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# Prevalence and severity of symptoms in women in menopause: a cross-sectional study

## *Prevalência e severidade de sintomas em mulheres na menopausa: um estudo descritivo*

## Abstract

***Introduction***: Many women experience symptoms associated with menopause that present with different degrees of intensity and affect their quality of life. ***Objective***: To identify the prevalence and severity of the main symptoms during different climacteric phases. ***Methods***: Women aged 40–65 years answered an online questionnaire on sociodemographic data, health, diet, menstrual, and menopausal characteristics. The internationally validated Menopause Rating Scale (MRS) questionnaire was used to assess menopausal symptoms and their intensities. ***Results***: 283 women were included (36.8% pre-menopausal, 24% peri-menopausal, and 39.2% post-menopausal). Excess weight was more prevalent in the peri-menopausal group than in the pre-menopausal group (P=0.012). Symptoms such as decreased libido, vaginal dryness, urinary incontinence, muscle and joint pain, lipid alterations, and hot flashes were more prevalent in the absolute values of post-menopausal women. Women in the peri-menopausal period had a higher prevalence, in absolute values, of stress, irritability, headache, skin problems, lack of concentration/memory, sleep disorders, and fatigue. According to the MRS, there was no difference in the psychosocial domain (P=0.265) but somato-vegetative and urogenital symptoms are more intense in peri-menopausal and post-menopausal women when compared to pre-menopausal women (P<0.001). The global score on the questionnaire also demonstrated a lower intensity in the pre-menopausal group's symptoms (P=0.001). ***Conclusions***: This study demonstrated a higher prevalence and severity of symptoms in peri-menopausal and post-menopausal women, which may impair the quality of life of these women at this stage of life.

**Keywords:** Menopause. General symptoms. Climacteric. Quality of life. Nutrition

## Resumo

***Introdução***: Muitas mulheres sofrem com sintomas associados à menopausa, que podem apresentar diferentes graus de intensidade e afetar sua qualidade de vida. ***Objetivo***: Identificar a prevalência e severidade dos principais sintomas nas diferentes fases do climatério. ***Métodos***: Foram selecionadas mulheres com idades entre 40 e 65 anos, que responderam a um questionário *on-line* com dados sociodemográficos, de saúde, alimentação e características menstruais e de menopausa. Para avaliar os sintomas da menopausa e sua intensidade, foi aplicado o questionário internacional validado *Menopause Rating Scale* (MRS). ***Resultados***: Foram incluídas 283 mulheres (36,8% na pré-menopausa, 24% na perimenopausa e 39,2% na pós-menopausa). Excesso de peso foi mais prevalente na perimenopausa do que na pré-menopausa (*P*=0,012). Sintomas como diminuição da libido, secura vaginal, incontinência urinária, dores musculares e articulares, alterações lipídicas e ondas de calor, calorões, foram mais prevalentes em valores absolutos nas mulheres pós-menopausa. As mulheres no período de perimenopausa apresentaram maior prevalência, em valores absolutos, de estresse, irritabilidade, dor de cabeça, problemas na pele, falta de concentração/memória, distúrbios do sono e fadiga.

De acordo com o MRS, não houve diferença no domínio psicossocial (*P*=0,265) e os sintomas somato-vegetativos e urogenitais são mais intensos nas mulheres na perimenopausa e pós-menopausa, quando comparadas com as mulheres na pré-menopausa (*P*<0,001). O escore global do questionário também demonstra essa intensidade menor no grupo pré-menopausa (*P*=0,001). ***Conclusões***: Este estudo demonstrou uma prevalência e severidade maior de sintomas em mulheres na perimenopausa e pós-menopausa, o que pode prejudicar a qualidade de vida dessas mulheres nessa fase da vida

**Palavras-chave:** Menopausa. Sintomas gerais. Climatério. Qualidade de vida. Nutrição

## INTRODUCTION

The climacteric period is the non-pathological process of biological transition characterized by changes in the woman's body between the reproductive and non-reproductive periods, during which there is a decrease in the production of estrogen and progesterone. This may involve a psychosocial scope, causing changes accompanied or not by symptoms. Menopause can appear at unexpected periods as a result of premature aging or artificially after surgical procedures that interrupt ovarian hormone production.[1-4]

Menopause is identified as a normal physiological process marked by the complete cessation of menstruation for a period of 12 continuous months due to the decrease in ovarian hormones: estrogen, and progesterone. With the decline of ovarian function, endocrinological changes occur gradually and nonlinearly in menopausal women, and the lower volume of estrogen that circulates during peri-menopause leads to symptoms and discomfort that interfere with a woman's quality of life.[5-9]

