Socioepidemiological Profile and Prevalence of Diabetes Mellitus and Arterial Hypertension Among Users of University in the Brazilian Amazon

Perfil Socioepidemiológico e Prevalência de Diabetes Mellitus e Hipertensão Arterial em Usuários de Serviços Universitários de Saúde na Amazônia Brasileira

Perfil Socioepidemiológico y Prevalencia de Diabetes Mellitus e Hipertensión Arterial em Usuarios de Servicios Universitarios de Salud em la Amazonia Brasileña

RESUMO

Objetivo: Analisar o perfil socioepidemiológico, a prevalência e os fatores associados à hipertensão arterial sistêmica e ao diabetes mellitus em usuários de serviços universitários de saúde na Amazônia brasileira. **Método:** Estudo transversal descritivo-analítico, realizado com 80 participantes, por meio de entrevistas estruturadas e aferições de pressão arterial e glicemia capilar. Foram aplicados testes de associação e regressão logística. **Resultados:** As prevalências autorreferidas de hipertensão arterial sistêmica (40%) e diabetes mellitus (21,3%) foram elevadas. O histórico familiar de hipertensão arterial sistêmica e de dislipidemia apresentou associação significativa com a doença. Observou-se controle inadequado da pressão arterial em 65,6% e da glicemia em 47,1% dos participantes. **Conclusão:** A população estudada apresenta elevada carga de doenças crônicas não transmissíveis e controle clínico insuficiente, indicando a necessidade de estratégias de cuidado voltadas à adesão terapêutica e à redução de desigualdades.

DESCRITORES: Hipertensão; Diabetes Mellitus; Fatores de Risco; Determinantes Sociais da Saúde; Região Amazônica.

ABSTRACT

Objective: To analyze the socioepidemiological profile, prevalence, and associated factors of systemic arterial hypertension and diabetes mellitus among users of university health services in the Brazilian Amazon. **Method:** Cross-sectional descriptive-analytical study conducted with 80 participants using structured interviews and measurements of blood pressure and capillary glucose. Association tests and logistic regression were applied. **Results:** High self-reported prevalences of systemic arterial hypertension (40%) and diabetes mellitus (21.3%) were observed. Family history of systemic arterial hypertension and dyslipidemia was significantly associated with the disease. Inadequate blood pressure control was observed in 65.6% and inadequate glycemic control in 47.1% of participants. **Conclusion:** The studied population shows a high burden of noncommunicable chronic diseases and insufficient clinical control, highlighting the need for care strategies focused on treatment adherence and reduction of inequalities.

KEYWORDS: Hypertension; Diabetes Mellitus; Risk Factors; Social Determinants of Health; Amazon Region.

RESUMEN

Objetivo: Analizar el perfil socioepidemiológico, la prevalencia y los factores asociados a la hipertensión arterial sistémica y a la diabetes mellitus en usuarios de servicios universitarios de salud en la Amazonía brasileña. **Método:** Estudio transversal descriptivo-analítico, realizado con 80 participantes mediante entrevistas estructuradas y mediciones de presión arterial y glucemia capilar. Se aplicaron pruebas de asociación y regresión logística. **Resultados:** Se observaron prevalencias elevadas de hipertensión arterial sistémica (40%) y diabetes mellitus (21,3%). El antecedente familiar de hipertensión arterial sistémica y dislipidemia se asoció significativamente con la enfermedad. El control de la presión arterial fue inadecuado en 65,6% y el control glucémico en 47,1% de los casos. **Conclusión:** La población estudiada presenta una elevada carga de enfermedades crónicas no transmisibles y un control clínico insuficiente, lo que evidencia la necesidad de estrategias de atención centradas en la adherencia terapéutica y la reducción de desigualdades.

DESCRIPTORES: Hipertensión; Diabetes Mellitus; Factores de Riesgo; Determinantes Sociales de la Salud; Región Amazónica.

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INTRODUCTION

Chronic noncommunicable diseases (NCDs), such as Diabetes Mellitus (DM) and Systemic Arterial Hypertension (SAH), represent the main global public health crisis of the 21st century, accounting for 71% of global deaths[1] . The number of adults living with diabetes reached 537 million in 2021, with a projection of 783 million by 2045[1] . In Brazil, the situation reflects this trend. Recent data indicate prevalences of 7.7% for DM and 23.9% for SHTN in the adult population, with an increase in the prevalence of self-reported diabetes from 5.5% to 7.4% between 2006 and 2019[2-1] .

DM and AH are the NCDs with the highest prevalence and impact on the Unified Health System (SUS), constituting the leading causes of cardiovascular morbidity and mortality[3] . Inadequate metabolic control of these conditions is a predictor of serious complications, such as stroke, acute myocardial infarction, nephropathy, and retinopathy, directly impacting patients' quality of life and survival[4-5] .

The distribution and management of NCDs are intrinsically linked to the social determinants of health. Variables such as income, education, and access to services are strongly associated with prevalence, treatment adherence, and clinical outcomes[6-7-8] . Individuals in socially vulnerable situations are at higher risk of developing NCDs and have worse outcomes, a finding corroborated by studies demonstrating a higher prevalence of DM and AH in populations with low educational attainment and income[6] .

