Epidemiological profile of elderly diabetic patients admitted to a University Hospital in western Paraná

Perfil epidemiológico de pacientes diabéticos idosos internados em um Hospital Universitário do Oeste do Paraná

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ABSTRACT

Introduction: Diabetes is a metabolic condition characterized by hyperglycemia due to problems in insulin secretion or action. Objectives: To identify the prevalence of diabetes in the elderly population, characterizing the patterns of occurrence of the disease and investigating possible gender and age disparities, as well as the influence of sociodemographic factors and comorbidities. Methodology: Retrospective longitudinal observational study in which data from patients with *diabetes mellitus* admitted to a University Hospital in Western Paraná from 2015 to 2022 were analyzed. Results: The results revealed a significant prevalence of diabetes, with the majority of patients being male and presenting a sociodemographic profile characterized by married, white ethnicity and Catholic. The main causes of hospitalizations were urinary focus sepsis, urinary tract infection, and pulmonary focus sepsis, while hypertension was the most prevalent comorbidity. Hospital evolution showed that most patients were discharged, with a significant proportion of deaths. Conclusion: The importance of a multidisciplinary and individualized approach to the management of diabetes in the elderly is highlighted, in addition to the need to consider contextual and population factors in the interpretation of epidemiological data.

Keywords: Diabetes mellitus, Prevalence, Multidisciplinary approach.

INTRODUCTION

Diabetes *mellitus* (DM) is considered a pandemic, with about 415 million people affected in 2015. This number is estimated to increase to 642 million individuals by 2040 (VICENTE-HERRERO et al., 2019). It is a metabolic condition characterized by hyperglycemia due to problems in the secretion or action of insulin. This can lead to chronic damage to organs such as the eyes, kidneys, nerves, heart, and blood vessels. Symptoms include increased thirst, frequent urination, weight loss, and blurred vision. Severe acute complications include ketoacidosis and hyperosmolar nonketotic syndrome. In the long term, diabetes can cause problems such as retinopathy, nephropathy, peripheral neuropathy, cardiovascular disease, and hypertension (AMERICAN DIABETES ASSOCIATION, 2010).

Diabetes in the elderly is linked to an increased risk of premature death and a higher incidence of other medical conditions, including relevant geriatric syndromes. This situation can have a negative impact on functional capacity, autonomy and quality of life, affecting not only the patient, but also the health system and family members. Older adults with diabetes often face polypharmacy (simultaneous use of multiple medications), increased risk of falls and fractures due to osteoporosis, cognitive and mobility decline, and chronic pain. Considering this complexity, it is essential to adopt an individualized and compassionate approach to their treatments (RAMOS et al., 2017).

The growing number of elderly people in the population, both in developed and developing nations, significantly influences the epidemiology of chronic diseases, such as diabetes and its association with other chronic non-communicable diseases, as well as hypertension. This variation in the distribution of the elderly population and the prevalence of diseases such as diabetes is the result of a complex interplay of social, economic, cultural, environmental, and political factors, along with individual characteristics, including sociodemographic and behavioral aspects. In Brazil, a country with a vast territorial extension, such disparities are particularly evident, with different regions presenting different sociodemographic and epidemiological contexts (FRANCISCO et al., 2018).

University hospitals play a crucial role in epidemiological research, allowing the detailed study of health and disease manifestations in different populations, including elderly diabetic patients. Epidemiology, as a science, seeks to understand the distribution of diseases and their determinants in different human groups. Thus, presenting as its main method the provision of continuous information that can support decision-making aimed at benefiting the health of the population (SILVA, 2008).

Understanding the epidemiological profile of elderly diabetic patients hospitalized in health institutions is essential to guide prevention, diagnosis, and treatment strategies for this vulnerable population. Diabetes mellitus, especially in the elderly, is associated with serious complications and significant costs to the healthcare system. However, the specific characteristics of this population within the hospital context still need to be investigated in detail. Therefore, this study seeks to fill this gap by providing essential information that can inform targeted health policies and more effective clinical practices for the management of diabetes in hospitalized older adults.

