Depressive Symptoms, Menopausal Status, and Climacteric Symptoms in Women at Midlife

HAYDEN B. Bosworth, PhD, LORI A. Bastian, MD, MPH, MAGGIE N. Kuchibhatla, PhD,
DAVID C. Steffens, MD, COLLEEN M. McBride, PhD, CELETTE SUGG SKINNER, PhD, BARBARA K. Rimer, DrPH, and
ILENE C. Siegler, PhD, MPH

Objective: Previous studies have found increased rates of depression in women aged 45 to 54 years, but the factors that influence these rates are not understood. It was assessed whether higher rates of depressive symptoms were associated with menopausal status, climacteric symptoms, and use of hormone replacement therapy. Design: Cross-sectional survey. Setting: Community sample. Methods: Data are from 581 women ages 45 to 54 years who were interviewed by telephone between October 1998 and February 1999. Measures: Depression was measured with the abbreviated CES-D, a depressive symptoms screening measure. Women’s reported perception of menopausal stage, frequency of periods in the preceding 12 months, and history of oophorectomy were used to classify their menopausal status into four categories: (1) no indication of menopause; (2) close to menopause; (3) had begun menopause; and (4) had completed menopause. Results: There were 168 women (28.9%) who reported a high level (≥10) of depressive symptoms when the abbreviated CES-D was used. In a logistic-regression analysis, significant factors associated with increased depressive symptoms included physical inactivity, inadequate income, use of estrogen/progesterone combination, and presence of climacteric symptoms (trouble sleeping, mood swings, or memory problems). Menopausal status was not associated with depressive symptoms. Conclusions: In this sample of women age 45 to 54 years, climacteric symptoms but not menopausal status were associated with higher rates of depressive symptoms. Key words: menopause, depression, climacteric symptoms.

METHODS

Data are from telephone interviews conducted between October 1998 and February 1999 among a random sample of women aged 45 to 54 years residing in Durham County, NC. Women who were...
Among this cohort of women age 45 to 54 years, 70 (12%) had no indication of menopause, 173 (30%) were close to reaching menopause, 187 (33%) had begun menopause, and 145 (25%) had completed menopause. The most common climacteric symptoms were hot flashes (65%), night sweats (56%), trouble sleeping (45%), mood swings (49%), and memory problems (44%). One hundred sixty-four women (28%) reported current use of hormonal replacement medication; 236 (41%) reported ever using a hormone replacement medication. Almost one third of the participants (29%) had abbreviated CES-D scores that indicated significant depressive symptoms (eg, ≥10). Among these 168 women with high depressive symptoms, the mean depressive score was 14.5 (range 10–30).

Overall, menopausal status—(1) no indication of, (2) close to reaching, (3) had begun, or (4) had completed menopause—was not strongly associated with depressive symptoms (p < .08). Examination of menopausal status indicated no significant difference in proportion of depressive symptoms among women in categories 2 to 4 (eg, close to, had begun, or had completed menopause). However, of women with no depressive symptoms, 14% were in group 1 (no indication of menopause), whereas, among women who did indicate depressive symptoms, only 7% were in this premenopausal group (Table 1).

All five climacteric symptoms were related to depressive symptoms. Women who had significant depressive symptoms, compared with women who did not, reported more hot flashes (72% vs. 62%), night sweats (66% vs. 52%), trouble sleeping (61% vs. 39%), mood swings (68% vs. 41%), and memory problems (60% vs. 37%).

There were no differences in proportion of depressed vs. nondepressed women by age, race, marital status, and whether women had a regular health care source. Women who reported greater depressive symptoms were significantly less likely than those who reported fewer depressive symptoms to have a college education (69% vs. 78%) or to report not having adequate income (85% vs. 94%), work for pay (79% vs. 87%), and exercise (48% vs. 68%). Women with depressive symptoms also were more likely to smoke (19% vs. 9%) than women who reported fewer depressive symptoms.

There were no differences between depressed and nondepressed women by whether they ever used HRT, were currently using HRT in general, or were currently using estrogen alone. However, women with fewer depressive symptoms were more likely to be using an estrogen/progesterone combination than women with more depressive symptoms (30% vs. 16%).
After adjusting for demographic factors (see Table 2), women in the close-to-menopause and begun-menopause categories were more likely to report significant depressive symptoms than those with no indication of menopause. In the final model, after adjusting for age, education, income, exercise, smoking status, climacteric symptoms (presence of hot flashes, night sweats, trouble sleeping, mood swings, and memory problems), and HRT use, menopausal status was no longer significantly related to depressive symptoms. Covariates significantly associated with increased depressive symptoms included physical inactivity, having inadequate income, being a smoker, the use of estrogen alone rather than in combination with progesterone, and experiencing climacteric symptoms (trouble sleeping, mood swings, and memory loss).

