



ORIGINALES

Body Mass Index and associated factors in climacteric women

Índice de Massa Corporal e fatores associados em mulheres climatéricas

Índice de Masa Corporal y factores asociados en mujeres

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ABSTRACT:

Goal: To identify the association between body mass index and sociodemographic factors, lifestyle, eating habits, anthropometric measurements and clinical factors of climacteric women assisted in Health Strategies of Montes Claros.

Methods: This is a cross-sectional, analytical epidemiological study with a sample of 874 perimenopausal women selected by simple random sampling. Sociodemographic data, lifestyle, eating habits, and clinical, obstetrical and gynecological factors were collected through standardized questionnaires, in addition to performing anthropometric assessment. The bivariate analysis was performed using the chi-square test.

Results: The results showed high prevalence of obesity (36.0%) and overweight (38.1%), as well as associations between body mass index and the the type of school attended ($p = 0.009$), smoking ($p = 0.023$), treatment for weight loss ($p = 0.000$), anthropometric measurements ($p = 0.000$) and clinical factors ($p = 0.000$).

Conclusion: We conclude that educational interventions to correct or improve the anthropometric profile may result in benefits for the health of climacteric women, since the presence of obesity and overweight was high, and lifestyle habits, anthropometric and clinical factors present themselves associated to morbidity.

Keywords: Body Mass Index; Climacteric; Family Health Strategy.

RESUMO:

Objetivo: Identificar a associação do Índice de Massa Corporal com os fatores sociodemográficos, hábitos de vida, hábitos alimentares, medidas antropométricas e fatores clínicos das mulheres climatéricas assistidas nas Estratégias da Saúde de Montes Claros.

Metodologia: Trata-se de um estudo epidemiológico transversal, analítico, com a amostra composta por 874 mulheres climatéricas selecionadas por meio de sorteio aleatório simples. Os dados sociodemográficos, hábitos de vida, hábitos alimentares e fatores clínicos, obstétricos e ginecológicos foram coletados por meio de questionários padronizados, além da realização de avaliação antropométrica. A análise bivariada foi realizada por meio do teste qui-quadrado.

Resultados: Os resultados apontaram prevalência elevada de obesidade (36,0%) e sobrepeso (38,1%), bem como associações do índice de massa corporal com o tipo de escola que frequentou ($p=0,009$), tabagismo ($p=0,023$), tratamento para perda de peso ($p=0,000$), medidas antropométricas ($p=0,000$) e fatores clínicos ($p=0,000$).

Conclusão: Conclui-se que intervenções educativas visando corrigir ou melhorar o perfil antropométrico poderão resultar em benefícios relativos à saúde da mulher climatérica, uma vez que a presença da obesidade e sobrepeso foi elevada, além de hábitos de vida, fatores antropométricos e clínicos apresentarem associados a essa morbidade.

Palavras chave: Índice de Massa Corporal; Climatério; Estratégia da Saúde da Família.

RESUMEN:

Objetivo: Identificar la asociación del índice de masa corporal con factores sociodemográficos, estilo de vida, los hábitos alimentarios, mediciones antropométricas y factores clínicos de mujeres climatéricas asistidos en las Estrategias de Salud de Montes Claros.

Metodología: Se trata de un estudio epidemiológico transversal, analítico, con una muestra de 874 mujeres perimenopáusicas seleccionadas por muestreo aleatorio simple. Los datos sociodemográficos, estilo de vida, los hábitos alimentarios y los factores clínicos, obstetricia y ginecología se recogieron a través de cuestionarios estandarizados, además de realizar la evaluación antropométrica. El análisis bivariente se realizó mediante la prueba de chi-cuadrado.

Resultados: Los resultados mostraron una alta prevalencia de la obesidad (36,0%) y el sobrepeso (38,1%), así como las asociaciones de índice de masa corporal con el tipo de escuela que asistió ($p = 0,009$), el tabaquismo ($p = 0,023$), el tratamiento para la pérdida de peso ($p = 0,000$), las mediciones antropométricas ($p = 0,000$) y los factores clínicos ($p = 0,000$).

Conclusión: Se concluye que las intervenciones educativas para corregir o mejorar el perfil antropométrico pueden resultar en beneficios para la salud de las mujeres climatéricas, ya que la presencia de la obesidad y el sobrepeso fue alta, y los hábitos de estilo de vida, antropométricas y factores clínicos asociados presentes para que la morbidad.