This study aims to identify the prevalence of diabetes among the admitted elderly, as well as to characterize the patterns of occurrence of the disease, including associated risk factors, frequent comorbidities, and relevant clinical outcomes. In addition, it seeks to investigate possible disparities in gender, age, and other demographic or clinical variables that may influence the presentation and management of diabetes in this specific population. The results of this study aim to contribute to a better understanding of the epidemiology of the disease in hospitalized older adults, supporting the development of more effective prevention and intervention strategies.

METHODOLOGY

This was a retrospective longitudinal observational study involving patients with *diabetes mellitus* admitted to a university hospital from January 1, 2015 to December 31, 2022. The study was carried out using data collected by the researcher from patient records after approval by the Ethics Committee and from the hospital's database, which contains data on the health and pharmacological process of the population to be studied.

The following criteria were considered for data collection in the medical records: age, gender, month of admission to the hospital, length of hospital stay, comorbidities, and patient evolution. The inclusion criteria were taken into account for the analysis of the medical records: patients who had been diagnosed with *diabetes mellitus*, patients in whom the hospital admission and follow-up form contained elements that satisfied the research data collection, and patients who had remained in the hospital for more than 24 hours, of all age groups. Hospitalized patients who did not have a diagnosis of *diabetes mellitus* or who did not contain complete information were excluded from the study, in order to be carefully analyzed.

These data were made available through the Tasy management software, which provides a computerized means of patient care and monitoring. The data were organized and tabulated in Microsoft Excel® and later analyzed in the Statistical Analysis Software (SAS), version 9.4. The results were expressed as means, standard deviations ($\pm$ SD) or frequencies. The association between the qualitative variables was verified using the Chi-square or Fisher's exact tests. Quantitative variables were analyzed using the Wilcoxon test and the Student's t-test. Statistical significance was set at $p < 0.05$. Access to the Hospital's medical records was made after approval by the Research Ethics Committee of the Assis Gurgacz Foundation, number 6,210,411, dated 07/31/2023.

RESULTS AND DISCUSSION

Of the total of 37 patients, 19 (51.35%) were male and 18 were female (48.65%), as shown in Figure 1. The mean age of all patients with diabetes who were admitted to the hospital was 78.75 years, median 79 years, mode 76, standard deviation 7.55 and Interquartile ratio (IQR) 12. In relation to these same variables, but analyzed separately by gender, we have: male gender (mean = 76.94, median = 76, mode = 76, standard deviation = 6.89, RIQ = 12) and female gender (mean = 80.66, median = 81.5, mode = 40, standard deviation = 7.94, RIQ = 10.25). However, Student's t-test for independent samples showed no statistically significant difference between the mean ages of the two groups (t(80.15) = -1.28, p = 0.203). Therefore, there is

insufficient evidence to reject the null hypothesis that there is no significant difference in mean age between male and female patients. These findings suggest that gender does not significantly influence the age of the diabetic patients in this study.

In a study on hospitalizations for *diabetes mellitus* in the state of Paraná, it was found that 61.6% of hospitalizations for this condition were of female patients, revealing that 23.9% of individuals with *diabetes mellitus* had already been hospitalized due to the disease, increasing the probability of hospitalization from two to six times due to its complications (SANTOS et al., 2015). These results point to variations in hospitalizations between the sexes, illustrated by Figure 1, highlighting the importance of considering factors such as diabetes complications and gender in the analysis of hospitalizations related to this disease.

