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Prevalence of Overweight Among Hypertensive Patients and Its Association with Adherence to Antihypertensive Therapy

Letícia de Santana Silva[1], Vivianne Soares Domingos da Silva[2], Marília Gabrielle Santos Nunes[3], Ellen Cristina Barbosa dos Santos[4], Maria da Conceição Cavalcanti de Lira[5], Gabrielly Lais de Andrade Souza[6], Glicia Maria de Oliveira[7], Augusto Cesar Barreto Neto[8]

[1]*Nurse. Federal University of Pernambuco (UFPE), Pernambuco, Brazil*
[2]*Undergraduate Nursing Student, Federal University of Pernambuco, Academic Center of Vitória, Pernambuco, Brazil. vivianne.sdsilva@ufpe.br*
[3]*Nurse. Federal University of Pernambuco, Academic Center of Vitória, Pernambuco, Brazil.*
[4]*Associate Professor, Academic Center of Vitória, Federal University of Pernambuco, Pernambuco, Brazil.*
[5]*Associate Professor, Academic Center of Vitória, Federal University of Pernambuco, Pernambuco, Brazil.*
[6]*Assistant Professor, Academic Center of Vitória, Federal University of Pernambuco, Pernambuco, Brazil.*
[7]*Assistant Professor, Academic Center of Vitória, Federal University of Pernambuco, Pernambuco, Brazil.*
[8]*Associate Professor, Academic Center of Vitória, Federal University of Pernambuco, Pernambuco, Brazil.*

Abstract:
Background: *Brazil has undergone an epidemiological and nutritional transition, characterized by a decline in infectious diseases and a significant rise in non-communicable chronic diseases (NCDs), such as obesity and hypertension. Obesity, recognized by the WHO as the "epidemic of the 21st century," is strongly linked to urbanization and poor dietary habits, emerging as a major risk factor for several comorbidities. Studies demonstrate a direct association between excess weight and elevated blood pressure levels. The coexistence of obesity and hypertension exacerbates cardiovascular outcomes and increases healthcare system costs.*
Materials and Methods: *This is a cross-sectional epidemiological survey conducted with hypertensive individuals registered in the Primary Health Care Information System, from both urban and rural areas of Vitória de Santo Antão, Pernambuco, Brazil. Individuals with mental disorders, physical limitations, specific clinical conditions, and pregnant women were excluded. The sample size was calculated using the SampleXS software, resulting in 435 participants. Sampling was stratified proportionally across Primary Health Units and selected randomly. Data collection was carried out through home interviews using a structured and pilot-tested instrument. The study followed the STROBE guidelines for observational studies.*
Results: *A total of 458 hypertensive individuals participated in the study. The prevalence of overweight, based on BMI, was 56%, while abdominal obesity, assessed by waist circumference (WC), was 70.9%, and obesity by neck circumference (NC) reached 89.3%. Age group, social class, and educational level were significantly associated with overweight ($p<0.05$). Participants reporting alcohol consumption showed higher rates of abdominal obesity (84.1%) and obesity by NC (90.9%). Adherence to antihypertensive treatment varied according to the instrument used, with the highest rate observed using the Haynes-Sackett test (85.6%), which also indicated a significant association between obesity and non-adherence. In the multivariate logistic regression analysis, higher social class (OR: 0.055; 95% CI: 0.013–0.230) and normal BMI (OR: 4.118; 95% CI: 2.088–8.120) were identified as independent predictors of treatment adherence.*
Conclusion: *It is necessary to develop strategies that promote adequate body weight, as even modest weight loss can lead to significant reductions in blood pressure. Public health actions focused on healthy aging represent an important approach for the prevention and control of these conditions.*
Key Word: *Body Mass Index; Hypertension; Chronic disease; Obesity.*

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I. Introduction

Brazil, like other developing countries, has been undergoing significant changes in its epidemiological and nutritional profiles, which have major implications for public health. There has been a shift in mortality patterns in the country, with a progressive reduction in deaths caused by infectious and parasitic diseases and an alarming increase in deaths associated with noncommunicable chronic diseases (NCDs).[1]