The challenge is amplified in the Northern Region of Brazil, characterized by geographical barriers, difficulties in accessing health services, and unfavorable socioeconomic indicators, resulting in heightened vulnerability[9] . It is estimated that the region is home to approximately 566,800 people with diabetes and 1.7 million with hypertension[7] .

Despite the high epidemiological relevance of NCDs in the Brazilian Amazon and the strategic role of university health services—which combine care, teaching, and research and frequently serve vulnerable populations[10], studies that characterize the socio-epidemiological profile, analyze the association with social determinants, and assess the metabolic control of patients treated in these settings are scarce.

Understanding this triad (profile, determinants, and control) is fundamental for the development of contextualized and effective interventions, such as pharmaceutical care, which has demonstrated a positive impact on adherence and metabolic control; and the improvement of services and professional training aligned with local and regional needs[11,12] .

Given this scenario, the present study aims to analyze the socioepidemiological profile and prevalence of DM and AH among users of university health services provided by the Integrated Clinics of the University of the Amazon (UNAMA), investigating associations with social determinants and evaluating the glycemic and blood pressure control of these patients.

METHOD

Study Design, Location, and Period

This study was observational and cross-sectional in nature, with a descriptive and analytical design. It was

conducted at the health services of the Integrated Clinics of the University of the Amazon (UNAMA) in the city of Belém, Pará, Brazil. These services, open to the public, encompass multidisciplinary care, including Psychology, Speech-Language Pathology, Dentistry, Nutrition, Physical Therapy, Aesthetics, and Occupational Therapy. The complex serves an average of 30 patients per day, in two shifts, five days a week.

Data collection took place over a six-month period, from November 2024 to April 2025. A cross-sectional design was employed to characterize the socioepidemiological profile of the users and to investigate the prevalence and association between social determinants and the occurrence of DM and AH at a single point in time, similar to the approach used by Calistro and Aciole[13] .

The researchers visited the Integrated Clinics three times a week, during the same hours the clinics were open (mornings and afternoons), to conduct recruitment and data collection. Patients were approached in the waiting room before their scheduled clinical appointments in various specialties and invited to participate in the study. The same research team conducted all patient approaches and administered the instruments throughout the study period, ensuring no duplicate participants.

The main reasons for refusal included lack of time due to the scheduled appointment time and immediate personal commitments following the consultation. The unit of observation was the patient (one interview per participant), regardless of whether they utilized multiple services offered by the Integrated Clinics

Population, Sample, and Eligibility Criteria

The study population comprised adult users of the healthcare services at UNAMA's Integrated Clinics during the data collection period. A non-probability convenience sample was used. The final sample consisted of 80 participants (N=80), recruited consecutively during the data collection period. Patients aged 18 years or older who used the teaching clinic's services at the time of the study or in the preceding six months were included. All eligible participants signed the Informed Consent Form (ICF).

Although this was a convenience sample, the sample size of 80 participants was considered adequate to meet the descriptive and exploratory objectives of the study. According to Lwanga and Lemeshow[14], to estimate prevalences with reasonable accuracy, using a 95% confidence interval and an estimated prevalence of 50% (the most conservative scenario in the absence of prior estimates), a sample of 80 individuals allows for a maximum error of approximately 11%, which is considered acceptable for studies characterizing population profiles.

Additionally, this sample size allows for the investigation of associations with moderate to high effect sizes among the variables of interest. It was estimated that approximately 1,800 patients were seen at the clinics during the data collection period (6 months × 4 weeks × 3 collection days × 30 patients/day, accounting for overlapping patient visits across different clinics), representing a participation rate of approximately 4.4% of those eligible.

Those with significant cognitive impairment that precluded safe participation or a reliable response to the questionnaire were excluded from the study, as were those who did not agree to participate. Impairment was identified through brief screening conducted by the researchers, with the assistance of healthcare professionals who directly provide clinical services (psychologists, physical therapists, occupational therapists, among others) and who are familiar with the clinical profile of the patients being treated. This assessment took place at the time of the initial approach, prior to administering the data collection instrument.

Data Collection and Definition of Variables

Data collection was performed through a structured interview, using a form with closed-ended and open-ended questions, administered by previously trained researchers. The instrument was structured to address the following dimensions:

Sociodemographic and Socioeconomic Variables

Gender: dichotomous categorical variable (Male, Female).

Age: continuous variable collected in full years at the time of the interview, subsequently categorized into age groups for descriptive analyses: 18 to 30 years, 31 to 50 years, and over 50 years.

Education: an ordinal categorical variable classified into four levels: (1) Illiterate—no formal literacy; (2) Up to 4 years of schooling—incomplete elementary school; (3) 5 to 8 years of schooling—complete elementary school to incomplete high school; (4) More than 8 years of schooling—complete high school or higher.

Monthly household income: an ordinal categorical variable based on the current minimum wage, classified into three strata: (1) 0 to 2 minimum wages; (2) 3 to 4 minimum wages; (3) More than 4 minimum wages.

Healthcare system used: nominal categorical variable representing the system predominantly used by the participant, classified as: (1) Public (SUS); (2) Private (health insurance plans or private); (3) Both.