Figure 1. Number of elderly diabetic patients hospitalized divided by sex between the years 2015 to 2022.
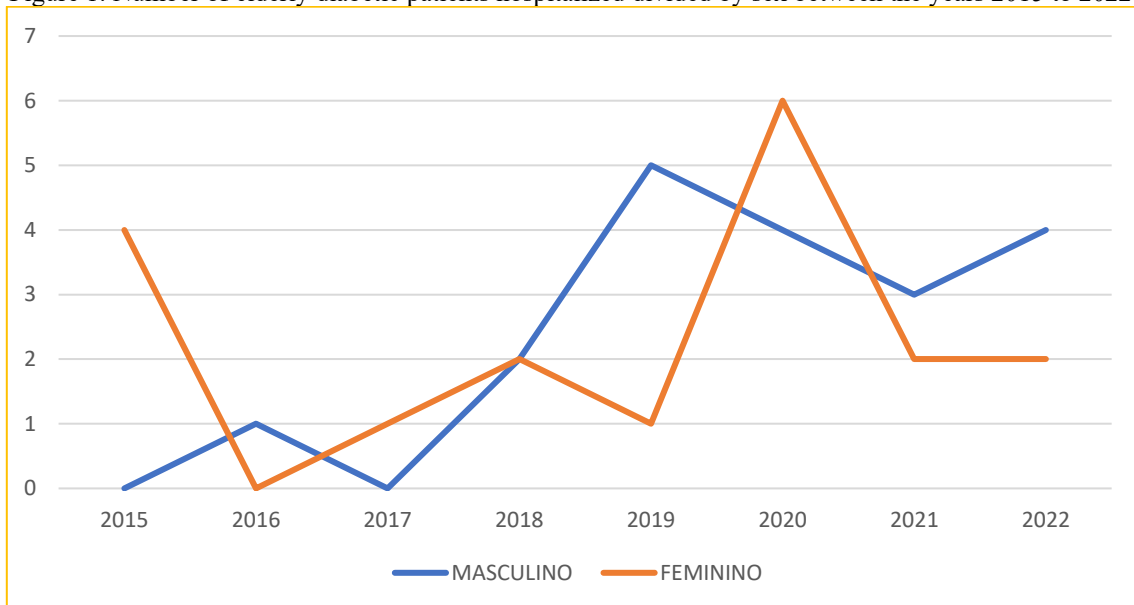
Source: Authors (2024).

The data in Table 1 reveal the sociodemographic profile of the patients studied, highlighting that most are married (62.16%), white (86.48%), follow the Catholic religion (78.40%), are retired (64.86%) and have completed high school (27.02%). In a related study, GALATO et al., investigated the use of medications in the elderly, with a special focus on polypharmacy. The observed frequency was similar in certain variables, such as married marital status and low level of education, comparable to those found in the present study. These findings emphasize the relevance of sociodemographic factors in adherence to drug treatment. Aspects such as the socioeconomic condition of the patients, their level of education, the family support

they receive, and the degree of understanding of the disease they face play crucial roles during this health-disease process.

The most common causes of hospitalizations found in this study can be seen in Figure 2. It is important to note that sepsis of the urinary focus, urinary tract infection, and sepsis of the pulmonary focus were the most common conditions observed in the sample of this study. In a study published by the American Diabetes Society, it was found that the leading causes of hospitalization in patients with a history of diagnosed diabetes were due to cardiovascular, endocrine, respiratory, gastrointestinal, iatrogenic issues, and neoplasms, respectively (SCHNEIDER et al., 2016). The results are contradictory because they depend on the population studied, the influence of the context and location of the studies, trends of changes in the causes of hospitalizations in different locations, as well as factors inherent to the disease itself and the patient.

Figure 2. Hospitalization diagnosis by the number of cases of elderly diabetic patients between the years 2015 and 2022.

Legend: PPL (infected pressure injury), CRF (chronic renal failure), COPD (chronic obstructive pulmonary disease), DM (*diabetes mellitus*), DKA (diabetic ketoacidosis), UTI (urinary tract infection).
Source: Authors (2024).

