

## Research Article

# The Mood of Menopausal Women is Affected by Stress Levels and Symptoms of Anxiety and Depression

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## Abstract

**Introduction:** Menopause is a period of vulnerability to psychological manifestations and can increase the sensitivity of emotions to stress and mood. Studies have analyzed factors associated with stress and symptoms of anxiety and depression, however, it is still scarce in the literature whether the mood changes these symptoms in menopausal women.

**Objective:** To analyze the relationship between mood and stress and depressive symptoms and anxiety in menopausal women.

**Methods:** Cross-sectional study composed of 90 menopausal women aged 40 to 59 years (52.6±4.1), one year without menstruation, with serum FSH (Follicle Stimulating Hormone) levels ≥25IU/ml, and with a positive score to the Menopause Rating Scale (MRS) questionnaire. The questionnaires were composed of sociodemographic and clinical aspects, Brunel's Mood Scale (BRUMS), Perceived Stress Scale (PSS) and Hospital Anxiety and Depression Scale (HADS).

**Results:** Women who showed symptoms of anxiety and depression scored more on the subscales of negative mood ( $p<0,001$ ), and less on the subscale of positive mood ( $p<0,001$ ) for depression and anxiety ( $p=0,005$ ); besides that they were more stressed than those without symptoms of anxiety and depression. Multiple linear regression analysis showed that mental confusion, fatigue and vigor have a predictive power of 33% in the stress of menopausal women.

**Conclusions:** The mood of women in menopause seems to be affected by those with high levels of stress and symptoms of anxiety and depression.

**Keywords:** Anxiety; Depression; Menopause; Mood; Stress

## Introduction

Menopause is a period of vulnerability to psychological manifestations [1], and can increase the sensitivity of emotions to stress and mood [2,3]. During the menopause transition and in the early post-menopausal years women are more likely to report depressed mood when compared to pre-menopausal women [4-6]. Although mood disorders can develop a greater depressive state, symptoms of depression are more common and deserve attention [7]. The prevalence of depression in females is approximately 20%, and the risk of its manifestation in women is 1,5 to 3 times higher than in men.

Women with high levels of anxiety during pre-menopause continue to experience this anxiety during the menopause transition, while those with low anxiety have an increased risk of developing high levels of anxiety during and after the menopause transition [8-10]. To date, studies have analyzed factors associated with stress and symptoms of anxiety and depression, however, it is still scarce in the literature whether the mood changes these symptoms in menopausal women. Since the increased deregulation of ovarian hormones can cause psychological damage at this stage of life, this study aims to ana-

lyze the relationship between mood and stress and depressive symptoms and anxiety in menopausal women.

**Methods**

**Study Type and Participants**

Cross-sectional study analyzes baseline data from the study "The effect of concurrent training and *vitex agnus-castus* on menopausal women on psychological, physical, hormonal profile and sexual function: a randomized clinical trial", a registered randomized clinical trial registered on the ReBEC platform (RBR number - 87ndrv). Carried out from October 2019 to November 2020, composed of menopausal women aged 40 to 59 years. To participate in the research, women should be residents of the Florianópolis - Santa Catarina (SC) region, be one year without menstruating and have serum FSH (Follicle Stimulating Hormone) levels  $\geq 25$  IU/ml [11]. In addition, women should have a positive score on the Menopause Rating Scale (MRS) questionnaire [12]. Those who used Hormone Replacement Therapy (HRT) were excluded.

The study was approved by the Human Research Ethics Committee (CEPSH) of the University of the State of Santa Catarina (UDESC), protocol No. 3.672.933. In addition, followed the recommendations of the STROBE [13] (The Strengthening the Reporting of Observational Studies in Epidemiology).

**Procedures**

The recruitment of participants occurred through advertisements in print and electronic media from October 2019 to February 2020. Participants responded to a self-administered online survey made up of the MRS questionnaire, and they should present a positive score for symptoms to participate. The next stage of the research. Subsequently, women with symptoms were invited to perform blood collection in order to check FSH levels. The collection was performed by a biochemical professional (M.F.) in February 2020 at a higher education institution. Of the 190 women recruited and who answered the questionnaire, 115 made themselves available and performed blood collection. Of these, 105 had FSH levels  $\geq 25$  IU/ml. After analyzing the eligibility criteria, 2 women who were taking HRT were excluded, 6 for not being able to contact via phone or e-mail, and 7 withdrew from the study, resulting in a total of 90 participants. All participants included in the survey responded to the Informed Consent Term in writing, and the study followed the recommendations and guidelines of the Declaration of Helsinki.