Frequency of medical visits: an ordinal categorical variable indicating the usual frequency of medical visits, classified as: (1) Monthly; (2) Quarterly; (3) Semi-annually; (4) Annual-

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ly.

Outcome Variables

Self-reported Diabetes Mellitus: dichotomous variable (Yes/No) determined by an affirmative response to the standardized and validated question: "Has a doctor ever told you that you have diabetes?"[15] . This form of self-reported assessment has been widely used in Brazilian epidemiological surveys and has adequate validity for prevalence studies.

Self-reported systemic arterial hypertension: dichotomous variable (Yes/No) determined by an affirmative response to the standardized question: "Has a doctor ever told you that you have arterial hypertension (high blood pressure)?"[15] .

Self-reported dyslipidemia: dichotomous variable (Yes/No) collected for complementary characterization of the sample's NCD profile.

DM/SAH Comorbidity: derived variable, dichotomously categorized (Yes/No), indicating the simultaneous presence of self-reported DM and SAH.

Family History Variables

Family history of hypertension: dichotomous variable (Yes/No) indicating the presence of a diagnosis of hypertension in first- or second-degree relatives.

Family history of DM: dichotomous variable (Yes/No) indicating the presence of a diagnosis of diabetes in first- or second-degree relatives.

Family history of dyslipidemia: dichotomous variable (Yes/No) indicating the presence of a diagnosis of dyslipidemia in first- or second-degree relatives.

Behavioral Variables

Physical activity: dichotomous variable (Yes/No) based on self-reported regular physical exercise (at least 2–3 times per week).

Smoking: dichotomous variable (Yes/No) indicating current tobacco use at any frequency.

Alcohol use: dichotomous variable (Yes/No) indicating consumption of alcoholic beverages at any frequency.

Metabolic Control and Self-Care Variables

Systolic Blood Pressure (SBP): continuous variable expressed in mmHg, obtained by direct measurement.

Diastolic Blood Pressure (DBP): continuous variable expressed in mmHg, obtained by direct measurement.

Capillary Blood Glucose (CBG): continuous variable expressed in mg/dL, obtained by direct measurement.

Blood Pressure Control: derived variable, dichotomous (Yes/No), where "Yes" indicates systolic blood pressure (SBP) < 120 mmHg AND diastolic blood pressure (DBP) < 80 mmHg, according to the Brazilian Guidelines on Hypertension[16] .

Glycemic Control: derived variable, dichotomous (Yes/No), where "Yes" indicates values of 65–100 mg/dL (fasting/preprandial) or 80–126 mg/dL (postprandial), according to the Brazilian Diabetes Society[17] .

Habit of measuring BP: dichotomous variable (Yes/No) applied to participants with DM and/or AH, indicating the regular habit of home blood pressure monitoring.

Healthy diet: dichotomous variable (Yes/No) based on the participant's perception of the quality of their usual diet.

Adherence to a specific diet: dichotomous variable (Yes/No) indicating whether the participant follows a meal plan prescribed by a healthcare professional (dietitian, physician).

Self-Reported Symptom Variables

For participants with self-reported DM and/or AH, the occurrence of common symptoms in the past 30 days was investigated, including: muscle pain, joint pain, stomach pain, fatigue/tiredness, headache, dizziness, among others. Each symptom was recorded as a dichotomous variable (Present/Absent).

Procedures for Assessing Glycemic and Blood Pressure Control

To assess clinical control at the time of the visit, blood pressure (BP) and capillary blood glucose (CBG) were measured for all participants, regardless of self-reported DM or AH.

Blood Pressure Measurement: BP was measured using a validated automatic upper-arm BP monitor, model HEM-7320 OMRON® (validated by the British and Irish Hypertension Society), following a standardized protocol. Participants were instructed to rest for at least five minutes before measurement, sitting with their arm supported at heart level. Two consecutive measurements were taken one minute apart, and the average of the two readings was used for analysis. Systolic and diastolic blood pressure values were recorded separately in mmHg.

Capillary Blood Glucose Measurement: CBG was measured by finger prick using a sterile disposable lancet and read on a calibrated G-Tech Vita® portable glucometer, following the manufacturer's instructions. Participants were not required to fast beforehand; whenever possible, the time of the last meal (fasting, preprandial, or postprandial) was recorded to ensure proper interpretation of the values according to the criteria of the Brazilian Diabetes Society.

Statistical Analysis

The collected data were coded and tabulated in spreadsheets (Microsoft Excel®). Statistical analysis was performed using BioEstat software version 5[18] . The analysis was conducted in sequential stages to meet the study objectives:

Descriptive Analysis

Categorical variables (sex, age

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group, education level, income, health system, frequency of visits, presence of NCDs, family history, behavioral habits, symptoms, self-care habits) were described using absolute (n) and relative (%) frequencies. Continuous variables (age, systolic blood pressure [SBP], diastolic blood pressure [DBP], body mass index [BMI]) were expressed as mean and standard deviation (SD).

Prevalence Calculation: The prevalences of self-reported DM and AH were calculated as the ratio of the number of positive cases to the total number of participants (n=80), expressed as a percentage and accompanied by their respective 95% confidence intervals (95% CI), calculated using the Wilson method. The prevalence of DM/AH comorbidity was calculated in a similar manner.