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Palabras clave: Índice de Masa Corporal; Climaterio; Estrategia de Salud de la Familia

INTRODUCTION

Climacteric is a biological and non-pathological phase characterized by the establishment of a continuous and progressive physiological process of hypoestrogenism¹. The influence of endogenous and exogenous factors in this period intensifies the alteration of the lipid profile, which generates a predisposition to weight gain, changes in body composition and consequently triggers obesity^{2,3}.

Obesity advent brings an increase to a set of risks for other chronic diseases such as diabetes, hypertension, depression and multiple neoplasias⁴. Its striking features are the increased adiposity located in the abdominal region or generalized.⁵ Studies have been conducted to characterize obesity risk factors in climacteric women; however, the risk impact of each of these factors is not yet clearly defined in the literature⁶ and causes controversy^{6,7}.

Obesity stands out as being both a disease and a risk factor for the onset of other comorbidities⁸, associated with the scarcity of data about this pathology in climacteric women assisted in primary care⁹. Therefore, the study aimed to identify the association of Body Mass Index (BMI) with sociodemographic factors, life habits, eating habits, anthropometric measures and clinical factors of climacteric women assisted in the Montes Claros Health Strategies.

MATERIALS AND METHODS

The present work comprises an analytical cross-sectional epidemiological study. The target population corresponded to the climacteric women of the city of Montes Claros, Minas Gerais, made up of 30,018 climacteric women registered in the 73 Family Health Strategy (FHS) units of Montes Claros, Minas Gerais, in 2014.

Sample selection occurred in two stages. Initially, the strategies were selected by conglomerates, making a total of 20 strategies, which covered the rural and urban areas. After that, a proportional number of women was selected obeying the stratification criteria according to the climacteric period (pre, peri and postmenopausal)¹⁰, identified through the records available in the units. After that selection, the family health agents invited these women go to the unit on the date established by the invitation. For each unit, 48 women were selected, making a total of 960 women called, of who 113 climacteric women were lost in the study because they did not complete all the evaluations. The final sample corresponded to 874 climacteric women. To incorporate the structure of the complex sampling plan into the statistical analysis of the data, each interviewee was associated with a weight w , which corresponded to the inverse of their probability of inclusion in the sample (f)¹¹.

Trained and calibrated professionals performed the data collection. Socio-demographic data, life habits and clinical factors were collected through questionnaires. The presence of diabetes mellitus and systemic arterial hypertension were self-reported by the interviewees. Anthropometric data such as waist circumference, waist-hip ratio and BMI were evaluated. Measurement of stature occurred with the help of the SECA 206 anthropometer on a wall with ninety degrees in relation to the floor and without skirting boards with the woman in proper position to evaluate this data. We used the SECA OMEGA 870 digital scale for measuring weight (kg). BMI was the result of the division of the body weight by the squared height (P / E^2). It caused the classification of those surveyed in eutrophic (18.5-24.9), overweight (25.0-29.9) and obesity (30.0- above)¹².

Abdominal circumference (AC) and waist -hip ratio (WHR) were evaluated using an inelastic millimeter tape measure in regions and with a standardized technique. Values ≥ 88 cm in AC were classified as altered according to NCEP/ATP-III¹³ and 0.80 in WHR, according to Molarius *et al.*,¹⁴.

We selected the independent variables considering the following dimensions: sociodemographic data (age, marital status, skin color, education, minimum wage, religion, school attended, paid activity and profession); lifestyle (physical activity, smoking, alcoholism and treatment to lose weight); dietary habits (salt in food, fruit intake per week, weekly soda intake and red meat fat intake); clinical factors (menopause, self-perception of depression, diabetes, and blood pressure); obstetric and gynecological factors (normal births, weight of the first child at birth, woman's hormone, type of menopause).

For statistical analysis, we used the *SPSS 20.0* software. Initially, we described the simple frequencies and percentages of the analyzed variables. Bivariate analysis was performed using the chi-square test. In all statistical analyzes, statistical significance was considered $p < 0.05$.

The research project was approved by the Research Ethics Committee of Faculdades Integradas Pitágoras of Montes Claros with opinion n. 817.666 (CAAE 36495714.0.0000.5109). Only the women who signed the Free and Informed Consent Term participated in the study. This study meets the regulatory norms of research involving human beings - Resolution n. 466/12 - of the National Health Council.

