

Abdominal obesity in adults in a municipality in the state of Bahia: a cross-sectional study

Obesidade abdominal em adultos de um município do estado da Bahia: um estudo transversal
Obesidad abdominal en adultos de un municipio del estado de Bahia: un estudio transversal

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Abstract

Introduction: It is estimated that approximately 2.3 billion adults worldwide will be overweight by 2025, including 700 million individuals with obesity. This represents a threat to the Brazilian population, as abdominal obesity is associated with a chronic inflammatory state, contributing to the development of cardiovascular risk factors. **Objective:** To estimate the prevalence and identify factors associated with abdominal obesity in adults enrolled in the Family Health Strategy in Mucugê (BA). **Methods:** This is a cross-sectional study with a sample composed of adult individuals residing in and registered with the Family Health Strategy in the municipality of Mucugê (BA), Brazil. Data collection was conducted through household visits in November and December 2021 and March 2022. Anthropometric measurements were taken, and a questionnaire was administered, including sociodemographic information, lifestyle habits, and knowledge about hypertension. **Results:** Of the 337 participants, the majority were female (64%) and self-identified as Brown (62.9%). The mean age was 46.7 years (± 15.6). A high prevalence of individuals with elevated cardiovascular risk based on waist circumference was observed (79.8%), with predominance among women (87.5%). Abdominal obesity was associated with increasing age, higher number of children, lower educational level, prior smoking, and self-reported hypertension. **Conclusions:** Considering that abdominal obesity is related to increased risk of cardiovascular outcomes, the routine measurement of waist circumference in primary care is recommended. Furthermore, understanding the associated factors may support the implementation of health strategies aimed at its prevention and control.

Keywords: Obesity, Abdominal; Prevalence; Risk factors; Population studies in public health.

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Resumo

Introdução: Estima-se que cerca de 2,3 bilhões de adultos ao redor do mundo estarão acima do peso em 2025, sendo 700 milhões de indivíduos com obesidade. Isso representa uma ameaça à população brasileira, pois a obesidade abdominal está associada a um estado de inflamação crônica, contribuindo para o desenvolvimento de fatores de risco cardiovasculares. **Objetivo:** Estimar a prevalência e identificar os fatores associados à obesidade abdominal em adultos cadastrados na Estratégia de Saúde da Família de Mucugê (BA). **Métodos:** Trata-se de um estudo transversal, cuja amostra foi constituída por indivíduos adultos residentes e cadastrados na Estratégia Saúde da Família (ESF) do município de Mucugê (BA). A coleta de dados foi realizada por meio de visitas domiciliares nos meses de novembro e dezembro de 2021 e março de 2022. Foram realizadas medidas antropométricas e aplicado um questionário contendo informações sociodemográficas, hábitos de vida e conhecimento sobre hipertensão arterial. **Resultados:** Dos 337 entrevistados, a maioria foi de indivíduos do sexo feminino (64%) e da cor parda (62,9%). A idade média foi de 46,7 anos ($\pm 15,6$). Observou-se uma elevada prevalência de indivíduos com alto risco cardiovascular pela avaliação da circunferência abdominal (79,8%), com predomínio no sexo feminino (87,5%). A presença da obesidade abdominal esteve associada ao aumento da idade, ao maior número de filhos, à baixa escolaridade, ao uso prévio de fumo e à hipertensão arterial autorreferida. **Conclusões:** Considerando que a obesidade abdominal está relacionada à elevação de riscos para agravos cardiovasculares, recomenda-se a realização da medida da circunferência abdominal na atenção básica. Ademais, o conhecimento dos fatores associados a esse agravo pode auxiliar a implementação de estratégias de saúde que visem sua prevenção e controle.

Palavras-chave: Obesidade abdominal; Prevalência; Fatores de risco; Estudos populacionais em saúde pública.

