



# The role of depressive symptomatology in peri- and post-menopause



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## ABSTRACT

**Objectives:** There is evidence that menopausal symptoms manifested at peri-menopause occur less frequently when compared to the symptoms experienced at post-menopause. The aim of this study was to investigate this and to test the hypothesis that depressive symptomatology mediates the relationship between menopausal stage and symptom frequency.

**Methods:** This cross-sectional study included 213 women (*M* age = 52 years), of whom 125 were peri- and 88 post-menopausal. Measures comprised the Center for Epidemiologic Studies-Depression scale (CES-D) and the Women's Health Questionnaire (WHQ) vasomotor symptoms and somatic symptoms subscales.

**Results:** Multiple mediated regression analyses provided evidence that somatic symptoms and vasomotor symptoms were less frequent at post- compared to peri-menopause, and that these differences were mediated by depressive symptomatology. Multivariate effect sizes ranged from small to moderate, and univariate effect sizes were uniformly small with wide confidence intervals.

**Conclusions:** The frequency of vasomotor and somatic symptoms appears to increase with depressed affect. The management of symptoms could include interventions of a psychotherapeutic nature, which may offset this effect, particularly in women for whom depressive symptoms are a feature of the climacteric syndrome. The extent to which depression and the climacteric syndrome may be causally related to one another remains unclear and longitudinal research should further examine the mechanisms of this association.

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## 1. Introduction

Depression is the single greatest cause of disability worldwide and women are almost twice as likely as men to suffer major depressive disorders (odds ratio 1.7, 95% confidence interval 1.5–2.0) [1,2]. A possible explanation for the gender difference in vulnerability for depression between men and women are varying levels of the gonadal hormones estrogen and progesterone [3–5]. Reproductive cycle events, like the menopausal transition, have also been implicated as windows of vulnerability for depression in women [6]. During menopause women are more likely to experience somatic/physical (e.g., insomnia, headaches, paresthesia)

and vasomotor (e.g., hot flashes, night sweats) symptoms caused by serotonergic and non-adrenergic fluctuations [7]. In particular vasomotor symptoms (VSM) have been associated with depressive symptoms (domino hypothesis [8]). Together with psychosocial and behavioural factors (e.g., social support, loss of interest in sex, stressful events) women transitioning into menopause might be particularly susceptible to mood disturbances in general and depressive symptomatology in particular.

Mood disturbances are reported by 75% of peri-menopausal women [9] and are routinely assessed in surveys examining menopausal symptomatology (e.g., depression, anxiety and irritability). There is currently no consensus whether depression or depressive symptoms constitute core menopausal symptoms [10]. Some researchers have excluded depression from the diagnostic criteria for reproductive related disorder [11], whereas others have shown in longitudinal studies that in particular the peri-menopausal period is associated with a changing hormonal milieu and increased occurrence (up to 2 to 14 fold) of depressive symptomatology compared to pre-menopause [12–14].

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The equivocal findings with regard to depressive episodes in menopause are partly due to methodological (e.g., epidemiological vs. clinical studies), diagnostic (assessment of depression; self-report vs. clinical assessment), and menopausal status differences [15]. For example, epidemiological studies have generally found no increase in depressive symptoms in menopause, whereas clinical studies have found higher prevalence rates [16]. In addition, differences exist in regard to menopausal symptom severity during the peri- vs. post-menopausal periods [17]. More recently, Freeman et al. [18] identified higher risk of depressive symptoms leading up to the final menopausal period and lower risk thereafter. However, for women with a history of depression the risk significantly increased both before and after menopause.

A number of risk factors have been identified, which might result in menopausal women experiencing more or less depression or depressive symptoms. These include VMS [19], hormonal vulnerability [20], socioeconomic status (SES), education and achievement (higher SES, education and income resulting in less depressive symptoms), smoking, exercise, body mass index (BMI), social support and partner status, coping, attitude, stressful life events and past history of mood disorder [21].

Elucidation of the role of depression during different stages of menopause (peri- vs. post) is of clinical relevance given its serious consequences for health and cognition. Menopausal symptoms including depression greatly influences well-being and quality of life [22]. In addition, depression is associated with other chronic diseases including metabolic syndrome, osteoporosis, cardiovascular disease [18] and reduced cognitive functioning [23]. Therefore, the present study examined whether depressive symptomatology mediates the hypothesized association between menopausal status and menopausal symptoms.

