PMDD as measured by disability adjusted life years (DALYs) is similar in magnitude to that associated with dysphoric disorders.⁹ Moreover, the rate of depression for women of childbearing age is approximately twice that of men, a difference not found before puberty or after menopause.¹⁴⁻¹⁷ A relationship between affect and menstruation thus appears likely.

Much less research has been conducted examining the relationship among the menses, mood, and behavior. In a study conducted by Barnard et al.,¹⁸ women with dysmenorrhea had significantly lower scores than women who did not report dysmenorrhea in the domains of physical and social functioning, physical role functioning, bodily pain, and general health perceptions. Additionally, women who reported abnormal, irregular, or heavy periods had significantly lower scores in role limitations due to impairments in physical and social functioning.¹⁸ In yet another study conducted by Alonso and Coe,¹⁹ menstrual pain was also associated with depression and anxiety.

Despite the potential adverse effects of premenstrual and menstrual symptoms on the health

and functioning of women of childbearing age, the public health impact and burden of these conditions are largely unrecognized.⁹ Research in this area has generally been restricted to clinical populations,^{1,20} community samples within a single state,²¹⁻²³ and samples of subjects residing outside the United States.²⁴⁻²⁶ Although menstruation may pose implications for mood and behavior, this area of research has not been well studied. Our study was designed to identify factors, both psychological and behavioral, related to menstrual-related problems. To examine these associations among women in the community, we analyzed data obtained from the National Health Interview Survey (NHIS), a large population-based assessment of the health and functioning of adults in the United States.

MATERIALS AND METHODS

The NHIS is an ongoing, computer-assisted personal interview that examines a nationwide representative sample of the civilian noninstitutionalized population of the United States. The NHIS is conducted by the Centers for Disease Control and Prevention (CDC), National Center for Health Statistics, in cooperation with the U.S. Bureau of Census.^{27,28} Each year, a representative sample of households across the United States is selected by means of a multistage cluster sample design. Trained interviewers from the U.S. Bureau of Census visit each selected household and administer the NHIS in person. The survey consists of three core components: the family core, the sample adult core, and the sample child core, in addition to supplemental modules.

Our research was focused on the sample adult core, which collects information on health conditions, activity limitations, health behaviors, and access to and use of healthcare services of one randomly selected adult in the family. In 2002, there were 11,933 women aged 18–55 years interviewed in the adult survey. These data were weighted to reflect the probability of selection, along with adjustments for nonresponse and poststratification in order to produce national estimates.^{28,29} Both black and Hispanic populations were oversampled to allow for more precise estimation of the study variables in these populations. SUDAAN (Research Triangle, release 8.0.0, Research Triangle Park, NC, 2001) software was used in the analyses to take into account the com-

plex sample design. NHIS methods, including the weighting procedure, are described elsewhere.^{28,29}

Women aged 18–55 years were asked, “During the past 12 months, have you had any menstrual problems, such as heavy bleeding, bothersome cramping, or premenstrual syndrome (also called PMS)?” Women who responded “yes” were considered to have menstrual-related problems.

The NHIS measures nonspecific psychological distress over a 30-day recall period with the Kessler 6 scale (K6), which has been featured in the NHIS since 1997.^{30–32} The K6 scale asks respondents about six manifestations of psychological distress: “During the past 30 days, how often did you feel (a) So sad that nothing could cheer you up? (b) Nervous? (c) Restless or fidgety? (d) Hopeless? (e) That everything was an effort? and (f) Worthless?” Possible responses were “All of the time,” “Most of the time,” “Some of the time,” “A little of the time,” and “None of the time.” Scoring of the individual questions is based on a scale of between 0 and 4 points, according to increased frequency of the problem, yielding a total score on a scale of 0–24.³³ This score is used to establish serious mental illness (SMI) status. To be classified as having a SMI, an individual must have at least one 12-month *Diagnostic and Statistical Manual IV* (DSM-IV) disorder other than a substance use disorder and have a serious impairment (Global Assessment of Functioning [GAF]) score of <60).³² According to scoring criteria established by Kessler, a score of ≥ 13 equalizes false positives and false negatives creating a total classification accuracy of 0.92.³² Thus, persons with a score of ≥ 13 are considered to be likely cases of SMI.^{31–33} Additional details on alternative scoring methods are available elsewhere.^{30,32}