Resumen

Introducción: Se estima que alrededor de 2.300 millones de adultos en todo el mundo tendrán sobrepeso en 2025, y 700 millones de personas serán obesas. Esto representa una amenaza para la población brasileña, ya que la obesidad abdominal está asociada a un estado de inflamación crónica, que contribuye al desarrollo de factores de riesgo cardiovascular. **Objetivo:** Estimar la prevalencia e identificar los factores asociados a la obesidad abdominal en adultos inscritos en la Estrategia de Salud Familiar de Mucugê (BA). **Métodos:** Se trata de un estudio transversal, cuya muestra estuvo compuesta por individuos adultos residentes y registrados en la Estrategia de Salud de la Familia (ESF) del municipio de Mucugê (BA). La recolección de datos se realizó mediante visitas domiciliarias en los meses de noviembre y diciembre de 2021 y marzo de 2022. Se tomaron medidas antropométricas y se administró un cuestionario que contenía información sociodemográfica, hábitos de vida y conocimientos sobre hipertensión. **Resultados:** De los 337 entrevistados, la mayoría eran mujeres (64%) y pardas (62,9%). La edad promedio fue de 46,7 años ($\pm 15,6$). Se observó una alta prevalencia de individuos con alto riesgo cardiovascular según la evaluación de la circunferencia abdominal (79,8%), con predominio del sexo femenino (87,5%). La presencia de obesidad abdominal se asoció con el aumento de la edad, un mayor número de hijos, un bajo nivel educativo, el consumo previo de tabaco y la hipertensión arterial autoinformada. **Conclusiones:** Considerando que la obesidad abdominal se relaciona con mayores riesgos de problemas cardiovasculares, se recomienda medir la circunferencia abdominal en atención primaria. Además, el conocimiento de los factores asociados a esta condición puede ayudar a implementar estrategias de salud dirigidas a prevenirla y controlarla.

Palabras clave: Obesidad abdominal; Predominio; Factores de riesgo; Estudios de población en salud pública.

INTRODUCTION

The emergence of restaurants and industries producing sugar-rich ultra-processed foods, combined with increasingly sedentary lifestyles, has contributed to the rising prevalence of overweight and obesity in contemporary societies worldwide¹. According to the Brazilian Association for the Study of Obesity and Metabolic Syndrome (*Associação Brasileira para o Estudo da Obesidade e da Síndrome Metabólica* – ABESO)², approximately 2.3 billion adults worldwide are expected to be overweight by 2025, of whom 700 million will be living with obesity. This trend of increasing overweight prevalence is similarly observed in Brazil.

In 2021, 57.25% of the Brazilian population was classified as overweight, while 22.35% was classified as obese³. According to data from the study *The Obesity and NCD Epidemic – Causes, Costs and Burden on SUS (A Epidemia de Obesidade e DCNT – Causas, custos e sobrecarga no SUS)*⁴, projections indicate that by 2030 the prevalence of overweight may reach 68%, whereas obesity may affect up to 26% of the population. Abdominal obesity poses a significant threat to the Brazilian population, as it is associated

with a state of chronic inflammation that contributes to the development of cardiovascular risk factors — including dyslipidemia, insulin resistance, and elevated circulating levels of pro-inflammatory cytokines. Consequently, it is linked to cardiovascular diseases, such as hypertension⁵.

The aim of this study was to estimate the prevalence of abdominal obesity and identify associated factors among adults registered with the Family Health Strategy (FHS) in Mucugê, Bahia (BA), Brazil.

METHODS

This cross-sectional, sample-based study was derived from the research project entitled “Proposal for Health Surveillance for the Detection of Minor Mental Disorders, Diabetes Mellitus, and Hypertension in Mucugê (BA)” (*Proposta de Vigilância à Saúde para a detecção de distúrbios psíquicos menores, diabetes mellitus e hipertensão arterial em Mucugê (BA)*). The parent project was funded by Fundação de Amparo à Pesquisa do Estado da Bahia (FAPESB), under Grant Agreement SUS0018/2021, and conducted by researchers from the Epidemiological and Statistical Situation and Analysis Room (*Sala de Situação e Análise Epidemiológica e Estatística – SSAEE*) at Universidade Estadual de Feira de Santana (UEFS).