Analysis of Associations between Categorical Variables

To investigate associations between NCDs (self-reported DM and AH) and sociodemographic, socioeconomic, behavioral, and family history variables, association tests for categorical variables were employed:

G-test: applied to assess the association between self-reported DM and the following categorical variables: educational level (4 categories), family income (3 categories), health care system used (3 categories), frequency of visits (4 categories); and between self-reported HTN and the same variables. The G-test was preferred over the Chi-square test when the expected frequencies in some cells were less than 5, as recommended by Nahm[19] .

Pearson's Chi-Square Test: applied specifically to test the association between sex (2 categories) and self-reported DM, as well as between sex and self-reported AH, as they presented expected frequencies suitable for this test. The significance level adopted for all association analyses was $p < 0.05$.

Bivariate Logistic Regression

To quantify the magnitude of the identified associations and those with clinical relevance even without statistical significance, Bivariate Logistic Regression was used. This method allows for the calculation of the Odds Ratio (OR) as a measure of association between each independent variable and the outcomes (self-reported DM and SAH), accompanied by its respective 95% Confidence Interval (95% CI) and p-value.

Bivariate models were constructed with self-reported DM and SAH as primary outcomes, and family history of SAH, DM, and dyslipidemia as independent variables, in addition to behavioral habits (physical activity, smoking, and alcohol use). Additional analyses were conducted using blood pressure control (normal BP), glycemic control (normal GC), and the habit of regularly measuring BP as outcomes, with the presence of self-reported DM and/or SAH as exposures.

The interpretation of ORs followed the following criteria: $OR > 1$ indicates an increased chance of the outcome occurring in the presence of the factor; $OR < 1$ indicates a reduced chance; $OR = 1$ indicates no association. Statistical significance was determined when the 95% CI did not include the value 1.0 and/or when $p < 0.05$.

Analysis of Variance (ANOVA)

ANOVA was used to compare the mean values of SBP, DBP, and CR between groups defined by the presence or absence of self-reported DM and SAH. The mean values of SBP, DBP, and CR were compared between participants with and without self-reported DM (n=17 versus n=63), as well as between participants with and without self-reported SAH (n=32 versus n=48). These comparisons allowed us to assess whether patients who recognized having these chronic conditions actually had blood pressure and glycemic values different from those without self-reported diagnoses.

Prior to performing the ANOVA, the D'Agostino-Pearson normality test was conducted to verify whether the data distributions met the test's parametric assumptions. The SBP, DBP, and BG variables exhibited an approximately normal distribution, allowing for the use of ANOVA.

Statistical significance was considered when $p < 0.01$ for comparisons of means, due to the adjustment for multiple comparisons performed.

Ethical Considerations

The study was conducted in full compliance with the ethical principles established by Resolutions No. 466/2012 and No. 510/2016 of the National Health Council. The study was submitted to and approved by the Research Ethics Committee (CEP) of UNAMA, under CAAE 82520124.7.0000.5173 (Opinion No. 7,187,666). All participants were fully informed about the objectives, procedures, risks, and benefits of the study and formalized their participation by signing the informed consent form.

RESULTS

Socioepidemiological Characterization of the Sample

The study included 80 participants who were patients at the Integrated Clinics of the University of the Amazon, with a mean age of 52.13 ± 17.91 years. Table 1 presents the distribution of sociodemographic, socioeconomic, and health service utilization characteristics of the study sample.

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Table 1. Frequency Distribution of Socioepidemiological Characteristics of Users Treated at the Teaching Clinic. Belém, Pará, Brazil, 2024–2025 (N=80).

Variables	N	%	Mean ± SD
Gender			
Male	25	Z1,25	
Female	55	68,75	
Age Group			
18 to 30 years old	14	17,5	
31 to 50	24	30	52,13 ± 17,91
>50	42	52,5	
Education			
Illiterate	1	1,25	
Up to 4 years	7	8,75	
5 to 8 years	35	43,75	
Over 8 years	37	46,25	
Family income			
0 to 2 minimum wages*	43	53,75	
3 to 4 SM	18	22,5	
> than 4 SM	19	23,75	
Health System			
Public	35	43,75	
Private	31	38,75	
Both	14	17,5	
Self-reported diseases			
Diabetes	17	21,25	
Hypertension	32	40	
Dyslipidemia	10	12,5	

SD: Standard deviation
*MW: Current Brazilian minimum wage for 2024–2025.
Source: data extracted and tabulated from semi-structured questionnaires administered to 80 different patients.

There was a predominance of females, representing 68.75% (n=55) of the participants, while males accounted for 31.25% (n=25). More than half of the sample (n=42, 52.5%) belonged to the age group over 50 years, followed by the 31–50 age group (n=24, 30%). Regarding educational background, the majority of participants had five or more years of schooling, totaling 90% (n=72) of the sample. Specifically, 46.25% (n=37) reported more than eight years of schooling and 43.75% (n=35) reported between five and eight years. The lowest educational strata corresponded to 8.75% (n=7) with up to four years of schooling and only 1.25% (n=1) of illiterate participants.