Subsequently, data collection was performed by Google Docs, in which the responsible researchers (DYF; JAK) of the Research Laboratory for Leisure and Physical Activity - LAPLAF/CNPq, sent the questionnaire links via e-mail and/or WhatsApp to the participants, according to their preference. The clinical questionnaire took approximately 15 minutes to complete. Figure 1 shows the recruitment of participants.

**Studied Variables**

Data collection consisted of individual questionnaires online through Google Docs. Anxiety and depression, mood and stress were adopted as the primary outcome. Anxiety and depression was analyzed using the Hospital Anxiety and Depression Scale - Anxiety and Depression Scale (HADS) [14], validated in Brazil [15], in order to identify possible or probable cases of anxiety disorders and/or mild depressive symptoms in non-clinical populations. Composed of 14 questions, seven of which are aimed

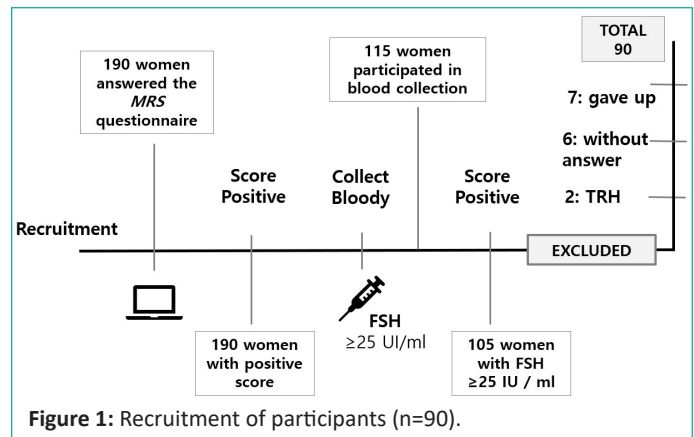


Figure 1: Recruitment of participants (n=90).

at assessing anxiety (HADS-A) and seven for depression (HADS-D). Each of its items is scored from 0 to 3 (from absent to very frequent), with a maximum score of 21 points for each scale. The cutoff points obtained in the literature are  $\geq 9$  (0-8: without anxiety/without depressive symptoms;  $\geq 9$  with anxiety/with depressive symptoms).

The Mood was analyzed by the Brunel Mood Scale (BRUMS) [16], which contains 24 mood indicators perceptible by the individual evaluated. The participants answered how they feel about these sensations, scoring from 0 to 4, with 0 being nothing and 4 extremely. It is divided into subscales related to anger (items 7,11, 19, 22), mental confusion (items 3, 9, 17, 24), depression (items 5, 6, 12,16), fatigue (items 4, 8, 10, 21), tension (items 1, 13, 14, 18) and vigor (items 2, 15, 20, 23). The first five factors mentioned are considered negative mood factors and the last, vigor, is considered positive. Each subscale contains four items, the sum of the responses from each subscale resulting in a score that can vary from 0 to 16.

Finally, stress was analyzed by the Perceived Stress Scale (PSS) adapted to Portuguese [17], which consists of 14 self-administered questions on a Likert-type scale ranging from 0 to 4 (0=never; 1=almost never; 2=sometimes; 3=almost always and 4=always). There are seven questions with a positive connotation (4-7,9,10,13) that must be added inverted. All other questions are added directly. There may be variation in the scores of the sum of the 14 questions from 0 to 56, with stress levels being higher the closer to 56.