The municipality of Mucugê is located in the Central South Bahia mesoregion and the Seabra microregion, approximately 448 km from the state capital, Salvador. Mucugê has an estimated population of 12,137 inhabitants distributed across a territorial area of 2,462 km² (urban and rural regions)⁶. The population is predominantly rural (60.34%) and female (50.40%)⁷. Regarding healthcare infrastructure, Mucugê has six FHS distributed throughout the municipality in both urban and rural areas.

The sample consisted of adults (aged ≥ 18 years) residing in the municipality of Mucugê and registered FHS. The population sample size was calculated using the formula: $N = Z^2p(1-p)/d^2$,⁸ in which the prevalence of obesity (p) was defined based on population-based studies conducted by the Brazilian Ministry of Health, which estimated obesity prevalence in Brazil at 25% ($p=0.25$)⁹. A 95% confidence interval was adopted ($Z=1.96$), with a sampling error of 5% ($d=0.05$). Accordingly, the minimum required sample size was estimated at 288 adults. A design effect (DEFF) of 0.2 was applied to adjust the sample size, considering that the population was drawn from multiple FHS units. Following this adjustment, the final sample size was established at 346 adults ($288 \times 1.2=346$).

Stratified and systematic random sampling techniques were employed to ensure proportional representation in the sample, maintaining the same percentage distribution of families and individuals registered across the six Family Health Units (*Unidades de Saúde da Família – USFs*) in the municipality⁷. Initially, 24 micro-areas were identified within the six USFs. Subsequently, 14 families were randomly selected from each micro-area, and one adult individual was selected per family. To reach the target sample size of 346 individuals, an additional 10 families were randomly selected from 10 of the 24 existing micro-areas. Individuals who could not be located after two attempts or who had died were replaced by another member of the same family, with efforts made to preserve similarity in age group and gender. Bedridden individuals, pregnant women, individuals with mental disorders, and those who declined to participate were excluded from the study. Ultimately, 337 adults were interviewed, resulting in nine sample losses.

Data collection was conducted through home visits between November and December 2021 and in March 2022. All randomly selected adults who agreed to participate in the study were interviewed after reading and signing the Informed Consent. Prior communication with participants was facilitated by Community Health Agents (CHAs) from the six USFs, who explained the study objectives and procedures.

Data were collected by 6 medical students from UEFS, who had received prior training in questionnaire administration, blood pressure assessment, and anthropometric measurements (weight, height, and waist circumference). The students were supervised by faculty members and accompanied by the CHA responsible for the respective micro-area during data collection. All participants received information and educational materials regarding hygiene practices, dietary measures, and lifestyle habits aimed at preventing obesity.

To assess the approximate completion time and clarity of the data collection instrument, as well as to ensure the standardization and quality of interviewers' data collection skills, participating students underwent 12 hours of laboratory training. In addition, a theoretical manual was developed, and a pilot study was conducted at USF Santo Antônio dos Prazeres in the municipality of Feira de Santana, Bahia.

Abdominal obesity was classified based on waist circumference (WC) measurements obtained using an inelastic fiberglass measuring tape with a maximum capacity of 150 cm and a precision of 1 cm. WC was measured at the midpoint between the lower margin of the rib cage and the iliac crest, in the horizontal plane¹⁰. Females with WC $\geq$ 80 cm and males with WC $\geq$ 90 cm were classified as having abdominal obesity, indicative of high cardiovascular risk¹¹.

A questionnaire was also administered to collect sociodemographic data (gender, age, marital status, educational level, family income, and number of children), lifestyle-related variables (tobacco use, physical activity, and frequency of physical activity), and information regarding prior awareness of a hypertension diagnosis.

Data were entered independently twice into the EpiData statistical software, version 3.1. After comparison of the datasets and identification and correction of data entry errors, the data were exported, processed, and analyzed using the Statistical Package for the Social Sciences (SPSS), version 17.0 for Windows. Individual participant data were not shared.

Initially, descriptive analyses were performed, presenting absolute and relative frequencies, as well as mean and standard deviation values. Subsequently, an exploratory bivariate analysis was conducted using the prevalence ratio (PR) as the measure of association and the 95% confidence interval (95%CI) as the measure of statistical significance.

The items recommended by the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) initiative for reporting observational studies were followed¹².