## 2. Methods

### 2.1. Participants

The study included 213 participants ( $M$  age=52.2 years,  $SD=5.9$ ) of which 125 were classified as peri-menopausal (58%;  $M$  age=50 years,  $SD=4.2$ ) and 88 post-menopausal (42%;  $M$  age=54.2 years,  $SD=5.9$ ). The sample included 17 participants who had undergone a surgical procedure that might affect their experience of menopause. Two post-menopausal women had each undergone a hysterectomy with bilateral oophorectomy, and 15 peri-menopausal participants had undergone a hysterectomy ( $n=8$ ) or hysterectomy with unilateral oophorectomy ( $n=7$ ). The sample contained no reports of chronic and debilitating illness and no psychoactive substance use was reported. Over 70% of participants were of Anglo-Celtic origin, most were employed on a full- or part-time basis, possessed a tertiary qualification, and had one or more children (see Table 1). Ethical approval for the study was provided by Victoria University Human Research and Ethics Committee.

### 2.2. Procedure

A cross-sectional study of menopause and depressive symptoms was undertaken with female volunteers recruited at peri-menopause (defined as the period from the commencement of menstrual irregularity to one year after the cessation of menstrual periods) and post-menopause (defined as one year or more after the cessation of menstrual periods) [24]. Participants were recruited via advertisements displayed in print media of the Queensland Menopause Society, advertisements displayed on the website of the Australian Menopause Society,

**Table 1**  
Demographic characteristics ( $n=223$ ).

Variables	<i>n</i>	(%)
Ethnicity		
Anglo-Celtic	157	(70.2)
European	42	(18.8)
Asian	12	(5.0)
Other	12	(5.0)
Education level		
Secondary	31	(14.0)
Trade or diploma	45	(20.3)
University degree	67	(30.1)
Post-graduate degree	79	(35.6)
Employment status		
Full time	105	(70.5)
Part time	32	(21.5)
Not in paid employment	12	(8.0)
Parity		
Nil	52	(23.3)
One	28	(12.6)
Two	94	(42.2)
≥Three	49	(22.0)
Relationship status		
Married	96	(64.0)
Separated or divorced	29	(19.4)
Single	24	(16.1)
Current smoker	25	(11.2)

and leaflets distributed at support organisation (e.g. Women's Wellness West). Consenting participants provided demographic information, including age, income, paid employment, parity and cigarette smoking and completed a questionnaire pack containing measures of depressive symptomatology and menopausal symptoms. Hard-copy and digital forms of the questionnaire pack were accessed via web-link and required between 25 and 30 min to complete.

### 2.3. Materials

#### 2.3.1. The Center for Epidemiologic Studies of Depression Scale (CES-D)

This widely-used 20-item CES-D [25] questionnaire asks participants to indicate the frequency of depressive symptoms experienced during the preceding week. Participants respond to items using a 4 point Likert scale, which ranges from 0 ("rarely or none of the time") to 3 ("most or all the time"). The CES-D yields a total score, which ranges from 0 to 60. Participants who score  $\geq 16$  are considered likely to be at risk of depression [25,41]. The internal consistency of the CES-D for the present sample was high ( $\alpha=0.92$ ) and comparable to that obtained from previous samples [26].

#### 2.3.2. The Women's Health Questionnaire (WHQ)

This 36-item WHQ questionnaire [27] assesses the frequency of menopausal symptoms over the preceding few days. Participants respond using five point scale with a range from 1 ("Yes, definitely") to 5 ("No, not at all"). The subscales of the WHQ comprise self-perceived attractiveness, depression, anxiety, sleep disturbance, sexual dysfunction, menstrual symptoms, VMS and somatic symptoms. Responses to items within each subscale are summed and re-scaled to range from 0 to 1, with higher scores corresponding to greater symptom frequency. The reliability of the vasomotor symptoms subscale ( $\alpha=0.83$ ) and the somatic symptoms subscale ( $\alpha=0.79$ ) ranged from adequate to good in the present sample.

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