Another notable change affecting the Brazilian population is the nutritional transition. Malnutrition, once prevalent in the country, has been replaced by another nutritional disorder: obesity. This condition is mainly linked to processes of urbanization, industrialization, and globalization, which have brought about changes—especially in eating habits—that make the population more prone to chronic diseases.[2,3]

The World Health Organization (WHO) refers to obesity as the "Epidemic of the 21st Century" and defines it as "a disease in which excess body fat has accumulated to such an extent that health may be adversely affected."[4]

Obesity is classified among NCDs and is considered a major issue in modern society due to its widespread prevalence worldwide.[5] Despite its high prevalence, a recent study conducted in the United States population showed no significant increase in obesity rates among youth and adults between 2003–2004 and 2009–2010.[6]

Obesity contributes to the occurrence and outcomes of various diseases, including cardiovascular and metabolic conditions as well as cancer,[7] which has led to a considerable increase in the demand for specialized health services—both public and private—resulting in substantial economic impacts.[8,9]

According to the 2020 Brazilian Guidelines on Hypertension (DBH-2020), obesity is a predisposing factor for conditions such as hypertension.[10] Studies have demonstrated an association between blood pressure levels and excess body weight, with hypertensive individuals who are obese presenting higher blood pressure values than those with normal weight.[11,12] This reinforces the need for healthcare professionals and services to pay greater attention to obesity, especially when aiming to control blood pressure levels.

Patients with comorbidities associated with hypertension require special care from healthcare professionals and services, as the presence of such conditions tends to reduce adherence rates to antihypertensive therapy.[13]

The coexistence of hypertension and obesity increases the risk of cardiovascular diseases, contributes to higher morbidity and mortality rates, and generates a significant burden on the healthcare system.[14] Research on hypertension and excess weight remains essential, given the growing and dynamic prevalence of these disorders across diverse populations. Understanding the prevalence of overweight among individuals with hypertension and its impact on treatment adherence will help enhance comprehension of this issue and provide valuable data to support the planning of preventive and health promotion strategies. This includes the development of public health policies aimed at reducing complications associated with cardiovascular and metabolic disorders.

Therefore, the objective of this study is to analyze the prevalence of overweight among hypertensive individuals and its association with adherence rates to antihypertensive treatment in the municipality of Vitória de Santo Antão, Pernambuco, Brazil.

II. Material And Methods

This is a cross-sectional epidemiological study of the "survey" type. The population selected for the study consisted of individuals with arterial hypertension, of both sexes, registered in the Primary Care Information System (Hypertension Control Program) from the urban and rural areas of the municipality of Vitória de Santo Antão, Pernambuco, Brazil. Exclusion criteria included individuals who reported or were reported by family members as having any mental health issues (self-reported or reported by family members), physical disabilities (which prevented anthropometric assessment), clinical conditions (Systemic Lupus Erythematosus, Diabetes, Acquired Immunodeficiency Syndrome - AIDS), and pregnancy (self-reported). The study adheres to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for observational studies.

To estimate the sample size, the SampleXS program [Brixton Health, UKI2, UK] was used, employing the following formula: $n = A / (E * E + (A / N))$, where n = sample size; A = 3.8416PQW, P = prevalence of the population in percentage; Q = (100 – P); E = maximum acceptable sample error; w = design effect; N = population size. The following criteria were adopted: (a) target population of 10,088 hypertensive individuals (Primary Care Information System); (b) adherence prevalence of 50%[15]; (c) 95% confidence interval (CI); (d) sample error of 5%; and (e) study design effect of 1. The minimum sample size was 391 hypertensive individuals (with a 10% increase to account for potential losses, n = 435 participants).

In order to ensure the necessary proportionality in a stratified sample, the samples were organized by proportional allocation for each Primary Health Care Unit and selected randomly using a randomization table created in the Randomizer program [Social Psychology Network Association, Middletown, CT, USA].