Secondary outcome was schooling (elementary school; high school; and higher education); the marital status (living together-married/in a stable relationship; living apart - widow/divorced/single); income (up to 4 minimum wages; 5 to 20 minimum wages; and more than 20 minimum wages, adopting

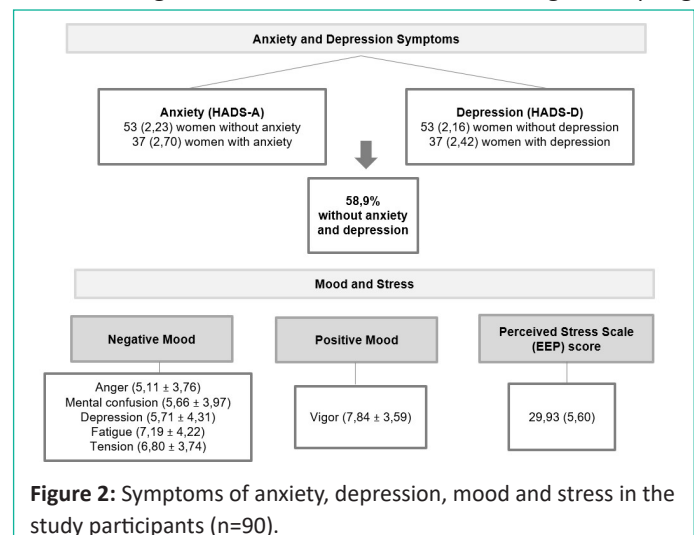
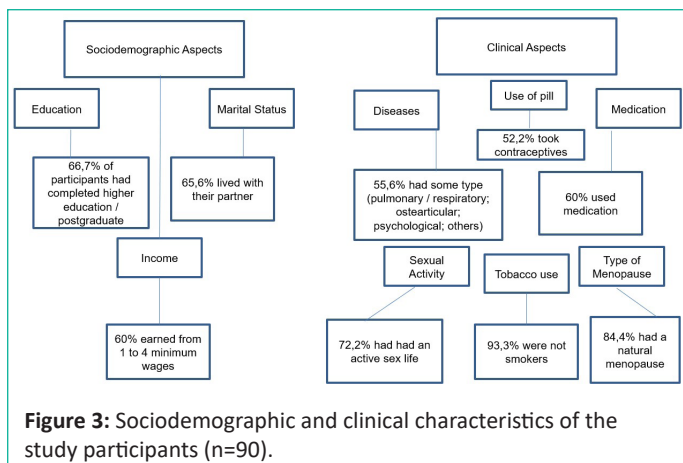


Figure 2: Symptoms of anxiety, depression, mood and stress in the study participants (n=90).



the 2019 minimum monthly wage of R\$998,00 based on the criteria of the Brazilian Institute of Geography and Statistics - IBGE); presence of diseases (yes/no); medication use (yes/no); tobacco consumption (yes/no); sexual activity (yes/no); type of menopause (natural/surgical); and contraceptive use (yes/no).

**Statistical Treatment**

The data were analyzed using descriptive and inferential statistics. In the descriptive analysis, measures of central tendency (average and median) and dispersion (standard deviation and interquartile range), and frequency and percentage values were verified. The normality of the data was verified using the Kolmogorov-Smirnov test (>50 participants). Mann Whitney's U test was performed to compare the scores on the subscales of the BRUMS questionnaire (anger, mental confusion, depression, fatigue, tension and vigor) among women who showed or not symptoms of anxiety and depression. A multiple linear regression analysis was performed to analyze the predictive capacity between stress and the mood subscales. The normality of the residue scores of the multiple linear regression model showed a normal distribution. The level of significance adopted was 95%. The software used was SPSS, version 20.0.

**Results**

Among the women eligible for the study, the final sample included 90 who met the criteria of blood analysis and the symptoms of menopause by MRS. The average age of women was 52,6±4,1 years, and the average age of menopause was 4,4±4,3 years, being characterized as an early menopause [11]. In addition, 86,7% of the participants had severe symptoms according to the MRS.

Figure 2 shows the pattern of women with symptoms of anxiety and depression, as well as the pattern in the mood and

stress subscales. The sociodemographic and clinical characteristics of women are shown in figure 3.

It was found that women who showed symptoms of anxiety and depression scored more on the negative mood subscales (anger, mental confusion, depression, fatigue and tension) (p<0,001), and less on the positive mood subscale (vigor) (p<0,001 for depression and p=0,005 for anxiety), in addition, they were more stressed than those without symptoms of anxiety and depression, according to data in table 1.

Multiple linear regression analysis showed that mental confusion, fatigue and stamina have a predictive power of 32,9% in stress in menopausal women.