RESULTS

We evaluated 874 climacteric women between the ages of 40 and 65. It was observed that the majority of the women were between 52 and 65 years old (45.3%), married (69.8%) and brown skinned (64.8%). As for schooling, the majority had complete primary education (68.2%), received up to a minimum wage (63.8%), were Catholic (66.9%), attended public schools (97.3%), did not work (59.6%). Regarding the profession, the majority of women reported working in domestic services (42.1%) (Table 1).

Table 1: Characterization of the sample according to sociodemographic factors of climacteric women, Claros, Minas Gerais Montes, 2014.

	Variables	n	%*
Sociodemographic factors			
Age	40 to 45 years of age	236	27.9
	46 to 51 years of age	241	26.8
	52 to 65 years of age	397	45.3
Marital status	With partner	559	69.8
	Without partner	228	30.2
Skin color	White	154	17.2
	Brown	553	64.8
	Black	112	12.1
	Another color	49	5.9
Education	High school/College degree	281	3.8
	Elementary school II	231	26.6
	Elementary school I	358	41.6
Minimum wage	More than one	128	36.2
	Up to one	217	63.8
Religion	Catholic	582	66.9
	Evangelical	221	24.9
	Another	67	8.2

School attended	Private	24	2.7
	Public	822	97.3
Work	Work	347	40.4
	Do not work	520	59.6
Profession	Domestic services	144	42.1
	Culinary services	38	12.3
	Educational services	18	5.1
	Health services	49	13.9
	Autonomous services	92	26.6

*: Corrected by the drawing effect (*deff*).

The practice of irregular physical activity was reported by (55.7%). Women reported they were not smokers (89.8%), they did not ingest alcohol (21.2%) and they did not have treatment for the weight loss (78.0%). Regarding eating habits, a large number of women reported to never salt in food (78.8%), to eat fruit 3 to 6 times a week (70.6%), not to drink soft drinks weekly (50.8% %), and the majority affirmed to remove the fat from red meat (80.5%). As for the anthropometric measurements, the AC of the majority of the women had altered (84.7%) and in the BMI, there were prevalence of overweight (38.1%) and obese (36.0%) women (Table 2).

Table 2: Characterization of the sample according to life habits, eating habits and anthropometric measurements in climacteric women, Montes Claros-MG, 2014.

Variables		n	%*
Life habits			
Physical activity	Very active/active	114	12.7
	Irregularly active	480	55.7
	Sedentary	280	31.6
Smoking	Do not smoke	739	89.8
	Smoke	80	10.2
Alcoholism	Do not ingest alcohol	646	78.8
	Ingest alcohol	163	21.2
Treatment for weight loss	Yes	637	78.0
	No	172	22.0
Eating habits			
Salt in food	Never put salt	781	95.2
	Put salt	39	4.8
Fruit intake per week	3 to 6 times	579	70.6
	< 3 times	150	18.9
	Never	87	10.5
Soft drinks intake per week	Do not ingest	419	50.8
	< 3 times	306	36.9
	3 to 6 times	94	12.3
Red meat fat ingestion	Do not eat red meat	26	3.3
	Take off the fat	653	80.5
	Eat the fat	135	16.2
Anthropometric measurements			
AC	Normal	139	15.3
	Altered	730	84.7
BMI	Eutrophic	228	25.9
	Overweight	333	38.1
	Obese	306	36.0

*: Corrected by the drawing effect (*deff*); AC: Abdominal circumference.

Regarding the menopausal phase, most women were postmenopausal (43.9%), non-diabetic (84.9%), non-hypertensive (51.0%), and had a good health (44.1%) (Table 3).

Table 3: Characterization of the sample according to clinical, obstetric and gynecological factors of climacteric women, Montes Claros-MG, 2014.

Clinical factor		Variables	n	%*
Menopause		Premenopausal	231	26.2
		Perimenopausal	276	29.9
		Postmenopausal	367	43.9
Diabetes		Non-diabetic	698	84.9
		Diabetic	121	15.1
Blood pressure		Non-hypertensive	415	51.0
		Hypertensive	401	49.0
Self-perception of health status		Very good	119	15.2
		Good	352	44.1
		Regular	260	30.7
		Poor	83	10.0

*: Corrected by the drawing effect (*deff*).

Table 4 shows the association of BMI levels among sociodemographic factors. There was a significant association between BMI changes and the school-attended variable ($p = 0.009$). Among women attending private schools, they had higher rates of overweight and obesity.

Table 4: Association of BMI levels among sociodemographic factors.