Data collection was conducted through a questionnaire, applied during home visits to the selected individuals, with a primary focus on adherence to both pharmacological and non-pharmacological treatment for arterial hypertension, specifically activities related to the Hiperdia Program. Prior to data collection, a pilot study was conducted with a population different from the selected one, but with similar characteristics, to assess the need for adjustments to the data collection instrument specifically developed for this research, which was based on previous studies on the topic.

Demographic, socioeconomic, and lifestyle-related data of the participants were obtained using a questionnaire recommended by the Brazilian Institute of Geography and Statistics (IBGE).[16] For social class analysis, the population was classified into classes A to E according to the criteria set by the Brazilian Association of Research Companies (ABEP).[17]

Body weight and height measurements were taken with the subject barefoot, with no objects in their hands, pockets, or head adornments, using a Balmak® scale with a capacity of up to 150 kg and a precision of 100 g, calibrated and verified by the National Institute of Metrology, Standardization, and Industrial Quality of Pernambuco. Height was measured using a stadiometer, with a precision of 1 mm and accuracy of 0.5 cm.

Body mass index (BMI) was calculated using the equation [weight (kg) / height (m)²]. For nutritional status classification, the following cut-off points were used: underweight (BMI < 18.5), normal weight (BMI 18.5-24.9), overweight (BMI 25-29.9), obesity grade I (BMI 30-34.9), obesity grade II (BMI 35-39.9), and obesity grade III (BMI ≥ 40). The values were grouped into: overweight (overweight and obese) and non-overweight (underweight and eutrophic).

Waist circumference (WC) and neck circumference (NC) were measured in centimeters using a non-extensible Sanny® tape measure, with duplicate measurements, while the patient stood with their abdomen relaxed and arms extended by their sides. For NC, the measurement was taken below the cricoid cartilage at the level of the glottis, at the collarbone level.[18-19] Waist circumference was measured horizontally at the midpoint between the lower edge of the last rib and the iliac crest. A maximum variation of 0.1 cm between the two measurements was allowed, with the procedure repeated if this variation was exceeded in both measurements. The cut-off point used identifies abdominal obesity when WC ≥ P90.[20]

For the analysis of neck circumference (NC), the cut-off points adopted to define overweight were NC > 35.5 cm for males and NC > 32 cm for females.[21]

Patient adherence was assessed using three standardized tests: Batalla, Haynes-Sackett, and Morisky-Green.22-23-24 These instruments were combined into a single questionnaire and applied to all participants. The Batalla test consists of three questions and measures adherence based on the patient's knowledge about their disease. In contrast, the Morisky-Green test comprises four questions and evaluates adherence based on the patient's attitudes toward medication use. In both tests, individuals are considered adherent only if they answer all questions correctly.[25] The Haynes-Sackett test involves a self-reported assessment of treatment adherence through two questions, where affirmative responses indicate non-adherence to treatment.

Data tabulation was performed using Microsoft Excel. Data analysis was conducted with the aid of the statistical software SPSS version 20.0 [SPSS Inc., Chicago, IL, USA].

For the description of proportions, the binomial distribution was approximated to the normal distribution using a 95% confidence interval. For the comparison of proportions, the Mantel-Haenszel test and Pearson's chi-square or linear trend tests were used. For interpretation purposes, the Type I error threshold was set at 5% ($p \leq 0.05$).

Multivariate analysis was used to estimate the independent contribution of each variable to the likelihood of adherence to antihypertensive treatment. Variables from the bivariate analysis with a significance level of up to 20% were tested for inclusion in the model. Binary logistic regression was employed using the Backward method. A Type I error threshold of up to 5% ($p \leq 0.05$) was adopted for interpretation.