**Discussion**

This study aimed to analyze the relationship between mood and stress and depressive symptoms and anxiety in menopausal women. The data suggest that when it comes to mood, that mental confusion, fatigue and vigor have a predictive power of 33% in the stress of menopausal women. Mental confusion is characterized by feelings of uncertainty, dizziness and instability in controlling emotions [18]. With regard to fatigue, it is characterized by exhaustion and low energy level, in addition to interfering with mood, causing irritability and physical tiredness [19]. The vigor factor is inversely related [16], characterized by feelings of excitement, disposition and physical energy [20]. These changes in mood are usually due to the loss of ovarian function, which decreases estrogen levels, causing somatic, metabolic and cognitive changes [6,21,22].

The participants in this study had an average stress score of 29,96, and although the PSS does not point to a specific cutoff point, it can range from 0 to 56. The women in this study had a high score on this scale compared to a study in Spain with 235 women, in which the average score was 16 points in the PSS [23], and with a cross-sectional study conducted in Germany with a sample of 1350 participants, in which the average score in the PSS was 12,9 points for those aged 45 to 60 years [24]; suggesting that these stress factors may be related to the appearance of other symptoms during menopause.

The literature points out that hot flashes are associated with increased stress during menopause [25,26] and are part of somatic symptoms [27]. Although it was not a direct objective of this study, it is important to highlight that it was part of the inclusion criterion, presenting a positive score for menopausal symptoms through the MRS, and 86,7% of the participants had severe symptoms according to the MRS, as well as the average score in the subscale of somatovegetative symptoms of 8,09

**Table 1:** Comparison of the BRUMS and PSS subscales between symptoms of anxiety and depression.

Variables	Without Depression Median (Q1-Q3)	With Depression Median (Q1-Q3)	p-value	Without Anxiety Median(Q1-Q3)	With Anxiety Median (Q1-Q3)	p-value
<b>BRUMS</b>						
Anger	3(1-6)	7(5,5-10,5)	<0,001	3(1-6)	7(5-9,5)	<0,001
Mental confusion	4(1-6)	8(6-12)	<0,001	4(1-6)	7(6-12)	<0,001
Depression	3(1-4,5)	9(6,5-12)	<0,001	3(1-6,5)	9(5-11,5)	<0,001
Fatigue	5(3-7,5)	10(8-13)	<0,001	6(3-8)	10(6,5-12)	<0,001
Tension	5(3-7)	10(7-12)	<0,001	5(3-7)	9(7-12)	<0,001
Vigor	9(7-11,5)	5(3-8)	<0,001	9(6-11)	7(3-9)	0,005
<b>PSS</b>						
Stress	23(18-27,5)	30(25,5-32)	<0,001	23(17-27)	30(26-32)	<0,001

Mann Whitney U test. Q1: First Quartile; Q3: Third Quartile.

**Table 2:** Multiple linear regression analysis of the PSS with the mood subscales.

Factors	B	DP	CI 95%	p-value	R <sup>2</sup> adjusted
Constant	27,33	2,78	21,794 - 32,876	<0,001	0,329
Anger	-0,16	0,30	-0,765 - 0,428	0,577	
Mental confusion	0,76	0,32	0,112 - 1,421	0,022	
Depression	0,48	0,29	-0,106 - 1,073	0,106	
Fatigue	-0,52	0,26	-1,054 - 0,008	0,054	
Tension	0,08	0,35	-0,633 - 0,793	0,824	
Vigor	-0,62	0,22	-1,064 - -0,178	0,007	

B: Beta Coefficient. DP: Standard Deviation. 95% CI: 95% Confidence Interval.

(3,18) points, which may perhaps explain the fact that women have high PSS scores, as they had high somatic symptoms. Corroborating with a previous study, where women who reported moderate or severe hot flashes, had a higher PSS score (21,9) compared to women with light hot flashes (19,5) or without hot flashes (18,2;  $p < 0,01$ ) [10].