Variables		Eutrophic		Overweight		Obesity		P value (χ^2)
		N	%*	n	%*	n	%*	
Sociodemographic factors								
Age	40 to 45 years of age	63	26.8	94	38.4	77	34.8	0.275
	46 to 51 years of age	72	30.0	83	34.5	83	35.5	
	52 to 65 years of age	93	23.0	156	39.9	146	37.1	
Marital status	With partner	148	25.9	211	37.7	196	36.4	0.786
	Without partner	53	24.0	91	39.9	81	36.1	
Skin color	White	39	24.2	59	37.8	56	38.0	0.694
	Brown	146	26.8	214	38.8	188	34.4	
	Black	28	23.6	35	30.0	47	46.4	
	Another color	14	26.8	22	46.4	13	26.8	
Education	High school/College degree	83	29.1	111	39.8	84	31.1	0.184
	Elementary school II	63	27.0	88	38.5	78	34.5	
	Elementary school I	80	22.5	133	36.6	143	40.9	
Minimum wage	More than one	39	30.3	50	40.0	37	29.7	0.476
	Up to one	58	25.1	85	38.6	73	36.3	
Religion	Catholic	161	27.4	223	38.4	194	34.2	0.120
	Evangelical	53	23.9	84	38.0	81	38.1	
	Another	14	21.8	24	34.6	29	43.6	

School attended	Private	2	6.4	13	56.8	9	36.8	0.009
	Public	221	26.8	311	37.6	283	35.6	
Work	Work	100	28,3	134	38,4	110	33.3	0.277
	Do not work	124	24,0	198	38,1	194	37.9	

*: Corrected by the drawing effect (*deff*); (χ^2): Qui-Square test; p value: Significance level $p < 0.05$.

Table 5 shows the significant association between the BMI change variables such as smoking ($p = 0.023$) and treatment for weight loss ($p = 0.000$). Among the non-smokers (74.7%) and those who received treatment for weight loss, (86.5%) had higher rates of overweight and obesity.

As for anthropometric factors, there were significant associations ($p = 0.000$), with BMI change. Women who presented altered AC (83.0%) and WHR (80.5%) had higher rates of overweight and obesity (Table 5).

Significant associations were also observed with the presence of diabetes ($p = 0.000$), high blood pressure ($p = 0.000$), self-perception of poor health status ($p = 0.000$), and prevalence of overweight and obesity (Table 5).

Table 5: Association of BMI levels among lifestyle, eating habits and anthropometric measures.

Variables		Eutrophic		Overweight		Obesity		P value
		n	%*	n	%*	n	%*	(χ^2)
Life habits								
Physical activity	Very active/active	33	26.9	44	37.4	37	35.7	0.694
	Irregularly active	120	25.1	190	40.1	165	34.8	
	Sedentary	75	26.8	99	34.8	104	38.4	
Smoking	Do not smoke	140	25.2	196	38.1	179	36.6	0.023
	Smoke	49	28.1	103	38.0	91	33.9	
Alcoholism	Do not ingest alcohol	170	27.0	238	36.1	233	36.9	0.244
	Ingest alcohol	36	20.2	71	44.6	55	35.2	
Treatment for weight loss	Yes	180	28.5	258	40.4	195	31.1	0.000
	No	24	13.5	54	30.4	93	56.1	
Eating habits								
Salt in food (dish)	Never put salt	196	25.0	303	38.5	276	36.4	0.406
	Put salt	13	34.8	11	28.4	15	36.8	
Fruit intake per week	3 to 6 times	148	25.5	225	38.4	201	36.1	0.690
	< 3 times	43	28.2	55	38.1	51	33.6	
	Never	17	20.4	34	37.0	36	42.6	
Soft drinks intake per week	Never	110	27.1	150	34.1	156	38.8	0.237
	< 3 times	74	23.1	126	41.2	104	35.7	
	3 to 6 times	24	25.2	39	46.2	30	28.6	
Red meat fat intake	Do not eat red meat	6	19.3	11	43.1	9	37.6	0.621
	Take off the fat	175	26.9	247	37.3	226	35.8	
	Eat the fat	27	20.5	53	39.8	54	39.7	
Anthropometric measurements								
AC	Normal	104	75.2	26	19.4	8	5.4	0.000
	Altered	123	17.0	305	41.2	298	41.8	
HWR	Normal	124	36.9	132	41.8	69	21.3	0.000
	Altered	104	19.5	199	35.6	237	44.9	
Clinical factors								
Diabetes	Non-diabetic	193	27.5	277	39.6	225	32.9	0.000

	Diabetic	16	14.0	37	26.6	65	56.4	
Blood pressure	Non-hypertensive	144	35.4	172	41.5	94	23.1	0.000
	Hypertensive	65	15.7	140	34.3	195	50.0	
Self-perception of health status	Very good	33	28.8	54	46.5	30	24.7	0.000
	Good	99	28.6	144	39.7	107	31.7	
	Regular	60	21.6	92	35.6	107	42.8	
	Poor	16	19.1	21	23.6	45	57.3	

*: Corrected by the drawing effect (*deff*); AC: Abdominal circumference; HWR: Hip-waist ratio; (χ^2): Qui-Square test; p value: Significance level $p < 0.05$.