This study is part of the research project entitled "Analysis of Adherence to Antihypertensive Treatment in the Municipality of Vitória de Santo Antão, Pernambuco," which was approved by the Research Ethics Committee for Human Subjects (CEP) of the Health Sciences Center (CCS) at the Federal University of Pernambuco (UFPE), under approval number 361/09. The research complied with the guidelines established by the Brazilian National Health Council, Resolution Nº 466/12, which governs research involving human subjects.

III. Result

A total of 458 hypertensive individuals participated in the study. The prevalence of overweight, according to BMI, was 56% (95% CI: 51.4–60.5). When measuring waist circumference (WC), abdominal obesity was present in 70.9% (95% CI: 66.5–74.8) of hypertensive individuals. The prevalence of obesity estimated by neck circumference (NC) was 89.3% (95% CI: 86.1–91.7).

In the bivariate analyses of associations with overweight and obesity (Table 1), age group, social class, and educational level significantly influenced ($p < 0.05$) the distribution frequency of individuals with excess body weight.

Regarding lifestyle, individuals who reported alcohol consumption (9.6%) showed a prevalence of abdominal obesity, based on waist circumference (WC), of 84.1%, and 90.9% were classified as obese according to neck circumference (NC). With respect to the prevalence of overweight, no statistically significant differences were observed in relation to skin color or smoking status.

Table nº 1: Overweight According to Socioeconomic, Demographic, and Behavioral Variables Among Hypertensive Patients Registered in the Hypertension and Diabetes Program. Vitória de Santo Antão, Pernambuco, Brazil.

	BMI				WC				NC			
	Overweight 256 (56,0) n(%)	Normal overweight 201 (44,0) n(%)	OR (CI95%)	P*	Abdominal obesity 324 (70,9) n(%)	Normal weight 133 (29,1) n(%)	OR (CI95%)	P*	Obesity 408 (89,3) n(%)	Normal weight 49 (10,7) n(%)	OR (IC95%)	P*
Age			0,74 (0,62-0,88)	**0,001**			1,14 (1,02-1,29)	**0,020**			1,09 (1,03-1,16)	**0,004**
Adult	90 (46,6)	103 (53,4)			149 (76,8)	45 (23,2)			183 (94,3)	11 (5,7)		
Older adult	165 (62,7)	98 (37,3)			175 (66,8)	87 (33,2)			225 (85,9)	37 (14,1)		
Race			1,09 (0,92-1,30)	0,307			1,04 (0,92-1,18)	0,496			0,99 (0,92-1,06)	0,897
White	76 (59,8)	51 (40,2)			93 (73,2)	34 (26,8)			113 (89,0)	14 (11,0)		
Non-white	180 (54,5)	150 (45,5)			231 (70,0)	99 (30,0)			295 (89,4)	35 (10,6)		
Socioeconomic status†				**0,007‡**				0.066‡				**0,006‡**
B/C	70 (46,4)	81(53,6)	1		117 (77,0)	35 (23,0)	1		145 (95,4)	07 (4,6)	1	
D	180 (61,2)	114 (38,8)	0,75 (0,62-0,91)		198 (67,6)	95 (32,4)	1,52 (1,34-1,74)		253 (86,1)	41 (13,9)	1,10 (1,04-1,17)	
E	06 (54,5)	05 (45,5)	0,85 (048-1,49)		08 (72,7)	03 (27,3)	1,05 (0,72-1,53)		09 (90,0)	01 (10,0)	1,05 (0,85-1,30)	
Education level				0,116‡				0,103‡				**0,001‡**
Illiterate§	131(59,8)	88 (40,2)	1		145 (66,5)	73 (33,5)	1		185 (84,9)	33 (15,1)	1	
Primary education‖	105 (53,0)	93 (47,0)	1,12 (0,95-1,33)		150 (75,4)	49 (24,6)	0,88 (0,78-0,99)		183 (92,0)	16 (8,0)	0,92 (0,86-0,98)	
Secondary and higher education	20 (50,0)	20 (50,0)	1,19 (0,86-1,66)		29 (72,5)	11 (27,5)	0,91 (0,74-1,13)		40 (100,0)	-	0,84 (0,80-0,89)	
Alcoholic beverage			0,79 (0,56-1,11)	0,138			1.21 (1.04-1,39)	**0,043**			1,02 (0,92-1,12)	0,713
Yes	20 (45,5)	24 (54,5)			37 (84,1)	7 (15,9)			40 (90,9)	4 (9,1)		
No	236 (57,1)	177 (42,9)			287 (69,5)	126 (30,5)			368 (89,1)	45 (10,9)		
Tobacco			1,07 (0,81-1,43)	0,621			0,87 (0,67-1,14)	0,276			1,02 (0,92-1,14)	0,669
Yes	21(60,0)	14 (40,0)			22 (62,9)	13 (37,1)			32 (91,4)	3 (8,6)		
No	235(55,7)	187 (44,3)			302 (71,6)	120 (28,4)			376 (89,1)	46 (10,9)		