In addition to determining the likely SMI status of the survey participants, we examined each domain individually and dichotomized the responses to the six questions by combining “All of the time” and “Most of the time” into one response category and “Some of the time,” “A little of the time,” and “None of the time” into another. In this investigation, we also examined responses to the following four “yes” or “no” questions referenced to the prior 12 months: “Have you been frequently depressed or anxious?” “Have you regularly had insomnia or trouble sleeping?” “Have you had excessive sleepiness during the day?” “Have you had recurring pain?”

The NHIS also obtains information about several modifiable risk behaviors and body mass index (BMI). Current smokers were defined as those who reported having smoked ≥ 100 cigarettes during their lifetime and who currently smoked every day or some days. BMI was calculated as weight in kilograms divided by the square of height in meters (kg/m^2). Respondents were considered overweight or obese if their BMI was ≥ 25 . Consistent with the U.S. Department of Agriculture and the U.S. Department of Health and Human Services guideline, women were considered to be heavy drinkers if they drank more than one drink per day.³⁴ Finally, respondents were considered to have met recommended leisure time physical activity requirements if they complied with either the moderate physical activity recommendation (≥ 30 minutes of moderate activity that caused a small increase in breathing or heart rate ≥ 5 days per week)³⁵ or the vigorous physical activity recommendation (≥ 20 minutes of vigorous activity that caused a large increase in breathing and heart rate ≥ 3 days per week).³⁶ Persons who did not meet either of these requirements were considered to be insufficiently physically active.

A total of 11,834 (99.2%) women answered the question about menstrual-related problems in the 2002 NHIS. Those without complete information for sociodemographic variables (age, race, education, marital status, and employment status) were excluded from our study, yielding data obtained from a total of 11,648 respondents available for analysis.

RESULTS

Approximately 18.9% (95% CI 18.0%–19.7%) of women aged 18–55 years reported experiencing menstrual-related problems over the past year. Women reporting menstrual-related problems were significantly more likely to be aged 18–44 years than 45–55 years (adjusted odds ratio [AOR] = 1.8), and significantly less likely to be Hispanic than white non-Hispanic (AOR = 0.7) (Table 1). Women who indicated they had been previously married were significantly more likely to report menstrual-related problems than women who were currently married (AOR = 1.4). Women who never worked outside the home were less likely to report menstrual-related problems than those who worked outside the home

TABLE 1. PREVALENCE OF MENSTRUAL-RELATED PROBLEMS AMONG FEMALE ADULTS AGED 18–55 YEARS FOR SELECTED CHARACTERISTICS: NATIONAL HEALTH INTERVIEW SURVEY, 2002