The Ministry of Health established the period between 40 and 65 years of age as the age range limits for the climacteric phase, segmented into pre-menopause, which usually starts after 40 years of age, with a reduction in progesterone levels, and reduced fertility in women with little change in the menstrual pattern; peri-menopause, which begins two years before the last menstrual period and lasts for up to one year after, characterized by an irregular menstrual cycle and endocrine alteration; and post-menopause, which begins one year after the last menstrual cycle.[10-12]

Menopause before the age of 40 years is called early menopause, and menopause after the age of 55 years is called late menopause. Furthermore, amenorrhea may also be induced by the surgical removal of parts of the female reproductive system, such as the ovaries. Under these circumstances, hormonal changes between the hypothalamic-pituitary and reproductive endocrine axes lead to changes in reproductive function and other relevant body areas.[13,14]

The main symptoms that may occur are vasomotor, psychological, and urogenital, hot flashes, menstrual irregularity, onset or worsening of premenstrual tension and menstrual cramps, palpitations, dizziness, tiredness, memory loss, headache, joint pain, attention, concentration, and memory deficit, sweating during sleep, decreased pelvic floor muscles, discouragement, altered mood due to increased cortisol levels, vaginal dryness, dyspareunia (pain during sexual intercourse), insomnia due to high peak stress, osteopenia, and osteoporosis, psychiatric disorders, sexual dysfunction, skin lesions, metabolic disorders such as dyslipidemia, insulin resistance, hyperinsulinemia, type 2 diabetes and obesity due to hypoestrogenism, weight gain, an increased risk of hypertension, lipid disorders, increased insulin resistance, and cardiovascular disease, among others.[8,15,16]

The most significant factors affecting the quality of life of climacteric women are psychosocial and affective symptoms, such as anguish, discouragement, tiredness, lack of energy, bad mood, irritability, lack of attention, poor concentration, and memory, in addition to the decrease in libido.[10] The reduction of estrogen and other hormonal changes in climacteric women promote weight gain and increase abdominal fat deposits, interfering with nutritional status.[17]

Hormone replacement therapy (HRT) has been proposed for the prevention and treatment of symptoms and diseases that arise during menopause, as it promotes a better quality of life for women and reverses and improves the symptoms caused by climacteric.[18-20] However, in addition

to HRT, changes in lifestyle and eating habits are also part of menopause therapy. Several studies related to diet during the climacteric phase have confirmed the importance of adopting good eating habits as they have a major impact on the quality of life. Therefore, adequate knowledge about diet during the menopausal phase may inform public health prevention and treatment actions, correctly directing the guidelines and interventions aimed at nutritional education, and contributing to strategies that can alleviate the negative aspects of the climacteric period.[21-24]

Knowing the most common symptoms as well as markers or indicators related to the quality of life during menopause allows for the development of nutritional strategies to improve the quality of life in this population. Therefore, the objective of the present study is to verify the prevalence of the main symptoms associated with the climacteric in peri-menopausal and post-menopausal women when compared with pre-menopausal women, and to evaluate the quality of life of these women in this phase of hormonal transition.

## METHODS

### Study design

This cross-sectional study was conducted through online interviews with women in the climacteric period, aged between 40 and 65 years, to analyze the most common symptoms in this population and verifying the quality of life related to women's health during this period.

### Population studied: inclusion and exclusion.

Women between 40 and 65 years of age residing in Brazilian territory who were in pre-, peri-, and post-menopause were invited to participate in this convenience sample. Women who agreed to participate and signed the Informed Consent Form (ICF) were included in the study. As an exclusion criterion, women who did not finish the questionnaire completely were excluded.

### Ethical aspects

This study was approved by the Institutional Ethics Committee (approval number 5.180.519, CAAE 53662021.7.0000.5105). All participants signed an ICF after receiving explanations about the research objectives and methods before having access to the online questionnaire.

### Data collection

The study was conducted through an online questionnaire, shared through a link on social networks, e-mail, WhatsApp, and other means, with all women who voluntarily agreed to participate in the research. The questionnaire was developed based on scientific research on menopause and addressed socioeconomic, demographic, and health issues; climacteric and menopausal parameters; signs and symptoms of menopause; and diet.