**DISCUSSION**

Perimenopausal status was significantly associated with greater depressive symptoms only when climacteric symptoms were not considered. We conclude that, although perimenopause is associated with an increase in depressive symptoms, it is climacteric symptoms rather than depressive symptoms that account for this relationship. In particular, we note the overlap between symptoms of depression and climacteric symptoms such as disturbances of mood, sleep, and concentration.

Almost 30% of our sample of women age 45 to 54 years of age reported high levels of depressive symptoms. Lower rates of depression had been previously reported in a similarly aged community sample (20–25% of women reported symptoms of irritability or depression) (30). The relatively higher prevalence of depressive symptoms noted in our study may be explained in part by our methods. That is, women were recruited on the basis of their interest in discussing HRT, and those more interested in HRT may have been experiencing more climacteric symptoms.

The high prevalence of depression may also reflect differences in specificity of the abbreviated CES-D compared with other measures. For the full CES-D, a cutoff value of 16 is commonly used for community samples and 20 for hospital patients. Further examination into appropriate cutoff values for perimenopausal women experiencing climacteric symptoms needs to be explored.

| TABLE 1. Demographic Characteristics, Climacteric Symptoms, and Menopausal Status by Depression Status |
|-----------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Variables                  | Total sample (n = 581)   | CES-D < 10 (n = 413)     | CES-D ≥ 10 (n = 168)     | p            |
| Mean CES-D (SD)            | 7.2 (5.6)                | 4.3 (2.8)                | 14.5 (3.9)               | .001         |
| Menopausal statusa         |                          |                          |                          |              |
| Not menopause (n = 70) (%) | 12.1                    | 14.2                    | 7.2                      | .02          |
| Close to menopause (n = 173) (%) | 30.1            | 29.9                    | 30.5                     | .85          |
| Begun menopause (n = 187) (%) | 32.5                | 30.4                    | 37.7                     | .09          |
| Completed menopause (n = 145) (%) | 25.2            | 25.5                    | 24.6                     | .81          |
| Climacteric symptoms       |                          |                          |                          |              |
| Hot flashes (%)             | 65                      | 62.3                    | 71.6                     | .04          |
| Night sweats (%)            | 56.2                    | 52.3                    | 65.9                     | .003         |
| Trouble sleeping (%)        | 45.3                    | 38.9                    | 61.4                     | .001         |
| Mood swings (%)             | 48.9                    | 40.8                    | 68.7                     | .001         |
| Memory problems (%)         | 43.8                    | 37.2                    | 60.0                     | .001         |
| Demographics and behavior   |                          |                          |                          |              |
| Mean age (SD)              | 49.5 (2.4)              | 49.5 (2.4)              | 49.3 (2.2)               | .3           |
| White (%)                  | 71.1                    | 73.6                    | 75.6                     | .62          |
| College or more (%)        | 75.4                    | 78.2                    | 68.5                     | .01          |
| Married (%)                | 75.2                    | 75.5                    | 74.4                     | .77          |
| Work for pay (%)           | 84.7                    | 87.4                    | 78.6                     | .007         |
| Adequate income (%)        | 91.1                    | 93.6                    | 84.6                     | .001         |
| Regular health provider (%) | 94.0                    | 95.2                    | 91.1                     | .06          |
| % who presently smoke       | 11.5                    | 8.7                     | 18.5                     | .001         |
| % who exercise             | 62.3                    | 68.0                    | 48.2                     | .001         |
| HRT use                    |                          |                          |                          |              |
| Ever used HRT (%)          | 40.7                    | 39.7                    | 43.1                     | .45          |
| Current HRT use (%)        | 26.7                    | 28.8                    | 21.6                     | .08          |
| Current only estrogen use (%) | 15.5            | 28.5                    | 28.4                     | .99          |
| Current estrogen + progesterone use (%) | 11.3 | 30.1 | 15.6 | .02 |

a Six missing menopausal status information.
Women with increased depressive symptoms, as indicated by the abbreviated CES-D, were less likely to have a college education, reported less adequate income, work for pay, less likely to exercise, and were more likely to smoke, have trouble sleeping, and report mood swings and memory problems. Depressed women were also less likely to use an estrogen/progesterone combination. In bivariate analyses, women who had reported no indication of menopause had fewer depressive symptoms.