BMI - Body Mass Index; 95% CI - 95% Confidence Interval; WC - Waist Circumference; NC - Neck Circumference; *Pearson's Chi-square test; I ≥ P85 for overweight. II ≥ P90 for obesity. III ≥ 0.5 for obesity. IV NC >35.5 cm for males, NC >32 cm for females. †One participant did not report age. ‡Chi-square test for trend. §Illiterate and literate individuals. ||Complete and incomplete primary education.

In Table 2, the prevalence of adherence to antihypertensive treatment was 26.5%, 16.6%, and 85.6% according to the Morisky-Green, Batalla, and Haynes-Sackett tests, respectively. The Haynes-Sackett test indicated that obesity was associated with treatment adherence, as among non-adherent individuals (14.4%), 80.3% and 77.3% were classified as obese based on BMI and NC, respectively. Most of the adherent patients, according to this test, were obese based on WC (73.7%) and NC (91.3%) measurements.

Table nº 2: Adherence to treatment according to the Morisky-Green, Batalla, and Haynes-Sackett tests among hypertensive patients enrolled in the Hypertension and Diabetes Program. Pernambuco, Brazil.

Variables	BMI				WC				NC			
	Overweight 256 (56,0) n(%)	Normal overweight 201(44,0) n(%)	OR (CI95%)		Abdominal obesity 324 (70,9) n(%)	Normal weight 133(29,1) n(%)	OR (CI95%)	P*	Obesity 408 (89,3) n(%)	Normal weight 49 (10,7) n(%)	OR (CI95%)	P*
Morisky-Green			1,10 (0,93 - 1,31)	0,265			0,93 (0,80-1,07)	0,295			0,99 (0,93-1,07)	0,992
Adherent	73 (60,3)	48 (39,7)			82 (67,2)	40 (32,8)			108 (89,3)	13 (10,7)		
Non-adherent	183 (54,5)	153 (45,5)			242 (72,2)	93 (27,8)			300 (89,3)	36 (10,7)		
Haynes-Sackett			0,64 (0,55-0,75)	**0,000**			1,35 (1,07-1,69)	**0,002**			1,18 (1,03-1,35)	**0,000**
Aderent	203 (51,9)	188 (48,1)			288 (73,7)	103 (26,3)			357 (91,3)	34 (8,7)		
Non-adherent	53 (80,3)	13 (19,7)			36 (54,5)	30 (45,5)			51 (77,3)	15 (22,7)		
Batalla			1,12 (0,92-1,37)	0,263			1,00 (0,85-1,17)	0,973			1,00 (0,92-1,09)	0,951
Adherent	47(61,8)	29 (38,2)			54 (71,1)	22 (28,9)			68 (89,3)	8 (10,5)		
Non-adherent	209 (54,9)	172 (45,1)			270 (70,9)	111 (29,1)			340 (89,2)	41 (10,8)		

BMI – Body Mass Index; 95% CI – 95% Confidence Interval; WC – Waist Circumference; NC – Neck Circumference; * Pearson's Chi-square test; I ≥ P85 for overweight, II ≥ P90 for obesity, III ≥0,5 for obesity, IV NC >35,5 cm for males, NC >32 cm for females.