The study was approved by the Municipal Health Department of Mucugê (BA) and by the Research Ethics Committee of UEFS, under Certificate of Presentation for Ethical Consideration (*Certificado de Apresentação para Apreciação Ética* – CAAE) number 15618119.7.0000.0053, in accordance with the recommendations of Resolution No. 466/2012¹³.

RESULTS

Among the 337 respondents, the majority were female (64.0%) and identified as mixed race (62.9%). The mean age was 46.7 years ($\pm$ 15.6), with mean ages of 45.6 years ($\pm$ 15.5) among females and 48.7 years ($\pm$ 15.6) among males. The distribution of sociodemographic and socioeconomic characteristics, as well as lifestyle habits, according to gender in the study sample is presented in Table 1.

In the study sample, married or cohabiting individuals predominated (60.2%). More than 70% of participants reported a family income of up to 2 minimum wages. Regarding educational attainment, only 10.7% had completed technical education or higher education, with males demonstrating a higher educational level than females.

Table 1. Cardiovascular risk characterization, measured by waist circumference, according to sociodemographic variables, lifestyle habits, and self-reported hypertension by gender in a sample of adults residing in and registered with the Family Health Strategy in the municipality of Mucugê (BA), 2022.

Characteristics	Total n=337 (100%)	Female n=216 (100%)	Male n=121 (100%)
Waist circumference			
Low cardiovascular risk	68 (20.2)	27 (12.5)	41 (33.9)
High cardiovascular risk	269 (79.8)	189 (87.5)	80 (66.1)
Age (years)			
18–24	28 (8.3)	17 (7.9)	11 (9.1)
25–34	58 (17.2)	43 (19.9)	15 (12.4)
35–44	75 (22.2)	53 (24.5)	22 (18.2)
45–54	64 (19.0)	40 (18.5)	24 (19.8)
55–64	46 (13.6)	22 (10.2)	24 (19.8)
≥65	66 (19.6)	41 (19.0)	25 (20.6)
Marital status			
Without partner	134 (39.8)	103 (47.7)	31 (25.6)
With partner	203 (60.2)	113 (52.3)	90 (74.4)
Education			
Technical course to completed higher education	36 (10.7)	20 (9.2)	16 (13.2)
Completed elementary school to completed high school	139 (41.2)	90 (41.7)	49 (40.5)
Illiterate to incomplete elementary school	162 (48.1)	106 (49.1)	56 (46.3)
Family income (minimum wage)			
≥4	19 (5.6)	9 (4.2)	10 (8.3)
2–4	66 (19.6)	39 (18.0)	27 (22.3)
1–2	119 (35.3)	75 (34.7)	44 (36.4)
≤1	133 (39.4)	93 (43.0)	40 (33.0)
Smoking status			
Never smoked	241 (71.5)	177 (81.9)	64 (52.9)
Former smoker	68 (20.2)	27 (12.5)	41 (33.9)
Daily smoker	28 (8.3)	12 (5.5)	16 (13.2)
Physical exercise practice			
Yes	69 (20.5)	41 (19.0)	28 (23.1)
No	268 (79.5)	175 (81.0)	93 (76.9)
Exercise frequency (times/week)			
>3	26 (37.7)	18 (43.9)	8 (28.6)
2–3	26 (37.7)	13 (31.7)	13 (46.4)
1	17 (24.6)	10 (24.4)	7 (25)
Self-reported hypertension			
No	218 (64.7)	140 (64.8)	78 (64.5)
Yes	119 (35.3)	76 (35.2)	43 (35.5)

More than 80% of respondents reported having at least one child. The majority of the sample identified as Catholic (55.2%), followed by Evangelical/Protestant (33.8%). Among the participants, 41.2% reported not having been born in the municipality of Mucugê (BA).

Regarding lifestyle habits, more than 70% of respondents reported never having smoked, and 20% reported engaging in regular physical exercise.

The prevalence of abdominal obesity (high cardiovascular risk, as defined by waist circumference) was 79.8%, and was higher among females (87.5%) than males (66.1%). Regarding hypertension, approximately 35% of respondents self-reported this comorbidity, with no statistically significant difference between genders.