Regarding socioeconomic status, the largest proportion of participants (n=43, 53.75%) fell within the family income bracket of 0 to 2 minimum wages. A minority (n=19, 23.75%) had a family income exceeding 4 minimum wages. Regarding access to the healthcare system, 43.75% (n=35) of users relied exclusively on the public system, while 38.75% (n=31) used the private system. The most prevalent self-reported chronic diseases in the sample were hypertension (40%, n=32) and diabetes mellitus (21.25%, n=17). The prevalence of self-reported dyslipidemia was 12.5% (n=10), indicating a high burden of NCDs among users treated at the university clinic.

Prevalence and Distribution of Chronic Noncommunicable Diseases

Hypertension was the most prevalent condition, at 40% (n=32/80; 95% CI: 29.3–50.7), followed by diabetes at 21.3% (n=17/80; 95% CI: 12.3–30.2). DM/HAS comorbidity was identified in 18.8% (n=15/80; 95% CI: 10.2–27.3) of the participants. Individuals with DM had a mean age of 65 ± 12.09 years versus 48.66 ± 17.70 years among non-diabetics, while those with hypertension had a mean age of

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62.09 ± 11.52 years compared to 45.5 ± 18.41 years in non-hypertensive individuals.

Table 2 presents the distribution of NCDs according to sociodemographic and socioeconomic characteristics. The bivariate analysis did not identify statistically significant associations between DM and any of the variables investigated: sex (p=0.285), education level (p=0.263), household income (p=0.234), health care system (p=0.386), frequency of visits (p=0.413), or family history (p>0.05 for all conditions). The distribution of DM was homogeneous across the different sociodemographic and socioeconomic strata.

For SAH, no significant differences were observed according to sex (p=0.805), education level (p=0.313), family income (p=0.641), frequency of medical visits (p=0.73), or family history (p>0.05). However, a statistically significant association was identified with the health system used (p=0.02). The prevalence of hypertension was 40.6% in the SUS, 28.1% in the private system, and 31.2% among users of both systems.

Table 2. Distribution of self-reported DM and SAH according to sociodemographic, socioeconomic, and health service utilization characteristics of patients seen at a teaching clinic. Belém, Pará, Brazil.

Variables		DM			SAH		
		Yes	No	p-value	Yes	No	p-value
Gender	Male	5	20	0,285[b]	9	16	0,805[b]
	Female	12	43		23	32	
Age							
Average ±		65±	48,66±	-	62,09 ±	45,5±	-
SD		12,09	17,70		11,52	18,41	
Education							
Illiterate		1	0	0,263[a]	1	0	0,313[a]
Up to 4 years of schooling		3	4		3	5	
5 to 8 years of study		7	29		17	18	
More than 8 years of schooling		6	30		11	25	
Income (Minimum wage)							
0 to 2		9	34	0,234[a]	19	24	0,641[a]
3 to 4		4	14		6	12	
>4		4	15		7	12	
Health System							
SUS		10	25	0,386[a]	13	22	0,02[a]
Private		5	26		9	22	
Both		2	12		10	4	
Frequency of Appointments							
Monthly		4	7	0,413[a]	5	5	0,73[a]
Quarterly		5	13		4	9	
Semiannual		3	12		8	9	
Annual		5	31		15	25	

*a G Test
*b Chi-square

Regarding distribution by education level and income, both conditions showed proportionally similar frequencies across the different strata, with no evidence of a socioeconomic gradient. Among participants with an income of 0 to 2 minimum wages, the prevalences were 59.37% (19/32) for hypertension and 52.3% (9/17) for diabetes. Educational level also did not show a linear pattern of association with the NCDs investigated. Among diabetic patients, 58% reported visiting a doctor quarterly (5) or annually (5), while among hypertensive patients, 72% visit a doctor at least once every six months (8) or annually (15).

The absence of significant associations between traditional sociodemographic variables and NCDs, except for the healthcare system in relation

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to AH, suggests that other determinants may be playing a predominant role in the occurrence of these conditions in the studied population. The finding of a higher prevalence of AH among SUS users indicates a possible profile of greater severity or a need for specialized care in this subgroup.

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Factors Associated with Chronic Noncommunicable Diseases

Table 3 presents the measures of association between family history and behavioral variables and the self-reported prevalences of Diabetes Mellitus and Systemic Arterial Hypertension.

Table 3. Family history and behavioral factors associated with DM and SAH: bivariate logistic regression analysis.