DISCUSSION

Due to the alterations that the female organism undergoes during this period, the association between obesity and climacteric has been object of study of several authors^{15,16}. Being overweight is a serious health problem, since it represents an important risk factor for the development of cardiovascular diseases, systemic arterial hypertension, respiratory problems, diabetes mellitus, dyslipidemias and neoplasias, with a significant impact on the mortality of affected individuals^{17,18}. It also increases significantly in women after they reach 40 years of age. It has reached 65% of them between 40 and 59 years of age and 73.8% in women over 60 years of age⁵⁴.

When associated sociodemographic factors with BMI, considering the type of school attended by the women, those attending private schools were more predisposed to the development of overweight and obesity. A study carried out by Rosaneli *et al*¹⁹ stated that school is a suitable place for healthy activities, including adequate food and educational and physical activities. These are decisive factors to prevent the occurrence of diseases. However, considering the rise of chronic diseases such as obesity in students of private schools, more studies focused on socioeconomic variables should be performed to clarify this association.¹⁹

Regarding cigarette smoking, those surveyed women with overweight and obesity were not smokers, information that is in agreement with the study by Soares and Barreto²⁰. They highlighted smoking as a protective action for overweight and abdominal obesity, as tobacco competes with brain reward sites for food, leading to reduced appetite. In addition, nicotine raises lipid oxidation levels, contributing to a more significant catalytic state and lower weight gain.

In this study, the results showed significant associations between BMI changes and treatment for weight loss. That confirms the findings of Leão *et al*²¹. They highlighted in their work the fact that most individuals seeking treatment for weight loss do not do so with the necessary motivation. In addition to this, there is evidence that weight loss depends on the change of the permanent lifestyle, requiring a multiprofessional and continuous approach in order to be successful.²²

The changes in waist circumference and waist-hip ratio were more evident in climacteric women who presented high BMI. This suggests that central obesity may be due to climacteric hormonal variations, leading to android obesity, accumulation of fat in the abdomen, and decreased fat in the hips and thighs (gynoid fat)².

Diabetes mellitus and systemic arterial hypertension were associated with high BMI indexes in the studied women. This fact meets Al-Safi and Polotsky²³. They point out that over the last decades the prevalence of obesity has increased in epidemic

proportions, along with several comorbidities such as hypertension and diabetes mellitus type two, due to the increase in life expectancy, changes in lifestyle and eating habits²⁰.

It is also emphasized that BMI was associated with self-perception of health, evidencing that overweight and obese women presented poor perception of their health status. This fact was already demonstrated in a previous study conducted with Brazilian women over 50 years of age²⁴. These findings also compare with data obtained by Lui Filho *et al*²⁵ in their study about climacteric, which observed that the climacteric symptoms, associated with obesity, bring negative repercussions to mood and negative self-perception of individual health.

Duarte *et al*²⁶ emphasize the importance of a more frequent monitoring of the health area of climacteric women, seeking to estimate the presence of obesity and associated factors. Such information contributes to the planning of health actions, programs and policies aimed at the promotion, prevention and diagnosis of these diseases, impacting on the reduction of the mortality of this population group.

The present study points out, by means of a probabilistic, stratified and representative sample of the climacteric population assisted in primary care, factors associated with overweight. However, it presents as main limitation the study design, of the transversal type, measuring the outcome and the exposure simultaneously and not proving temporality.

CONCLUSION

The present study identified a high prevalence of overweight and obesity among the climacteric women assisted by primary care, as well as associations between the Body Mass Index and the type of school attended, smoking, treatment for weight loss, anthropometric measures, and factors, such as diabetes, blood pressure and self-perception of health status. These findings point to the need for strategies for obesity control to be planned and implemented, especially among climacteric women.

The Family Health Strategy should be more incisive in the search for prevention and reduction in the number of obesity cases among climacteric women, since this action will have a positive impact on changes in the morbidity and mortality profile of this population group.

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