Analysis of waist circumference measurements according to socioeconomic characteristics and lifestyle habits among both female and male participants (Table 2) showed that the presence of abdominal obesity was associated with increasing age and a higher number of children.

Among females, individuals aged ≥ 65 years exhibited a 2.36-fold higher prevalence of abdominal obesity (PR 2.36; 95%CI 1.34–4.19) compared with those aged 18–24 years. Similarly, among males, the same age-group comparison showed a 2.93-fold higher prevalence of abdominal obesity (PR 2.93; 95%CI 1.09–7.85).

Among females, participants with more than three children exhibited a 1.59-fold higher prevalence of abdominal obesity (PR 1.59; 95%CI 1.22–2.07) compared with those who reported having no children. A similar association was observed among males (PR 1.50; 95%CI 1.01–2.22).

Respondents who were illiterate or had incomplete primary education exhibited the highest prevalence of abdominal obesity. Compared with individuals who had completed technical education or higher education, the prevalence of the outcome was 1.34 times higher among females (PR 1.34; 95%CI 1.01–1.80) and 1.75 times higher among males (PR 1.75; 95%CI 0.98–3.11).

Former smokers exhibited a higher prevalence of abdominal obesity compared with individuals who had never smoked, both among females (PR 1.16; 95%CI 1.09–1.23) and males (PR 1.32; 95%CI 1.04–1.67).

Regarding hypertension, individuals who self-reported a diagnosis of hypertension exhibited a higher prevalence of abdominal obesity compared with those who did not report having hypertension, both among females (PR 1.18; 95%CI 1.09–1.29) and males (PR 1.48; 95%CI 1.17–1.88).

DISCUSSION

The high prevalence of abdominal obesity observed in the sample from the municipality of Mucugê (79.8%) may reflect the endemic nature of obesity in both Brazil and globally. Several studies have reported abdominal obesity frequencies ranging from 60 to 80% of the populations investigated^{14–17}. A recent study¹⁴ involving 12,232 participants from ELSA-Brasil, conducted among residents of six Brazilian cities, documented abdominal obesity prevalence ranging from 77.0 to 99.1%, with variation attributed to differences in diagnostic criteria. Another study¹⁶, conducted in 2010 with 457 residents of São Francisco do Conde, a municipality in the interior of Bahia, reported a prevalence of 62.1%, which was considered high compared with findings from other studies conducted during the same period.

A higher prevalence of abdominal obesity was observed among female participants (87.5%). This finding is well established in the literature and is consistent with several studies investigating abdominal adiposity in Brazil^{17–21}. However, no consensus has been reached regarding the explanation

Table 2. Prevalence, Prevalence Ratio, and 95% Confidence Interval by gender for sociodemographic variables and high and low cardiovascular risk measured by waist circumference in a sample of adults residing in and registered with the Family Health Strategy in the municipality of Mucugê (BA), 2022.