In the multivariate logistic regression analysis (Table 3), using the Haynes-Sackett test, the following remained as independent risk factors for adherence to hypertension treatment: higher socioeconomic status (OR: 0.055; 95% CI: 0.013–0.230) and a normal Body Mass Index (OR: 4.118; 95% CI: 2.088–8.120).

Table nº 3: Independent predictors of adherence to hypertension treatment through the Haynes-Sackett test, according to the multivariate logistic regression analysis. Vitória de Santo Antão, Pernambuco, Brazil.

Risk factors	Final model			
	n 455	OR adjusted*	CI95%	P†
Socioeconomic status (SES) - ABEP				
Status B/C		1	Ref	
Status D		0,726	[0,376-1,402]	0,340
Status E		0,055	[0,013-0,230]	<0,001
BMI				<0,001
Obese		1		
Normal		4,118	[2,088-8,120]	

OR: Odds Ratio. 95% CI: 95% Confidence Interval. Ref: Reference category. * Model adjusted for the variables: use of salt shaker, adding salt to food, residence, physical activity level, race, waist circumference measurement, body mass index, and sex. † Likelihood ratio for heterogeneity of proportions.

IV. Discussion

Obesity is a condition that independently contributes to elevated blood pressure and is responsible for a significant proportion of such cases.[12] Findings from the Framingham Heart Study suggest that obesity accounted for 78% of hypertension cases in men and 65% in women.[26] Despite this, some obese patients either do not associate or are unaware of obesity as a risk factor for hypertension.[27]

Nutritional status can be assessed using several parameters, with Body Mass Index (BMI) being the most commonly used anthropometric indicator by healthcare services for screening excess weight. This is due to its role as a predictor of morbidity and mortality from various chronic diseases.[28] However, some authors argue that BMI is no longer an accurate measure of body fat quantity, as it does not account for differences in fat distribution, which pose significant health risks independent of total adiposity. Waist circumference (WC) and neck circumference (NC) reflect central adiposity and are better predictors of cardiometabolic diseases than BMI. These measures are simple to obtain and low-cost, making them suitable for use in population-based studies.[29,30]

This study among hypertensive individuals identified a high prevalence of excess weight based on BMI and central obesity based on WC and NC, confirming the close association between excess weight and hypertension, as previously reported by other authors.[31,32] The prevalence of excess weight was lower when assessed by BMI than by WC and NC, suggesting that even individuals with normal BMI may present altered WC and NC values, indicating central obesity.

According to BMI-based assessment, being elderly was a risk factor for obesity, a finding consistent with previous studies.[14] This may be attributed to age-related changes, such as reduced physical activity, increased consumption of high-calorie foods, and physiological alterations like slowed basal metabolism and hormonal changes, all of which contribute to increased BMI. In contrast, this study observed a decrease in WC and NC with increasing age, which differs from other studies reporting an increase in central adiposity with advancing age.[31,32,33]

This study found an inverse association between social class and obesity based on BMI. However, when evaluating neck circumference (NC), a higher social class was associated with a greater prevalence of obesity. This difference can be partially explained by the fact that the NC measurement method is still not a standardized assessment for the Brazilian population.

Several studies have shown that higher social classes are associated with increased obesity prevalence due to easier access to high-calorie foods and lower physical activity levels in more affluent groups.[34] Conversely, other studies have highlighted a higher prevalence of obesity in lower social classes, justifying that individuals from lower socioeconomic strata tend to consume foods with high fat and carbohydrate content because they are cheaper and provide greater satiety.[35,36]

There is also a trend of increased excess weight with higher educational levels when evaluating NC measurements. No statistically significant associations were found between education level and excess weight based on WC or BMI, probably because most of the participants in this study were elderly, which complicates anthropometric evaluations and may impair the accuracy of BMI and WC measurements.