<i>Characteristic</i>	<i>% (95% CI)</i>	<i>Adjusted odds ratio^a (95% CI)</i>
Age group, years		
18–24	21.7 (19.4–23.9)	1.8 (1.5–2.2)
25–34	20.3 (18.8–21.8)	1.8 (1.5–2.1)
35–44	21.5 (19.8–23.2)	1.9 (1.6–2.2)
45–55	13.1 (11.8–14.4)	Referent
Race/ethnicity		
White, non-Hispanic	19.6 (18.6–20.6)	Referent
Black, non-Hispanic	20.3 (18.3–22.4)	1.0 (0.8–1.1)
Other, non-Hispanic	14.4 (10.6–18.1)	0.7 (0.5–1.0)
Hispanic	14.6 (12.8–16.5)	0.7 (0.6–0.8)
Marital status		
Married	17.1 (16.1–18.2)	Referent
Previously married	21.4 (19.5–23.3)	1.4 (1.2–1.6)
Never married	20.9 (19.0–22.8)	1.1 (1.0–1.3)
Member of an unmarried couple	21.6 (18.3–24.9)	1.2 (1.0–1.5)
Employment status		
Currently working	18.8 (17.8–19.7)	Referent
Retired	4.8 (0–9.7)	0.3 (0.1–1.0)
Formerly worked	21.4 (19.4–23.3)	1.2 (1.0–1.3)
Never worked	12.1 (9.2–15.1)	0.6 (0.4–0.8)
Education		
<High school graduate	18.0 (15.7–20.4)	Referent
High school graduate or GED	19.1 (17.6–20.5)	1.0 (0.8–1.2)
Some college	21.2 (19.3–23.1)	1.1 (0.9–1.3)
AA degree	19.6 (1.72–22.0)	1.0 (0.8–1.3)
Bachelor’s degree	17.9 (16.0–19.7)	0.9 (0.7–1.1)
>Bachelor’s degree	13.7 (11.2–16.3)	0.7 (0.5–0.9)

^aModel adjusted for age, race or ethnicity, education, marital status, and employment status.

(AOR = 0.6). Menstrual-related problems were also less frequently reported by women with more education than a bachelor’s degree than by women with less than a high school education (AOR = 0.7).

As Table 2 indicates, even after adjusting for sociodemographic characteristics, women with menstrual-related problems were significantly more likely than those without to report that they had experienced all measures of psychological distress, sleep impairment, and pain assessed in the 2002 NHIS. Specifically, women with menstrual-related problems were more likely to report frequent depression or anxiety (AOR = 2.5), insomnia (AOR = 2.4), excessive sleepiness (AOR = 3.0), and recurring pain (AOR = 2.5) over the past 12 months. Women with menstrual-related problems were also more likely to report feeling sad (AOR = 1.7), nervous (AOR = 2.1), restless (AOR = 2.6), hopeless (AOR = 2.0), or worthless (AOR = 2.2) and that everything requires effort

(AOR = 2.1) all of the time or most of the time in the past 30 days. Notably, 16.4% (95% CI 13.5%–19.3%) of women with menstrual-related problems reported that impairments in these domains interfered with their lives and activities “a lot of the time” compared with 11.4% (95% CI 10.0%–12.7%) of those without menstrual-related problems. Additionally, women with menstrual-related problems reported a 2.2 higher odds of likely SMI relative to women without menstrual-related problems.

Women with menstrual-related problems were also significantly more likely than those without such symptoms to engage in adverse health behaviors. Specifically, they were more likely to smoke cigarettes (AOR = 1.2), to drink heavily (AOR = 1.4), and to be overweight or obese (AOR = 1.5) (Table 3).

Given that the questions about health behaviors ask about current behavior and the K6 scale asks questions pertaining to the past 30 days, we

TABLE 2. COMPARISON OF MENTAL HEALTH, SLEEP IMPAIRMENT, AND PAIN BETWEEN WOMEN AGED 18–55 YEARS WITH MENSTRUAL-RELATED PROBLEMS AND THOSE WITHOUT MENSTRUAL-RELATED PROBLEMS, WITH UNADJUSTED AND ADJUSTED ORS: NATIONAL HEALTH INTERVIEW SURVEY, 2002