Characteristics	Waist circumference					
	Female (n=216)			Male (n=121)		
	HR (%)	LR (%)	PR (95%CI)	HR (%)	LR (%)	PR (95%CI)
Age (years)						
18–24	41.2	58.8	1.00	27.3	72.7	1.00
25–34	81.4	18.6	1.97 (1.10–3.55)	40.0	60.0	1.46 (0.46–4.61)
35–44	90.6	9.4	2.20 (1.24–3.91)	63.6	36.4	2.33 (0.84–6.44)
45–54	95.0	5.0	2.31 (1.30–4.10)	79.2	20.8	2.09 (1.08–7.78)
55–64	95.5	4.5	2.32 (1.30–4.12)	75.0	25.0	2.75 (1.02–7.41)
≥65	97.6	2.4	2.36 (1.34–4.19)	80.0	20.0	2.93 (1.09–7.85)
Marital status						
Without partner	85.4	14.6	1.00	54.8	45.2	1.00
With partner	89.4	10.6	1.04 (0.94–1.15)	70.0	30.0	1.27 (0.90–1.80)
Education						
Technical course to completed higher education	70.0	30.0	1.00	43.7	56.3	1.00
Completed elementary school to completed high school	83.3	16.7	1.19 (0.88–1.60)	61.2	38.8	1.39 (0.76–2.54)
Illiterate to incomplete elementary school	94.3	5.7	1.34 (1.01–1.80)	76.8	23.2	1.75 (0.98–3.11)
Family income (minimum wage)						
≥4	71.4	28.6	1.00	80.0	20.0	1.00
2–4	89.7	10.3	1.25 (0.88–1.77)	66.7	33.3	0.83 (0.55–1.25)
1–2	89.3	10.7	1.25 (0.88–1.75)	61.4	38.6	0.76 (0.52–1.13)
≤1	87.1	12.9	1.21 (0.86–1.71)	67.5	32.5	0.84 (0.57–1.23)
Number of children						
None	61.1	38.9	1.00	51.9	48.1	1.00
1 or 2	89.4	10.6	1.46 (1.11–1.91)	63.3	36.7	1.22 (0.80–1.86)
≥3	97.4	2.6	1.59 (1.22–2.07)	77.8	22.2	1.5 (1.01–2.22)
Smoking status						
Never smoked	85.9	14.1	1.00	62.5	37.5	1.00
Former smoker	100	0	1.16 (1.09–1.23)	82.9	17.1	1.32 (1.04–1.67)
Daily smoker	83.3	16.7	0.97 (0.74–1.25)	37.5	62.5	0.6 (0.31–1.16)
Physical exercise practice						
Yes	85.4	14.6	1.00	64.3	35.7	1.00
No	88.0	12.0	1.03 (0.89–1.18)	66.7	33.3	0.96 (0.70–1.31)
Exercise frequency (times/week)						
>3	77.8	22.2	1.00	50.0	50.0	1.00
2–3	92.3	7.7	1.18 (0.88–1.59)	76.9	23.1	1.53 (0.72–3.27)
1	90.0	10.0	1.15 (0.83–1.59)	57.1	42.9	1.14 (0.44–2.93)
Hypertension						
No	82.1	17.9	1.00	56.4	43.6	1.00
Yes	97.4	2.6	1.18 (1.09–1.29)	83.7	16.3	1.48 (1.17–1.88)

HR: High cardiovascular risk/abdominal obesity (women: WC≥80 cm; men: WC≥90 cm); LR: Low cardiovascular risk (women: WC<80 cm; men: WC<90 cm); PR (95%CI): Prevalence Ratio (95% Confidence Interval).

for this predominance among females. It has been suggested that this pattern may be associated with a greater concentration of body fat in women, potentially influenced by female hormones and pregnancy history²². Furthermore, menopause may contribute to an increased tendency toward visceral fat accumulation due to declining levels of female hormones, resulting in a shift from a gynecoid to an android fat distribution pattern²³.

This study identified an association between age and abdominal obesity, with increasing age corresponding to a higher prevalence of central obesity. This association was observed in both genders. Advancing age is associated with a decline in growth hormone and androgen levels, as well as a reduction in basal metabolic rate, factors that may contribute to greater weight gain²². Additionally, changes in lifestyle habits, reduced engagement in regular physical activity, redistribution of adipose tissue, and poor dietary patterns may accompany the natural aging process and facilitate visceral fat accumulation^{18,19}.

An association was also observed between the number of children and the presence of abdominal obesity in both genders. Parity has been associated with central obesity in women, as the pregnancy-puerperal period involves multiple hormonal changes that may predispose individuals to abdominal fat accumulation¹⁶. Additionally, pregnancy may lead to stretching of the abdominal muscles and separation of muscle bundles, potentially favoring this process²⁴. In this context, a study conducted by Kac et al.²⁵ reported a threefold higher risk of abdominal obesity among women older than 35 years with at least two children, corroborating the findings of the present study.

Less favorable socioeconomic conditions are recognized as risk factors for obesity²⁶. In the present study, an association was observed between educational level and abdominal obesity, indicating that lower educational attainment was associated with the presence of abdominal obesity, corroborating findings reported in previous studies^{15,18}. A possible explanation for this association is that individuals with lower educational levels may have more limited access to health promotion information and may be more likely to consume foods high in sugars and fats, as these products tend to be less expensive and more palatable¹⁶.