In the survey, the participants were asked about their current weight and height, and from these data, the body mass index (BMI) was calculated, as proposed by the World Health Organization (WHO).[25] In this study, the BMI was categorized into underweight, normal weight (eutrophic), overweight, and obese (all obesity categories together) for the classification of nutritional status, also according to the classification proposed by the WHO.[25]

Participants were asked which stage of menopause they were in (pre-, peri-, and post-menopause), as well as the age at which menstruation began to fail or the last menstruation, if applicable. They were also asked whether they had undergone a hysterectomy or bilateral oophorectomy. Study participants also answered questions about their age at menarche, number of pregnancies, weight gain during menopause, use of HRT, and contraceptive use.

Quality of life during the climacteric period and severity of symptoms were assessed using the Menopause Rating Scale (MRS) questionnaire. It is an internationally validated instrument, translated into many languages, and recognized for use in Brazil. It has 11 questions and is distributed into three domains: somatic-vegetative symptoms, urogenital symptoms, and psychological symptoms. Each question is rated on a severity scale ranging from 0 (no symptoms) to 4 ( severe symptoms). The global score of the questionnaire, or a separate score for the three domains, was obtained by adding the values of each question that comprised the domain. For the global score, 0–4 points indicate absent or occasional symptoms, 5–8 points indicate mild symptoms, 9–16 points indicate moderate symptoms, and >17 points indicate severe symptoms.[26,27]

### Statistical analysis

The database was created using Microsoft Excel (Office 2013®) and analyzed using the Statistical Package for Social Sciences (SPSS®), version 19.0 for Windows (SPSS Inc., Chicago, IL, USA). The Kolmogorov-Smirnov test was used to assess normality. Qualitative (categorical) variables are described using absolute and relative frequencies (percentages). Quantitative variables with a normal distribution are presented as mean and standard deviation and distribution were compared using a one-way analysis of variance (ANOVA). Variables with non-normal or categorical distributions are presented as median (minimum-maximum) and were compared using the Kruskal-Wallis test. A test of analysis of multiple comparisons (post hoc), Tukey's test, was also performed to verify the differences between the three groups. Results with a significance level of 95% (P-value ≤0.05) were considered significant.

## RESULTS

Initially, the survey received 293 responses. After excluding duplicates and applying the exclusion criteria, 283 women were included in the analyses: 104 (36.8%) pre-menopause, 68 (24.0%) peri-menopause, and 111 (39.2%) post-menopause. Table 1 presents the general characteristics of the participants. There were no differences between the groups in terms of marital status, per capita income, height, weight, BMI, alcohol consumption, smoking, and physical exercise. The statistical difference observed with respect to age was expected since menopause is usually associated with increasing age in women. A difference in education was observed between the pre- and post-menopausal groups, while a difference in BMI categories was observed between the pre- and peri-menopausal groups. The prevalence of overweight women was higher in peri-menopause and post-menopause, whereas most pre-menopausal women were classified as eutrophic.