Characteristic	% with menstrual-related problems (95% CI)	% without menstrual-related problems (95% CI)	Unadjusted odds ratio (95% CI)	Adjusted odds ^a (95% CI)
Reported condition during the past 12 months				
Frequently depressed or anxious	30.7 (28.3–33.1)	15.4 (14.5–16.2)	2.4 (2.2–2.8)	2.5 (2.2–2.8)
Insomnia or trouble falling asleep	30.7 (28.5–32.8)	16.4 (15.5–17.4)	2.3 (2.0–2.5)	2.4 (2.1–2.7)
Excessive sleepiness during the day	22.8 (20.6–25.0)	8.9 (8.1–9.6)	3.0 (2.6–3.5)	3.0 (2.5–3.4)
Recurring pain	29.1 (27.0–31.3)	14.8 (13.8–15.8)	2.4 (2.1–2.7)	2.5 (2.2–2.9)
Kessler 6—reported condition of all of the time or most of the time in the past 30 days				
So sad nothing could cheer you up	5.7 (4.5–6.8)	3.2 (2.8–3.6)	1.8 (1.4–2.3)	1.7 (1.3–2.2)
Nervous	8.3 (7.0–9.6)	4.1 (3.7–4.6)	2.1 (1.7–2.6)	2.1 (1.7–2.5)
Restless and fidgety	11.2 (9.5–12.9)	4.5 (4.0–5.0)	2.7 (2.2–3.3)	2.6 (2.1–3.1)
Hopeless	4.5 (3.4–5.5)	2.3 (1.9–2.6)	2.0 (1.5–2.7)	2.0 (1.5–2.7)
Worthless	4.4 (3.3–5.6)	2.0 (1.7–2.3)	2.3 (1.7–3.2)	2.2 (1.6–3.1)
Everything is an effort	9.3 (8.0–10.6)	4.5 (4.0–5.0)	2.2 (1.8–2.7)	2.1 (1.7–2.5)
Kessler 6—defined cases of likely serious mental illness				
Kessler 6 scale measure for likely serious mental illness	13.1 (7.5–18.7)	3.8 (3.4–4.2)	2.3 (1.8–2.8)	2.2 (1.7–2.8)

^aModel adjusted for age, race or ethnicity, education, marital status, and employment status.

TABLE 3. COMPARISON OF HEALTH BEHAVIORS BETWEEN WOMEN AGED 18–55 YEARS WITH MENSTRUAL-RELATED PROBLEMS AND THOSE WITHOUT MENSTRUAL-RELATED PROBLEMS, WITH UNADJUSTED AND ADJUSTED ORS: NATIONAL HEALTH INTERVIEW SURVEY, 2002

Characteristic	% with menstrual-related problems (95% CI)	% without menstrual-related problems (95% CI)	Unadjusted odds ratio (95% CI)	Adjusted odds ratio ^a (95% CI)
Current smoker	27.8 (25.5–30.1)	22.0 (20.8–23.0)	1.4 (1.2–1.6)	1.2 (1.1–1.4)
Heavy drinker	6.0 (4.8–7.1)	4.2 (3.8–4.7)	1.5 (1.2–1.8)	1.4 (1.1–1.7)
Overweight/obese ^b	53.6 (51.0–56.3)	46.1 (44.8–47.4)	1.4 (1.2–1.5)	1.5 (1.3–1.6)
Insufficient level of leisure time physical activity ^c	65.3 (62.8–67.8)	68.7 (67.4–69.9)	0.9 (0.8–1.0)	0.9 (0.8–1.0)

^aModel adjusted for age, race or ethnicity, education, marital status, and employment status.

^bBMI ≥ 25 kg/m²; women currently pregnant are excluded.

^cDoes not meet the moderate physical activity (≥ 30 minutes of moderate activity that caused a small increase in breathing or heart rate ≥ 5 days per week) or the vigorous physical activity (≥ 20 minutes of vigorous activity that caused a large increase in breathing and heart rate ≥ 3 days per week) recommendations.

repeated all analyses excluding women who reported that they were currently pregnant ($n = 366$). There were no notable differences in results between this subgroup and the entire study population.