Depressive symptoms were not associated with surgical menopause (oophorectomy) or use of unopposed estrogen (eg, not combined with progesterone). However, women who used an estrogen/progesterone combination had significantly fewer depressive symptoms than those who did not use estrogen alone. A previous randomized, placebo-controlled study found no evidence that estrogen/progesterone combination therapy was related to increased depressive symptoms (31). Although our findings might imply that estrogen/progesterone combination is more effective in relieving depressive symptoms than estrogen alone, it is important to consider that only 10 women categorized as being depressed were using an estrogen/progesterone combination, as opposed to 54 women who were using a similar combination and were not depressed. An alternative explanation for our finding is that physicians may have been more hesitant to prescribe progesterone to depressed women. Thus, given the small sample size and the possibility that a selection bias occurred, this result needs to be considered carefully.

Our findings seem to support the hypothesis that the association between depressive symptoms and menopause stems from a decline in estrogen that is directly associated with biochemical changes in the brain that lead to depression (32, 33). Our findings support this hypothesis in two ways (2). We found the highest rate of depressive symptoms among women who were close to or had begun menopause. In theory, women in these stages of menopausal transition experience the greatest decline in estrogen, whereas women who have completed menopause have adapted to low and stable levels of endogenous estrogen and are no longer experiencing drastic shifts in estrogen levels. Similarly, if estrogen decline caused depressive symptoms, one would expect women taking HRT to have lower levels of depressive symptoms (3). Although these differences were not statistically significant,
Menopause Status and Depression

cant ($p < .08$), we found that fewer women who were currently taking HRT had depressive symptoms compared with those not taking HRT (29% vs. 22%). In support of this relationship, a recent randomized clinical trial reported that estrogen significantly boosted mood in 80% of the depressed women (34).

Exercise was associated with decreased depressive symptoms in this sample. Exercise may alleviate some climacteric symptoms. Research has indicated that exercisers’ moods are significantly more positive than sedentary women’s moods, regardless of menopausal state (35, 36). Slavin and Lee (35) found that exercising women scored lower on somatic symptoms and memory-concentration difficulties. Exercise may alleviate depressive symptoms indirectly by preventing hot flashes. In a controlled study of >1200 women aged between 52 and 54 years, moderate and severe hot flashes and sweats were only half as common among the physically active postmenopausal women (22%) than in the control group (44%) (37).

The significant relationship found in our study between smoking and depressive symptoms suggests that women who smoke may constitute a high-risk group that deserves more attention. This relationship between smoking and depression has been noted previously (38–43). In a community-based cohort of women aged 36 to 44 years, for example, smokers in the upper tertile of pack-years were 1.9 (95% CI 1.5–2.3) times more likely to have CES-D scores of 16 or more (38).

A lack of adequate income was associated with increased depressive symptoms. This result is consistent with other large community studies. Kaplan et al. (44), for example, found, in a random sample of approximately 7000 Alameda County adults, that inadequate income was associated with an increased risk of depression (RR = 1.42; CI = 1.24–1.72). It is likely that financial difficulties are associated with increased stress and subsequent depressive symptoms (45, 46).

The results of this study should be considered in light of a few limitations. Climacteric and depressive symptoms were both measured by self-report and may well be manifestations of the same underlying biological process. It may be difficult, even with a clinical interview, to clearly distinguish these variables. It is also important to recognize that this study was cross-sectional, and no causality can be inferred from the results. This study did not consider prior depression—a potent predictor of current depression status. Other potential factors that may be related to high level of depressive symptoms in this age group that were not examined include stress of daily living, chronic disease, and family problems (4).

Menopausal status does not appear to have a direct relationship with depressive symptoms, but rather increased climacteric symptoms explain the observed increased rates of depressive symptoms among women of this cohort. Even after considering hormone replacement medication, climacteric symptoms remained significantly related to increased depressive symptoms. We conclude that climacteric symptoms explain the relationship between menopause state and depression (eg, the menopausal state itself is associated with what appears to be depressive symptoms such as mood disturbances, sleep, and concentration problems). This has implications for our understanding of both menopause and depression. For example, should the nomenclature be changed to accommodate mood disorders that occur during perimenopause? Further studies are warranted to understand how hormonal shifts can produce depressive symptoms.

This research is supported by Grant 5U19-CA72099 from the National Cancer Institute.

REFERENCES


14. Myers LS, Dixon J, Morriessette D, Carmichael M, Davidson JM. Effects of estrogen, androgen, and progesterin on sexual psycho-

Psychosomatic Medicine 63:603–608 (2001)