Variables	DM		OR (95% CI)	p value	HAS		OR (95% CI)	p value
	Yes	No			Yes	No		
Family history of SAH								
Yes	12	38	1,57 (0,49-5,03)	0,62	27	23	5,86 (1,93-17,8)	0,002
No	5	25			5	25		
Family history of DM								
Yes	12	32	2,32 (0,73-7,37)	0,23	19	25	1,34 (0,54-3,32)	0,67
No	5	31			13	23		
Family history of dyslipidemia								
Yes	8	15	2,84 (0,93-8,67)	0,11	15	8	4,41 (1,57-12,34)	0,007
No	9	48			17	40		
Physical activity								
Yes	12	31	2,47 (0,78-7,85)	0,19	18	25	1,18 (0,48-2,90)	0,89
No	5	32			14	23		
Smoker								
Yes	1	3	1,22 (0,11-12,62)	0,65	3	1	4,86 (0,48-48,98)	0,34
No	16	59			29	47		
Alcohol use								
Yes	6	21	1,09 (0,35-3,35)	0,89	11	16	1,04 (0,40-2,69)	0,88
No	11	42			21	32		

SAH showed statistically significant associations with a family history of hypertension among participants, which was the most strongly associated factor, increasing the odds of developing the disease by 5.86 times (OR = 5.86; 95% CI: 1.93–17.8; p = 0.002). Similarly, a family history of dyslipidemia significantly increased the odds of SHA by 4.41 times (OR = 4.41; 95% CI: 1.57–12.34; p = 0.007).

Behavioral variables (physical activity, smoking, and alcohol use) and family history of diabetes did not show a significant association with hypertension (p > 0.05 in all cases). For diabetes, none of the variables tested reached statistical significance (p > 0.05). Family history of dyslipidemia had the highest OR value (OR = 2.84), indicating a risk trend with 95% CI: 0.93–8.67 and p = 0.11. Similarly, a family history of DM tended to increase the likelihood of self-reported DM by 2.32 times (95% CI: 0.73–7.37; p = 0.23). Physical activity also tended to be associated with DM (OR = 2.47; 95% CI: 0.78–7.85; p = 0.19), but without statistical significance. Smoking and alcohol use also showed no significant association with DM (p = 0.65 and p = 0.89, respectively).

Metabolic Control and Clinical Profile of Patients with Chronic Diseases

Table 4 presents the metabolic parameters, clinical control, and monitoring habits of patients with self-reported DM and AH. The comparative analysis revealed statistically significant differences in the mean values of SBP, DBP, and capillary blood glucose between the groups with and without chronic diseases (p<0.01 for all comparisons by ANOVA).

Diabetic patients had a mean SBP of 127.6 ± 17.5 mmHg, diastole of 74.7 ± 12.8 mmHg, and capillary blood glucose of 135.7 ± 40.6 mg/dL, values significantly higher than those observed in non-diabetics (118.5 ± 18.5 mmHg, 75.8 ± 11.8 mmHg, and 110.4 ± 17.0 mg/dL, respectively).

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Similarly, hypertensive patients had a SBP of 125.9 ± 18.29 mmHg, diastolic blood pressure of 76.8 ± 13.78 mmHg, and blood glucose of 120.0 ± 31.89 mg/dL, compared to 116.8 ± 18.11 mmHg, 74.7 ± 10.7 mmHg, and 113.1 ± 20.88 mg/dL in non-hypertensive individuals.

Regarding monitoring habits, 76.5% (n=13/17) of diabetics reported regularly checking their blood pressure, with a trend toward a statistical association (OR 3.57; 95% CI: 1.05–12.16; p=0.053). Among hypertensive patients, this habit was even more prevalent (84.4%; n=27/32), observed in 82.6% of women and 88.8% of men with hypertension, with no statistical difference between the sexes.

Table 4. Metabolic Control (glycemic and blood pressure) and Self-Reported Monitoring Habits in Patients with DM and AH Treated from November 2024 to April 2025 at a teaching clinic. Belém, Pará, Brazil.

Variables	DM		OR (95% CI)	p value	HAS		OR (95% CI)	p value
	Yes	No			Yes	No		
Blood pressure monitoring habits								
Yes	13	30	3,57 (1,05-12,16)	0,053	27	16	10,8 (3,49-33,34)	8,73
No	4	33			5	32		
PAS (mean ± SD)	127,6 ± 17,5	118,5 ± 18,5	-	<0,01	125,9 ± 18,29	116,8 ± 18,11	-	<0,01
PAD (mean ± SD)	74,7 ± 12,8	75, 8 ± 11,8	-	<0,01	76,8 ± 13,78	74,7 ± 10,7	-	<0,01
Normal BP								
Yes	5	32	0,40 (0,12-1,28)	0,17	11	26	0,45 (0,18-1,12)	0,11
No	12	31			21	22		
GC (mean ± SD)	135,7 ± 40,6	110,4 ± 17,0	-	<0,01	120,0 ± 31,89	113,1 ± 20,88	-	<0,01
Normal GC								
Yes	9	55	0,16 (0,04-0,54)	<0,05	24	40	0,60 (0,20-1,77)	0,40
No	8	8			8	8		

p<0,01: ANOVA

O controle pressórico adequado foi observado em apenas 29,4% (n=5/17) dos diabéticos e 34,4% (n=11/32) dos hipertensos, sem significância estatística (p=0,17 e p=0,11, respectivamente). Destaca-se importante disparidade entre sexos: entre os diabéticos com PA controlada, 10 eram mulheres e nenhum era homem; similarmente, 10 dos 11 hipertensos com PA normal eram mulheres.

A presença de DM autorreferido demonstrou uma associação inversa e estatisticamente significativa com a normoglicemia no momento da aferição. Os pacientes diabéticos apresentaram uma chance significativamente menor de terem a GC dentro dos padrões de normalidade (OR = 0,16; IC95%: 0,04-0,54; p<0,05) em comparação aos não diabéticos. Descritivamente, apenas 52,9% (n=9/17) dos indivíduos com DM autorreferido demonstraram controle glicêmico na triagem.