**Table 1.** General characteristics of the research participants. Belo Horizonte, MG, Brazil, 2021.

| Characteristics | Pre-menopause (n=104) | Perimenopause (n=68) | Post-menopause (n=111) | P-Value[#] |
|---|---|---|---|---|
| Age (years) | | | | |
| Mean ± SD | 43.4 ± 2.8 | 47.2 ± 4.2 | 54.1 ± 5.7 | **<0.001[a]** |
| Marital status – n (%) | | | | 0.631 |
| With partner | 75 (72.1%) | 51 (75.0%) | 76 (68.5%) | |
| No partner | 29 (27.9%) | 17 (25.0%) | 35 (31.5%) | |
| Schooling – n (%) | | | | **0.001[b]** |
| Uneducated | 0 | 0 | 0 | |
| Elementary school | 2 (1.9%) | 5 (7.3%) | 9 (8.1%) | |
| High school | 11 (10.6%) | 11 (16.2%) | 24 (21.6%) | |
| University education | 70 (67.3%) | 44 (64.7%) | 70 (63.1%) | |
| Master's, Doctorate, Postdoctoral | 21 (20.2%) | 8 (11.8%) | 8 (7.2%) | |
| Per capita income – n (%) | | | | 0.443 |
| Up to 1 minimum wage | 18 (17.3%) | 19 (27.9%) | 25 (22.5%) | |
| Between 1 and 3 minimum wages | 52 (50.0%) | 28 (41.2%) | 56 (50.5%) | |
| More than 3 minimum wages | 34 (32.7%) | 21 (30.9%) | 30 (27.0%) | |
| Reported height (m) | | | | |
| Mean ± SD | 1.64 ± 0.06 | 1.61 ± 0.06 | 1.62 ± 0.06 | 0.069 |
| Current weight reported (kg) | | | | |
| Mean ± SD | 70.8 ± 13.2 | 71.6 ± 14.9 | 71.0 ± 12.7 | 0.940 |
| BMI (kg/m$^2$) | | | | |
| Mean ± SD | 26.5 ± 4.8 | 27.4 ± 5.3 | 26.9 ± 4.5 | 0.454 |
| BMI categorization – n (%) | | | | **0.012[c]** |
| Low weight (BMI < 18.5 kg/m$^2$) | 0 | 0 | 2 (1.8%) | |
| Normal weight (18.5 ≤ BMI < 25.0 kg/m$^2$) | 51 (49.0%) | 19 (27.9%) | 38 (34.2%) | |
| Overweight (25.0 ≤ BMI < 30.0 kg/m$^2$) | 35 (33.7%) | 29 (42.7%) | 45 (40.6%) | |
| Obesity (BMI ≥ 30.0 kg/m$^2$) | 18 (17.3%) | 20 (29.4%) | 26 (23.4%) | |
| Has there been weight loss greater than 10% in the last 6 months? – n (%) | | | | 0.634 |
| Yes | 20 (19.2%) | 12 (17.6%) | 16 (14.4%) | |
| No | 84 (80.8%) | 56 (82.4%) | 95 (85.6%) | |
| Consumption of alcoholic beverages – n (%) | | | | 0.674 |
| Yes | 50 (48.1%) | 32 (47.1%) | 47 (42.3%) | |
| No | 54 (51.9%) | 36 (52.9%) | 64 (57.7%) | |
| Smoke – n (%) | | | | 0.675 |
| Yes | 5 (4.8%) | 3 (4.4%) | 5 (4.5%) | |
| No | 90 (86.5%) | 61 (89.7%) | 94 (84.7%) | |
| Used to smoke, but not currently | 9 (8.7%) | 4 (5.9%) | 12 (10.8%) | |
| Physical activity (minimum of 30 minutes) – n (%) | | | | 0.187 |
| Sedentary | 28 (26.9%) | 26 (38.2%) | 36 (32.5%) | |
| Once or twice a week | 25 (24.0%) | 15 (22.1%) | 39 (35.1%) | |
| Three to five times a week | 47 (45.2%) | 23 (33.8%) | 29 (26.1%) | |
| More than five times a week | 4 (3.8%) | 4 (5.9%) | 7 (6.3%) | |

Note: BMI: body mass index; SD: standard deviation; kg: kilogram; m: meter; [#]: One way ANOVA test for variables with normal distribution and Kruskal Wallis H test for categorical variables or with non-normal distribution. Analysis of multiple comparisons: [a]: difference between all groups; [b]: difference between pre- and post-menopause; [c]: difference between pre- and perimenopause.

When questioned about their self-assessed general health, only 38.7% of post-menopausal women said they had excellent health, 56.8% said they had fair health with points to improve, and 4.5% said they had poor health. In the peri-menopause group, 32.4% reported that they were in excellent health, 60.2% were in fair health, and 7.4% were in poor health. Among the pre-menopausal women, 48.1% reported excellent health, 48.1% reported fair health, and 3.8% reported poor health. There were no significant differences between the groups (P=0.091).

Table 2 presents the menopausal parameters, clinical history, and treatment of the 283 volunteers divided into groups. There were no differences in age at menarche between the groups (P=0.584). There were also no differences in the age at which menses started to fail, comparing the peri-menopausal and post-menopausal groups (P=0.201). A high percentage of women (>60%) reported difficulty in losing weight, but there were no significant differences between the groups (P=0.121). The differences observed for the removal of the uterus and both ovaries were expected since these surgeries can trigger menopause; therefore, only post-menopausal women answered yes to the questions.

**Table 2.** Characteristics of menopause, clinical history, and treatment of research participants. Belo Horizonte, MG, Brazil, 2021.