The drugs used by the patients were recorded in detail in Table 2. It is noteworthy that the mean number of drugs per patient was 5.71. Studies indicate that the use of three or more medications is considered polypharmacy, and is often associated with the elderly and individuals with chronic diseases (DOS SANTOS et al., 2021). In a study conducted by PAGOTTO et al., it was observed that, in addition to oral antidiabetic drugs such as Metformin (66.1%) and Glycazide (7.1%), other drugs of various drug classes frequently used by diabetic patients included Simvastatin (29.5%), Acetylsalicylic Acid (25.9%) and Losartan (25.9%). Some of these drugs showed a higher prevalence in this study.

Table 1. Epidemiological profile of elderly diabetic patients between 2015 and 2022.

MARITAL STATUS	n (%)	RACE	n (%)	RELIGION	n (%)	PROFESSION	n (%)	EDUCATION	n (%)
Divorced	2 (5,40)	Yellow	0 (0)	No data	2 (5,40)	No data	3 (8,10)	No data	5 (13,52)
Married	23 (62,16)	White	32 (86,48)	Baptist	1 (2,70)	Home	5 (13,52)	Illiterate	2 (5,40)
Single	0 (0)	Black	0 (0)	Catholic	29 (78,40)	Farmer	3 (8,10)	Complete fundamental	6 (16,22)
stable union	2 (5,40)	Brown	5 (13,52)	Evangelical	2 (5,40)	Retiree	24 (64,86)	Incomplete fundamental	2 (5,40)
Widower	10 (27,02)			Others	3 (8,10)	Autonomous	1 (2,70)	Full medium	10 (27,02)
						Dressmaker	1 (2,70)	Incomplete midfielder	2 (5,40)
						Agricultural technician	1 (2,70)	Primary	9 (24,33)
								Graduated	1 (2,70)

Source: Authors (2024).

According to SILVA et al., the main comorbidities identified in their study were obesity, dyslipidemia, and hypertension. In this study, hypertension (27%) stood out as the most prevalent comorbidity, followed by dementia (8%) and congestive heart failure (7%). These conditions are frequently observed in this sample group and represent factors that increase the risk of complications and adverse outcomes.