Alcohol consumption is a known risk factor for the development of abdominal obesity and for increasing blood pressure levels.[12] However, the precise influence of ethanol on the accumulation of body fat remains unclear due to a lack of standardization in the methodologies used to assess alcohol consumption in terms of frequency, quantity, and duration.[33]

Nunes et al. found that excess weight was related to non-adherence to antihypertensive treatment, as 79% of patients who were non-adherent to treatment had a BMI indicating obesity.[13] In the present study, individuals with excess weight, according to BMI, showed a tendency to have lower adherence to antihypertensive treatment when adherence was assessed using the Haynes-Sackett test. In contrast, individuals with central obesity exhibited a tendency to have higher adherence to treatment. The Batalla and Morisky-Green tests showed that excess weight did not interfere with treatment adherence. It is likely that the Haynes-Sackett test is more sensitive in assessing adherence among obese groups than the other tests used. This highlights the importance of using multiple instruments in evaluating adherence to hypertension treatment to identify specific patient groups.

Research conducted with hypertensive individuals in Bangladesh showed that the presence of comorbidities, such as obesity, increased adherence to antihypertensive treatment. This is because obesity, along with hypertension, contributes to the occurrence of other comorbidities and cardiovascular complications, making patients more concerned about their health and consequently more adherent to treatment.[37]

Adherence to non-pharmacological treatment involves lifestyle changes and requires several adjustments to one's way of life. Patients with excess weight have greater difficulty adapting to these changes, and consequently, they are less adherent to the treatment.[38]

The multivariate analysis in Table 3 showed that higher social class and normal BMI were independent risk factors for adherence to antihypertensive treatment. In other words, eutrophic individuals and those from higher social classes are more likely to adhere to treatment, which aligns with findings from both national and international studies.[1337,39]

Ambaw's study demonstrated that the number of comorbidities associated with hypertension significantly influenced adherence behavior. Specifically, patients with none or only one comorbidity associated with hypertension were 2.5 and 2.28 times more likely to adhere to treatment compared to those with two or more associated diseases.[40]

Among the strengths of the present study, the direct measurement of anthropometric data and blood pressure, rather than relying on self-reports, can be highlighted. Another positive aspect is the geographic scope of the study, which was conducted across all healthcare units in a municipality located outside the metropolitan region. Additionally, the sample size was sufficient to ensure prevalence estimates, as well as the ability to identify factors associated with treatment adherence using the Odds Ratio, facilitated by multivariate logistic regression analysis. The use of three instruments for measuring adherence allowed for the evaluation of adherence from different perspectives.

However, the study has limitations that should be considered when interpreting the results. It is a cross-sectional study, where cause-and-effect relationships cannot be determined. The population is very homogeneous from an ethnic perspective, although the sample was carefully selected to exclude confounding factors in the analysis. The fact that interviews were conducted in participants' homes, which required more time for data collection, led to operational difficulties in obtaining the sample. Another additional limitation was that only the Haynes-Sackett test showed inconsistencies in the multivariate analysis.

V. Conclusion

Obesity is closely associated with cardiovascular and metabolic morbidities and mortalities. Additionally, its presence interferes with hypertensive patients' adherence to antihypertensive treatment, contributing to increased blood pressure levels. Therefore, strategies must be developed to promote weight management, as even modest weight loss results in a significant reduction in blood pressure. Public health actions focused on healthy aging represent an important alternative for the prevention and control of these conditions.

The use of multiple indicators to identify overweight is necessary, as measurements of waist circumference (WC) and hip circumference (HC), when combined with body mass index (BMI), better predict health risks than BMI alone. Healthcare professionals, especially those working in primary health care, should raise awareness within their teams regarding the importance of using these measures in anthropometric assessment and ensure proper training for accurate measurements.

Since the Haynes-Sackett test is a simple and sensitive tool for assessing adherence to treatment in obese groups, it should be routinely used in primary health care to identify hypertensive patients who are not adhering to proper treatment protocols and to develop strategies aimed at improving adherence.

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