| Characteristics | Pre-menopause (n=104) | Perimenopause (n=68) | Post-menopause (n=111) | P-Value[#] |
|---|---|---|---|---|
| Age at menarche (years) | | | | |
| Mean ± SD | 12.5 ± 1.6 | 12.5 ± 1.6 | 12.7 ± 1.6 | 0.584 |
| Age menses started to fail (years) | | | | |
| Mean ± SD | - | 45.0 ± 4.9 | 46.0 ± 5.0 | 0.201 |
| Age when the last menstruation came (years) | | | | |
| Mean ± SD | - | - | 47.5 ± 5.2 | - |
| Number of pregnancies – n (%) | | | | **<0.001[b]** |
| None | 19 (18.3%) | 9 (13.2%) | 10 (9.1%) | |
| One | 37 (35.6%) | 20 (29.4%) | 21 (18.9%) | |
| Two | 34 (32.7%) | 26 (38.3%) | 45 (40.5%) | |
| Three or more | 14 (13.4%) | 13 (19.1%) | 35 (31.5%) | |
| Hysterectomy (removal of the uterus) – n (%) | | | | **<0.001[b,d]** |
| Yes | 0 | 0 | 23 (20.7%) | |
| No | 104 (100%) | 68 (100%) | 88 (79.3%) | |
| Bilateral oophorectomy (removal of both ovaries) – n (%) | | | | **0.003[b,d]** |
| Yes | 0 | 0 | 9 (8.1%) | |
| No | 104 (100%) | 68 (100%) | 102 (91.9%) | |
| Perimenopause or post-menopause weight gain | | | | **<0.001[a]** |
| Yes | 0 | 42 (61.8%) | 79 (71.2%) | |
| No | 104 (100%) | 26 (38.2%) | 32 (28.8%) | |
| Difficulty losing weight | | | | 0.121 |
| Yes | 64 (61.5%) | 52 (76.5%) | 76 (68.5%) | |
| No | 40 (38.5%) | 16 (23.5%) | 35 (31.5%) | |
| Hormone replacement therapy – n (%) | | | | 0.634 |
| Yes | 6 (5.8%) | 5 (7.4%) | 19 (17.1%) | |
| No | 97 (93.3%) | 63 (92.6%) | 83 (74.8%) | |
| I used to, but I don't currently | 1 (1.0%) | 0 | 9 (8.1%) | |
| Have used or are using any hormonal contraceptive method after the age of 40 | | | | 0.051 |
| Yes | 36 (34.6%) | 19 (27.9%) | 22 (19.8%) | |
| No | 68 (65.4%) | 49 (72.1%) | 89 (80.2%) | |

Note: SD: standard deviation; [#]: One way ANOVA test for variables with normal distribution and Kruskal Wallis H test for categorical variables or with non-normal distribution. Analysis of multiple comparisons: [a]: difference between all groups; [b]: difference between pre and post menopause; [c]: difference between pre and perimenopause; [d]: difference between perimenopause and post-menopause.

Volunteers were asked about their main symptoms common in menopausal women. Figure 1 shows the prevalence of these symptoms in each group. Symptoms such as decreased libido, vaginal dryness, urinary incontinence, muscle and joint pain, lipid alterations, and hot flashes were more prevalent in the absolute values of post-menopausal women. Women in peri-menopause had a higher prevalence, in absolute values, of stress, irritability, headache, skin problems, lack of concentration/memory, sleep disorders, fatigue, and lack of energy (Figure 1).