Tobacco is recognized for its anorexigenic effects and its potential to increase metabolic rate (MR), accompanied by reduced appetite²⁷. Although smoking may contribute to lower body weight, it can also influence fat distribution through increased plasma cortisol concentrations and alterations in the testosterone-to-estrogen ratio, resulting in greater visceral fat accumulation and insulin resistance²⁸.

Following smoking cessation, MR decreases, while increased appetite emerges as a symptom of nicotine withdrawal²⁹. Thus, the high prevalence of abdominal obesity observed among former smokers in the present study may be explained by the body weight set point hypothesis, which proposes that deviations from an individual's habitual body weight are compensated for through behavioral changes and adaptations in MR, thereby maintaining a physiological set point. During tobacco use, this set point may be lowered, whereas following smoking cessation, it tends to return to baseline levels. However, these compensatory mechanisms may be affected by nicotine withdrawal, reduced MR, and increased appetite, resulting in abdominal fat accumulation³⁰. This mechanism may help explain both the findings of the present study and the stronger association observed between abdominal obesity and former smoking status.

Regarding the observed association with hypertension, it is well established in the literature that abdominal obesity contributes to the development of hypertension³¹, highlighting the relevance of waist circumference measurement in cardiovascular risk stratification. However, the reverse relationship may also be plausible, as chronic hypertension itself may promote metabolic disturbances, such as insulin resistance and dyslipidemia, thereby contributing to visceral fat accumulation³².

One limitation of this study is its cross-sectional design. Although this design is considered highly suitable for identifying the occurrence of health conditions and detecting at-risk groups³³, it does not allow causal relationships to be established, as the analysis of the exposure-disease relationship is conducted at a single point in time. Another limitation concerns the potential for selection bias, given that the majority of respondents were female (64%), despite the implementation of strategies aimed at minimizing the loss of male participants. Furthermore, analyses of confounding factors and interactions were not performed, procedures that are important for drawing more robust conclusions³³.

This study is distinctive in that it investigates the prevalence of abdominal obesity and cardiovascular risk in a municipality for which such information remains unavailable. Another important aspect relates to the cutoff points adopted to identify abdominal obesity and elevated cardiovascular risk (women: $WC \geq 80$ cm; men: $WC \geq 90$ cm)¹¹, which provide greater predictive value compared with other cutoff criteria.

CONCLUSION

A high prevalence of abdominal obesity was observed, which was associated with increasing age, number of children, lower educational level, former smoking status, and hypertension.

Given the high prevalence of abdominal obesity and its association with multiple factors, the routine measurement of waist circumference in primary care settings is recommended, along with the implementation of targeted strategies for the prevention and control of this condition.

Knowledge of the factors associated with abdominal adiposity may support the implementation of health strategies aimed at preventing and controlling this condition, including the promotion of healthy lifestyle habits that may improve the quality of life of the population in the municipality of Mucugê.

CONFLICT OF INTERESTS

Nothing to declare.

AUTHORS' CONTRIBUTIONS

RRS: Formal analysis, Conceptualization, Data curation, Writing – original draft, Writing – review & editing, Investigation, Methodology, Validation, Visualization. EPR: Project administration, Formal analysis, Conceptualization, Data curation, Writing – review & editing, Investigation, Methodology, Funding acquisition, Resources, Software, Supervision, Validation, Visualization. FPVB: Formal analysis, Data curation, Writing – original draft, Writing – review & editing, Investigation, Methodology. HAL: Formal analysis, Data curation, Investigation, Methodology, Validation, Visualization. ICT: Formal analysis, Data curation, Investigation, Methodology, Validation, Visualization. TSCT: Formal analysis, Data curation, Investigation, Methodology, Supervision, Validation, Visualization. JAG: Formal analysis, Data curation, Investigation, Methodology, Supervision, Validation, Visualization. MAN: Project administration, Formal analysis, Investigation, Methodology, Funding acquisition, Resources, Supervision, Validation, Visualization. CLNS: Project administration, Formal analysis, Conceptualization, Data curation, Writing – review & editing, Investigation, Methodology, Funding acquisition, Resources, Software, Supervision, Validation, Visualization.

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