Observou-se importante diferença entre sexos: 67% (n=8/12) das mulheres diabéticas versus apenas 20% (n=1/5) dos homens diabéticos apresentaram controle glicêmico adequado. Entre as mulheres hipertensas, 87% apresentaram glicemia normal, comparado a 44,4% dos homens hipertensos (p=0,04).

Em relação aos pacientes com comorbidade DM/HAS e descontrole metabólico (n=6), destaca-se que 83,3% (n=5/6) referiram ter uma alimentação saudável, porém apenas um seguia dieta específica. Os sintomas autorreferidos mais prevalentes entre os hipertensos foram dor muscular e fadiga/cansaço (ambos >60%), enquanto nos diabéticos predominaram dor muscular, dor articular e fadiga/cansaço (65%). Pacientes com ambas as condições relataram principalmente dor muscular e dor articular (67%), seguidos de fadiga/cansaço (60%), sem diferenças estatisticamente significativas entre os grupos.

DISCUSSÃO

As prevalências autorreferidas de HAS e DM observadas neste estudo superaram os parâmetros regionais e nacionais documentados pelo VIGITEL 2023[15], evidenciando uma carga de doenças crônicas não transmissíveis particularmente elevada entre os usuários dos serviços universitários de saúde na Amazônia brasileira. Este achado pode ser compreendido pelo perfil etário da amostra, composta predominantemente por indivíduos acima de cinquenta anos, faixa em que a prevalência de

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DCNT se eleva. A literatura nacional tem demonstrado que desigualdades nos comportamentos de risco para DCNT se acentuam com o envelhecimento e são mais pronunciadas em regiões com maior vulnerabilidade social[20].

Nesse sentido, os serviços universitários de saúde parecem funcionar como pontos de convergência para a população mais vulnerável e sintomática da região, desempenhando um papel estratégico na detecção e no manejo dessas condições crônicas. O predomínio feminino e a alta concentração em estratos de baixa renda corroboram essa interpretação e validam o papel dessas clínicas-escola como portas de entrada para subgrupos populacionais que enfrentam barreiras de acesso na atenção primária à saúde[10].

Apesar do perfil de vulnerabilidade socioeconômica predominante na amostra, a ausência de associações estatisticamente significativas entre DM e HAS e os determinantes sociais tradicionais, como escolaridade e renda, configurou um achado paradoxal que merece análise. A literatura é consistente em demonstrar que desigualdades socioeconômicas exercem papel crucial na ocorrência dessas condições crônicas, com estudos ecológicos brasileiros confirmando associação entre menor renda e maior prevalência de diabetes mellitus tipo 2[21], bem como, entre vulnerabilidade social e maior carga de DCNT[10]. A explicação mais plausível para essa dissonância reside na homogeneidade relativa dos estratos socioeconômicos investigados, uma vez que mais da metade dos participantes pertencia ao estrato de menor renda. Essa concentração em um segmento socialmente desfavorecido provavelmente mascarou o gradiente de risco que seria detectável em uma população com maior estratificação socioeconômica. Complementarmente, o estado do Pará apresenta historicamente uma das menores prevalências de diagnóstico de hipertensão do país[2], o que sugere que diferenças regionais no acesso diagnóstico podem subestimar a prevalência real dessas condições em territórios amazônicos.

A associação significativa entre HAS e o sistema de saúde utilizado reforça essa perspectiva, indicando um diferencial de acesso ao diagnóstico vinculado ao tipo de serviço frequentado, visto que usuários do SUS tendem a ser mais rotineiramente triados para hipertensão nas unidades de atenção básica[7]. Assim, mais do que a ausência de influência dos determinantes sociais, os resultados deste estudo podem refletir limitações inerentes à composição da amostra e ao contexto de acesso diferenciado ao diagnóstico na região.

Em contrapartida, o componente familiar emergiu como o principal preditor de risco para HAS na amostra estudada. O histórico familiar tanto de hipertensão quanto de dislipidemias esteve significativamente associado à ocorrência de HAS, com magnitudes de efeito expressivas que reforçam a relevância de componentes genéticos e do compartilhamento de fatores de risco cardiovascular no agrupamento familiar dessas condições. Esses achados são consonantes com a literatura recente em genética cardiovascular, que tem demonstrado que a predisposição hereditária é um dos pilares fundamentais na fisiopatologia da hipertensão arterial[22], e com estudos que documentam a relação sinérgica entre dislipidemia e hipertensão, mediada por mecanismos de disfunção endotelial e aterosclerose compartilhados[5]. A associação entre histórico familiar de dislipidemias e HAS observada neste estudo é particularmente relevante, pois reforça que essas condições compartilham uma base fisiopatológica comum, e que a agregação familiar de fatores de risco cardiovascular deve ser considerada na abordagem clínica e na identificação precoce de indivíduos em risco.