**Figure 1.** Prevalence of common menopausal symptoms. Belo Horizonte, MG, Brazil, 2021.

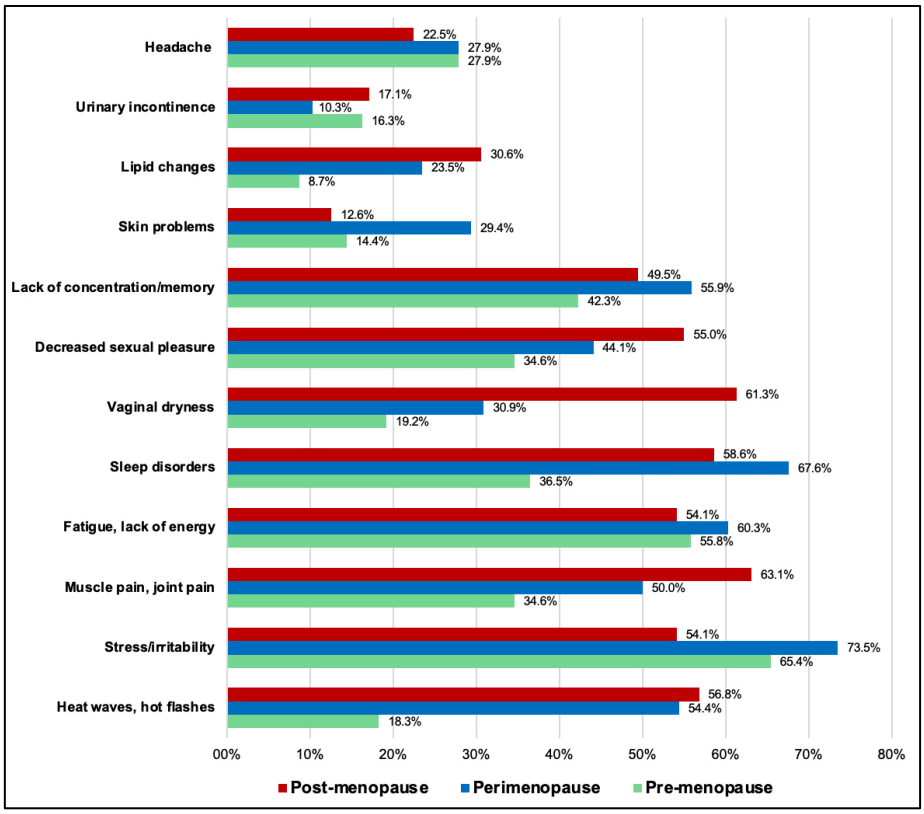



Table 3 presents the results of the analysis of symptoms and quality of life using the Brazilian version of the Menopause Rating Scale. There was no significant difference between the groups in terms of psychosocial domain symptoms (P=0.265). In the other domains (somato-vegetative and urogenital disorders), as well as in the global score, there were differences between the groups, mainly when comparing pre-menopause with post-menopause and pre-menopause with peri-menopause. Differences did not occur when comparing peri-menopause and post-menopause.

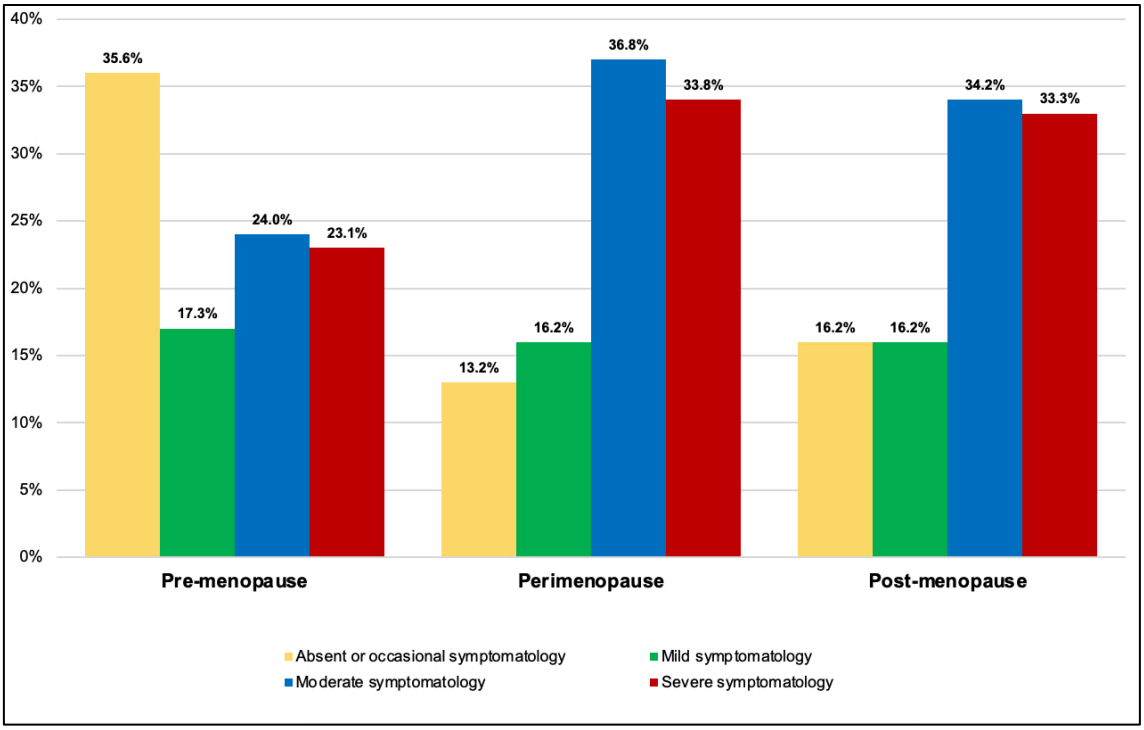
**Table 3.** Quality of life according to the *Menopause Rating Scale* by domains and groups. Belo Horizonte, MG, Brazil, 2021.