DISCUSSION

Our research suggests that menstrual-related problems in women pose considerable public health implications, as they are reported by

nearly 19% of U.S. women. Previous research suggests that anxiety and depressive disorders are related to PMS and PMDD.^{26,37,38} Our findings suggest that indicators of these disorders may potentially occur across much of the menstrual cycle and manifest more than twice as often in women who experience symptoms than in those who do not. Additionally, those with menstrual-related problems are between 1.7 and 3.0 times more likely to report insomnia, sleepiness, recurrent pain, sadness, nervousness, restlessness, hopelessness, worthlessness, and that everything was an effort. As potential indicators of depressive disorders, these symptoms are in turn associated with considerable disability³⁹ and impaired quality of life.⁴⁰

Consistent with prior research on PMS, we found that menstrual-related problems were associated with lower education and working outside the home.²³ Our results also indicate that women with menstrual-related problems were more likely to have been previously married. All these associations could indicate potential differences in personal, social, and occupational functioning, distinguishing women with menstrual-related problems from those without. Very little research has examined potential explanations for these associations. However, several studies indicate that family-related and work-related stress may increase menstrual-related problems and alter the menstrual cycle.^{41,42}

Paralleling previous research findings that reported that women tend to seek treatment for premenstrual symptoms during their 30s,¹⁰ our data revealed that women aged ≤ 44 years were more likely than those aged ≥ 45 years to report menstrual-related problems. However, given that women of all the ages under investigation reported menstrual-related problems, earlier assessment of these symptoms could potentially prevent associated psychological distress from assuming a chronic course.

Our results revealed that alcohol use, smoking cigarettes, and being overweight or obese were also associated with menstrual-related problems. Previous research has suggested that women with premenstrual symptoms are more likely to drink alcohol⁴³ and that those who drink are more likely than nondrinkers to experience moderate to severe premenstrual symptoms.^{44,45} Similarly, the results of prior investigations show that smokers and ex-smokers have an increased risk of menstrual-related problems,^{23,46} with the highest risk

being for heavy smokers. Symptoms include increased tension, irregular periods, heavy periods, and severe pain during menses.^{46,47} Our finding that being overweight or obese was associated with menstrual-related problems is in keeping with the positive associations between mood disorders and obesity in women and with the finding that eating disorder symptomatology is exacerbated during the premenstrual phase.^{48,49}

There are several limitations to our study. First, as the question regarding menstrual-related problems is broad, we were unable to determine if psychological distress and adverse health behaviors were related to dysmenorrhea or premenstrual symptoms. Additionally, we were unable to precisely specify where along the menstrual cycle the psychological and behavioral associations are more evident. Second, information about severity and frequency of menstrual-related problems was not collected. Third, as our data are cross-sectional, we could not infer a causal relationship among menstrual-related problems, emotional well-being, and engagement in risk behaviors. Fourth, these data are based on self-reports and were not validated by physical or psychiatric examination. Fifth, we do not have information on other medical causes of menstrual-related problems, such as fibroids, polycystic ovary syndrome, pelvic inflammatory disease, or hyperplasia. Finally, our data may be subject to recall bias given the 12-month and 30-day recall periods.

CONCLUSIONS

Complementing the work of previous investigators who examined premenstrual symptoms in clinical settings,^{1,20} our data suggest that menstrual-related problems are prevalent among women of reproductive age in a large community-based population in the United States. Menstrual-related problems are associated with substantial psychological distress, a finding that corroborates results reported in clinical samples^{1,5,20} and strongly supports the claim that menstrual-related problems pose important public health implications.⁹

Our results further suggest menstrual-related problems are associated with differences in social and occupational functioning, which may be evident in a greater number of domains than are generally recognized. Because in the absence of effective intervention, depressive disorders commonly

assume a chronic course,^{50,51} the association between menstrual-related problems and affective disturbance may be particularly noteworthy. Thus, including an assessment of menstrual-related problems as part of the standard evaluation of women during their reproductive years may better enable healthcare providers to recognize and treat potential manifestations of these symptoms. Potentially, by assessing menstrual-related problems, providers may be further alerted to also gauge the presence of health risk behaviors and affective disturbance. This practice may in turn improve the quality of life of women affected by menstrual-related problems.

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