Para o DM, embora nenhuma variável tenha alcançado significância estatística, o histórico familiar de dislipidemias e de diabetes apresentou tendência de associação, com magnitudes de efeito clinicamente notáveis. É razoável considerar que o número reduzido de casos diabéticos na amostra comprometeu o poder estatístico necessário para detectar essas associações, uma limitação reconhecida em estudos transversais com tamanho amostral restrito[14]. Estudos com amostras maiores seriam necessários para confirmar essas tendências observadas na população amazônica.

O controle metabólico dos pacientes com DCNT revelou-se insatisfatório, com proporções de diabéticos e hipertensos apresentando valores pressóricos e glicêmicos inadequados no momento das aferições. A associação inversa entre o diagnóstico autorreferido de DM e a normalidade glicêmica indica que, apesar do reconhecimento da doença, parcela substancial dos pacientes diabéticos não alcança metas terapêuticas adequadas. Esses resultados alinham-se com evidências recentes que documentam baixas taxas de controle metabólico em pacientes com multimorbidade no contexto da atenção primária brasileira, mesmo entre aqueles em uso regular de medicamentos[23]. A análise estratificada por sexo revelou disparidades de gênero: as mulheres diabéticas e hipertensas demonstraram indicadores de controle glicêmico e pressórico substancialmente superiores aos dos homens, que apresentaram descontrole metabólico quase generalizado. Esse padrão é corroborado por estudos que associam o sexo masculino à menor adesão medicamentosa e menor busca por serviços de saúde, mediados por fatores comportamentais e culturais[24]. A constatação de que as mulheres constituem a maioria dos pacientes com controle adequado, enquanto os homens apresentam descontrole sistêmico, revela uma lacuna assistencial crítica que demanda estratégias de saúde pública específicas para o engajamento do público masculino ao tratamento e monitoramento de DCNT.

A carga sintomática autorreferida, dominada por fadiga, dor muscular e dor articular em proporções eleva-

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das em todos os subgrupos de DCNT, reflete a complexidade clínica dessas condições, que envolve mecanismos de inflamação crônica e disfunção endotelial com repercussões sistêmicas[4]. Essa sintomatologia, frequentemente subestimada na prática clínica, compromete a qualidade de vida e pode interferir na adesão ao tratamento, configurando um ciclo vicioso de descontrole metabólico.

Um achado particularmente relevante foi o descompasso entre a percepção subjetiva de autocuidado e o controle clínico efetivo: a grande maioria dos pacientes com comorbidade DM/HAS em descontrole metabólico referiu alimentação saudável, embora quase nenhum seguisse dieta específica orientada por profissional. Este resultado evidencia que a percepção individual de autocuidado, quando dissociada de intervenções nutricionais estruturadas e de adesão farmacológica adequada, mostra-se insuficiente para o manejo efetivo das DCNT. Tais evidências reforçam a necessidade de implementar abordagens multidisciplinares que integrem o cuidado farmacêutico, o acompanhamento nutricional individualizado e programas de educação em saúde contextualmente adaptados à realidade amazônica, especialmente nos serviços universitários que já congregam a infraestrutura necessária para essa integração assistência-ensino-pesquisa.

Limitações

O delineamento transversal não permite estabelecimento de causalidade nas associações observadas. A amostragem por conveniência apresenta viés de seleção, limitando representatividade populacional e capacidade de extrapolação. A prevalência autorreferida, sem confirmação laboratorial sistemática, sujeita-se a viés de memória e aferição diferencial. O tamanho amostral reduzido para análise de diabetes (n=17) compromete poder estatístico para detectar associações. A homogeneidade relativa da amostra quanto aos determinantes sociais pode ter mascarado importantes gradientes de desigualdade. Estudos com amostras maiores, incorporando biomarcadores objetivos como hemoglobina glicada, com delineamentos longitudinais, seriam necessários para aprofundar compreensão da epidemiologia destas condições em ambientes clinico-escola na região amazônica.

CONCLUSÃO

Este estudo evidenciou uma expressiva carga de doenças crônicas não transmissíveis entre usuários de serviços universitários de saúde na Amazônia Brasileira, com prevalências que superam os parâmetros regionais e nacionais. O perfil dos participantes revelou alta vulnerabilidade socioeconômica e um expressivo predomínio de mulheres na busca por assistência. Verificou-se que o componente genético e o histórico familiar atuam como determinantes preponderantes para a ocorrência dessas condições, sobrepondo-se aos fatores sociais tradicionais nesta população específica.

O controle clínico mostrou-se insatisfatório, caracterizado por um descompasso entre a percepção subjetiva de autocuidado e a efetividade do controle metabólico. As disparidades de gênero identificadas, com indicadores de controle mais desfavoráveis entre os homens, apontam para a necessidade de priorizar políticas públicas locais voltadas à saúde do homem e ao rastreio ativo de complicações crônicas. Intervenções baseadas em evidências, como a implementação do cuidado farmacêutico sistemático, o acompanhamento nutricional estruturado e programas multidisciplinares de educação em saúde, são fundamentais para transpor as barreiras da adesão terapêutica.

Por fim, sugere-se a realização de pesquisas futuras com delineamentos longitudinais e intervencionais para aprofundar a compreensão da história natural dessas patologias e validar a eficácia de estratégias assistenciais personalizadas no contexto amazônico.

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