| Climacteric symptoms | Median | Minimum | Maximum | P-Value[#] |
|---|---|---|---|---|
| Domain Somato-Vegetable | | | | **<0.001** [b,c] |
| Pre-menopause | 2.00 | 0 | 9 | |
| Perimenopause | 4.00 | 0 | 15 | |
| Post-menopause | 4.00 | 0 | 16 | |
| Domain Urogenital Dysfunctions | | | | **<0.001** [b,c] |
| Pre-menopause | 1.50 | 0 | 10 | |
| Perimenopause | 2.00 | 0 | 10 | |
| Post-menopause | 4.00 | 0 | 12 | |
| Domain Psychosocial | | | | 0.265 |
| Pre-menopause | 4.00 | 0 | 16 | |
| Perimenopause | 5.50 | 0 | 16 | |
| Post-menopause | 4.00 | 0 | 16 | |
| Global Score | | | | **0.001** [b,c] |
| Pre-menopause | 7.00 | 0 | 29 | |
| Perimenopause | 11.50 | 0 | 39 | |
| Post-menopause | 11.00 | 0 | 41 | |

Note: [#]: Kruskal Wallis H test for categorical variables or those with non-normal distribution. Analysis of multiple comparisons: [a]: difference between all groups; [b]: difference between pre and post menopause; [c]: difference between pre and perimenopause; [d]: difference between perimenopause and post-menopause.

Figure 2 shows the division of the groups based on the severity of symptoms in the global score of the MRS questionnaire. The observed statistical differences also occurred when comparing pre-menopause with both post-menopause and peri-menopause. Differences also did not occur when comparing peri-menopause with post-menopause.

**Figure 2**. Severity of symptoms according to the Menopause Rating Scale. Belo Horizonte, MG, Brazil, 2021.




Note: Statistical difference between groups (P=0.001), which occurs between pre- and perimenopause (P=0.011), between pre- and post-menopause (P=0.009). It does not happen between perimenopause and post-menopause (P=0.950).

Women were asked if there was any food they felt improved their symptoms. Among post-menopausal women, only 23 (20.7%) responded positively. In the peri-menopause group, there were 15 women (22.1%), and in the pre-menopause group, 17 (16.3%) said they believed in the improvement of symptoms with the consumption of a particular food. Among the most cited foods were fruits and vegetables, chocolate, Peruvian maca, artichokes, fibers, and teas such as lemon balm and passion fruit.

When asked whether any food could worsen their reported symptoms, 40 (36%) post-menopausal women answered yes. In the peri-menopausal and pre-menopausal groups, 17 (25%) and 33 (31.7%) participants answered yes, respectively. The most cited foods were sugar, sweets in general, alcohol, high-starch foods, coffee, dairy products, sausages, peppers, and soft drinks.

When asked how they rated their diet, there were no significant differences between the groups (P=0.387). In the pre-menopausal group, only 31 women (29.8%) reported having a healthy diet. A total of 69 women (66.4%) said they had a good diet but needed improvement, and 4 (3.8%) said they had a bad diet and ate badly. In the peri-menopausal group, 17 (25%) participants said they had a healthy diet, 46 (67.6%) had a good diet but with points to improve, and 5 (7.4%) had a bad diet. In post-menopause, 26 (23.4%) participants said they had a healthy diet, 77 (69.4%) had a good diet that needed improvement, and 8 (7.2%) had a bad diet. The vast majority of women said they believe that food and nutrition can improve menopausal symptoms (98.1% of pre-menopausal women, 92.6% of peri-menopausal women, and 93.7% of post-

menopausal women). However, only 41 pre-menopausal women (39.4%) currently undergo nutritional monitoring. This percentage is even lower in peri-menopausal (33.8%) and post-menopausal (23.4%) women.

## DISCUSSION

The present study evaluated the prevalence of the main symptoms associated with menopause and observed more severe symptoms in peri-menopausal and post-menopausal women than in pre-menopausal women. Symptoms such as decreased libido, vaginal dryness, urinary incontinence, muscle and joint pain, lipid alterations, and hot flashes were more prevalent in the absolute values of post-menopausal women. Women in the peri-menopausal period had a higher prevalence, in absolute values, of stress, irritability, headache, skin problems, lack of concentration/memory, sleep disorders, fatigue, and lack of energy.

Regarding weight and BMI, in our research, it was possible to identify that the peri-menopause and post-menopause groups had a higher prevalence of women in the obese and overweight categories, whereas, in the pre-menopause group, most women were classified as eutrophic. When comparing all groups, there was no difference in terms of difficulty losing weight, but the study showed that more than 60% of the women complained of this difficulty. These data confirm what was observed in the study by Silva and Oliveira,[28] which demonstrated that post-menopausal women are more overweight and obese due to increased caloric intake and an imbalance in energy expenditure associated with physical and psychological transitions and lifestyle changes that take place during this period. In a study of 200 climacteric women aged 40–65 years, Gallon and Wender[29] found a mean BMI of 30.1 kg/m$^2$ (obesity grade I), whereas the mean BMIs in our study were classified as overweight.