In addition, the results of this study showed that the mood is different in women who experienced symptoms of anxiety and depression. During perimenopause there is a greater frequency and severity of depressive manifestations, 2 to 14 times greater than in the pre-menopausal years [9]. The literature points out that the appearance of depressive symptoms may be a consequence of vasomotor symptoms, standing out due to hot flushes and night sweats [28], in addition, systematic review and meta-analysis studies pointed out that negativity in relation to climacteric, obesity and stress are factors significantly associated with an increased risk of depression. However, women who have a longer reproductive period and late menopause have a lower risk of depression after menopause [29,30].

In this study, 41,1% of the participants had symptoms of anxiety and depression, in line with a Brazilian study carried out with a sample of 93 women, in which the results were similar. The prevalence of depression was 36,8%, while anxiety was 53,7% [31]. The results of the present study also point out that women with symptoms of anxiety and depression also had higher levels of stress ( $p < 0,001$ ). This can be justified since these changes in mood are related to the transition process of menopause, in which women are at greater risk of developing stress, depression and anxiety [32]. Women are more likely to experience depression in periods of biological vulnerability and changes in hormone levels, such as the menstrual cycle, pregnancy and postpartum phases and the transition from menopause. Depressed mood is probably related and should be treated specifically [33,34].

A longitudinal study carried out in Switzerland, shows that there are factors that can influence mood, such as sociodemographic (unemployment, education, race) and health-related aspects (smoking, chronic illnesses, a history of anxiety and postpartum depressive symptoms, vasomotor symptoms, partner's death, body mass index and self-esteem) [35]. The reduction of estrogen due to loss of ovarian function results in different symptoms for each woman, such as changes in sleep and mood [36]. Self-esteem is directly associated with anxiety and depression, which may be related to the perception of stress and mood during this period of life [37,38].

As forms of treatment for these symptoms, a randomized controlled clinical trial with pilates, involving 110 menopausal women, proved effective in improving the quality of sleep,

depression, anxiety and fatigue of these women [39]. In addition, a 6-week study examined the feasibility, acceptability, and preliminary efficacy of group cognitive-behavioral therapy in women in the peri- and post-menopause with mood disorders, showing that this therapy was feasible and effective in women with mood disorders [40].

As strengths, this study stands out for being, to date, the first to provide data on Brazilian women in menopause related to mood. In addition, another strong point was to use serum FSH analyzes. Finally, the association between mood and stress, and symptoms of anxiety and depression, is innovative. This study has some limitations, it should be mentioned its transversal character with women in menopause, and the fact that it is a small sample of the South of Brazil, therefore the results cannot be extrapolated to the rest of the population.

### Implications for Practice and/or Policy

The results of this study showed that middle-aged women in a region of southern Brazil have severe symptoms related to menopause and high levels of stress, directly affecting the mood of this population. Thereby, these findings are very relevant for health professionals in seeking and innovating for forms of treatment and prevention in the symptoms of this condition, given the impact that these symptoms have on the health of these women.

Otherwise, these findings will contribute not only to health professionals, but also to the government, with an overview of how a part of the Brazilian population is found in this capital, whereas future research is necessary to collaborate in improving women's health in middle age, and in making appropriate decisions in the implementation of public policies focused on this population.

### Conclusion

The symptoms of anxiety and depression are affected by high levels of stress. In addition, menopausal women who showed symptoms of anxiety and depression, had a higher score on negative mood (anger, mental confusion, depression, fatigue and tension), and a lower score on the positive mood subscale (vigor). Mental confusion, fatigue and vigor have a predictive power of 33% in the stress of menopausal women.

### Author Statements

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### Contributors

All authors made substantial contributions to the conception and design of the study, or data acquisition, or data analysis and interpretation, article writing or critical review for important intellectual content and approved the final version to be submitted. DYF and JBBM conducted the conception and design of the study, or acquisition of data, or analysis and interpretation of data. DYF, JBBM, THR, and AP conducted drafting the article and revising it critically for important intellectual content. DYF, JBBM, JAK, THR, AP and ACAG conducted the final approval of the version to be submitted.

## Ethical Statement

This study followed the recommendations and guidelines of the Declaration of Helsinki and was approved by the UDESC Ethics Committee on Human Research (CEPSH) (Protocol 3.672.933). All women responded to the Free and Informed Consent Form. In addition, followed the recommendations of the STROBE (The Strengthening the Reporting of Observational Studies in Epidemiology).

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