As for menstrual and reproductive parameters, there was no difference in relation to the age at menarche for all three groups, and in relation to the age at which menstruation began to fail when comparing the peri-menopausal and post-menopausal groups. In our study, the most common post-menopausal symptoms were hot flashes (56.8%), vaginal dryness (61.3%), decreased sexual pleasure (55%), muscle and joint pain (63.1%), and dyslipidemia (30.6%). In the peri-menopause group, symptoms such as sleep disorders (67.6%), lack of concentration/memory (55.9%), fatigue/lack of energy (60.3%), and stress/irritability (73. 5%). In a study by Silva et al.,[30] 80.2% of the women experienced hot flashes. Other symptoms included muscle, joint, and sleep problems (25.2%); psychological changes (22.5%); and sexual problems (9.7%). The authors showed fewer urogenital symptoms compared with our study. However, owing to physiological, hormonal, and physical changes resulting from aging in women, a set of factors are usually compromised, causing sexual dysfunction.[31]

In the analysis of the degree of symptoms according to the MRS, the peri-menopause and post-menopause groups presented, respectively, a median global score of 11.5 and 11.0 and, in the interpretation of the questionnaire, scores of 8 or higher indicate moderate or severe symptoms. In the pre-menopausal group, the mean overall score was 7.0. In the study by Filho et al.,[2] the median global score was 8.0; however, they did not separate the three groups, as in our study. The study by Lorenzi et al.[32] also used the MRS scale and did not find differences between the pre- and post-menopausal groups in the global score, unlike what was observed in our study. In this study, the authors found an overall score of 11.0 for pre-menopause and 12.0 for post-menopause. However, in the prevalence of severe symptoms in the post-menopausal group, the percentages were similar between their study and ours (34.9% and 33.3%, respectively).[32]

In a study by Silva et al.,[30] it was observed that 90.4% of women had symptoms associated with menopause, with 55.9% being severe, 25.6% moderate, 8.9% mild, and 9.6% asymptomatic, based on the MRS classification. Somatovegetative symptoms were more prevalent (31.9%) and classified as very severe.

Psychological symptoms of anxiety (49.9%) and irritability (41.7%) were most frequently of severe and very severe intensity.

When participants in this study were questioned about their diet 59.1% of the women said that they felt an improvement in symptoms with some foods and 92.7% said that some foods worsened menopausal symptoms. In Kozakowski et al.,[33] the consumption of vegetables and fruits, cereals, olive oil, and oilseeds; low consumption of saturated fats, meat, and processed foods; and moderate consumption of dairy products and wine brought several health benefits to menopausal women, as well as reducing the risk of cardiovascular disease, diabetes, and obesity.

In addition, in the present study, 17.1% of women took HRT after menopause, and 8.1% said they had taken it but no longer did it. HRT is an effective measure to reduce symptoms resulting from menopause and is one of the most commonly used treatments; however, it can increase the risk of thrombosis and cerebrovascular events. Therefore, it is essential to seek more beneficial HRT measures to improve the quality of life of women during this phase.[34]

In our study, most women believed that nutrition could improve their symptoms. However, only 39.4% of the pre-menopausal women underwent nutritional monitoring. According to a study by Rezende et al.,[35] follow-ups by a nutritionist together with a multidisciplinary team is essential to help with aspects related to healthier aging, to prevent obesity and associated pathologies, and improve symptoms and quality of life of women in this phase.

This study has some limitations, such as the convenience sample and the inclusion of self-reported variables such as weight and height. Even so, the study has value in that it achieved an important sample size, divided into three groups, to verify the differences between women who still menstruate regularly, those who are in the transition to menopause, and those who are already post-menopausal. By understanding the prevalence of these symptoms, nutritionists and health professionals can devise strategies capable of alleviating them and contributing to a better quality of life for women who are going through this period of transition and who need to receive attention to ensure a smooth and healthy transition.

## CONCLUSION

Menopause is a normal physiological event in a woman's life, which includes pre-menopause, peri-menopause, and post-menopause, resulting in symptoms that can affect her health and quality of life. The present research allowed us to document the presence of more severe symptoms in women in the peri- and post-menopausal groups, compared to pre-menopausal women, which highlights the importance of health professionals addressing these symptoms. Knowing the prevalent symptomatology in this phase of female aging makes it possible to define precise strategies, such as nutritional education, to ease symptoms and improve the quality of life of this population.

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## Contributors

Santos AS, Moreira AB, and Souza MLR participated in the idealization of the study design; in the collection, analysis, and interpretation of data; and in the writing of the study. All authors reviewed and approved the final version of the manuscript for submission.

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