Figure 3. Comorbidities of elderly diabetic patients between 2015 and 2022.
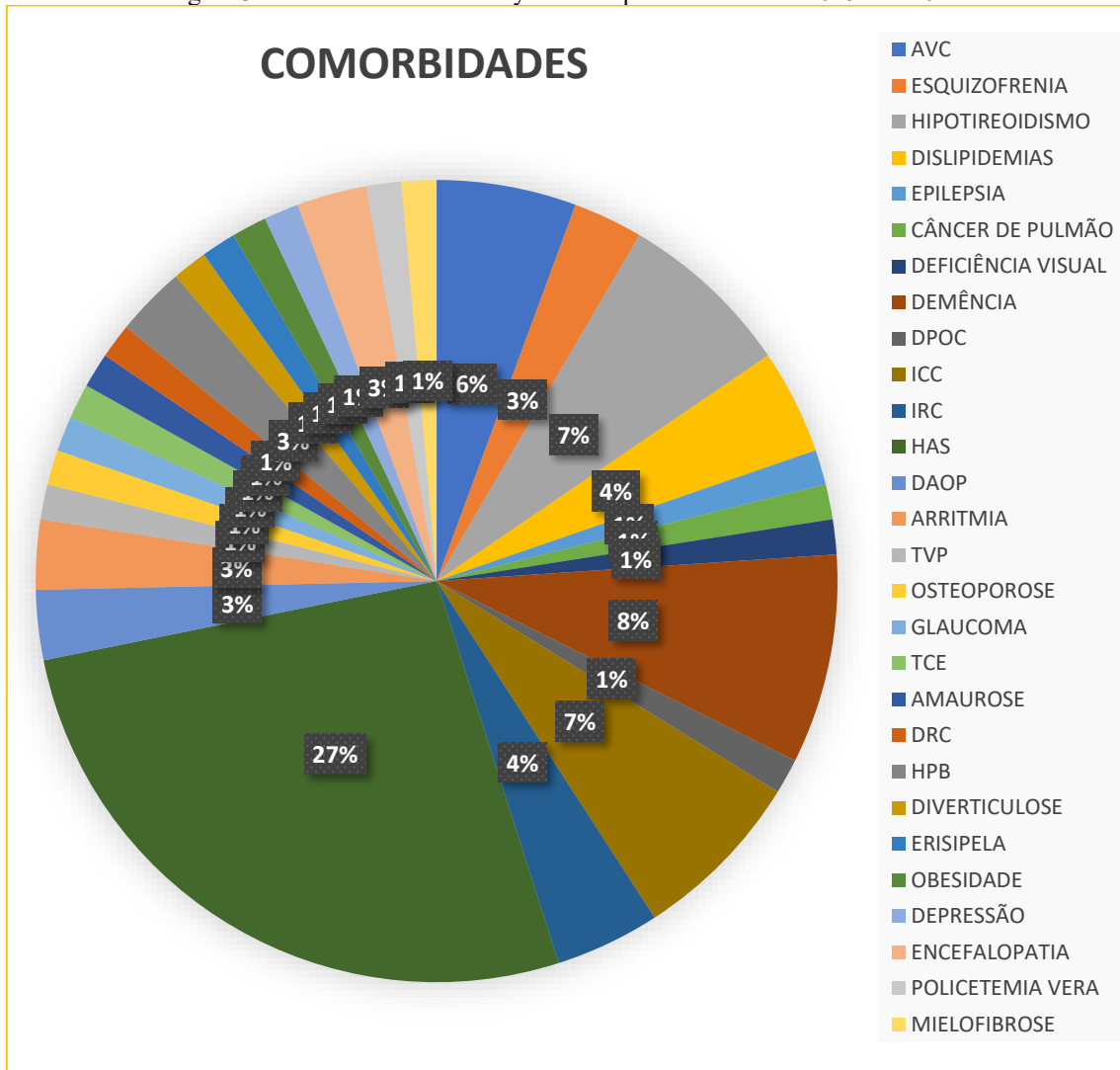
Legend: Stroke (cerebrovascular accident), COPD (chronic obstructive pulmonary disease), CHF (congestive heart failure), CRF (chronic renal failure), SAH (systemic arterial hypertension), PAOD (peripheral arterial obstructive disease), DVT (deep vein thrombosis), TBI (traumatic brain injury), CKD (chronic kidney disease), BPH (benign prostatic hyperplasia).
Source: Authors (2024).

Regarding the hospital evolution of the patients, it was observed that 29 (78.38%) were discharged from the hospital, while 6 (16.22%) died and 2 (5.40%) were transferred to another health unit. A comprehensive survey on various aspects related to hospitalization for *diabetes mellitus* revealed a significant increase in the rate of deaths and cases of hospitalized patients due to this chronic disease. This trend entails direct costs for the health system and families, in addition to contributing to a higher prevalence of complications associated with diabetes (JACOMINI et al., 2023). Given this worrisome scenario, it is crucial to emphasize the importance of proper diabetes management. This involves blood glucose control, regular health

monitoring, adherence to drug treatment, periodic medical follow-up, and implementation of self-care measures to prevent complications and improve patients' health outcomes.

CONCLUSION

The significant prevalence of diabetes in the elderly population and the complexity of the comorbidities identified highlight the importance of a multidisciplinary and individualized approach for the effective management of this health condition. In addition, the discrepancies observed in relation to previous studies underscore the need to consider contextual and population factors when interpreting epidemiological data, thus informing health interventions and policies aimed at improving the care and health outcomes of these patients.

Given the challenges associated with diabetes in the elderly, it is essential to prioritize prevention strategies, early diagnosis, and appropriate treatment to reduce complications and improve quality of life. These findings provide a solid basis for the implementation of more effective clinical practices and health policies aimed at improving clinical outcomes and reducing diabetes-related morbidity and mortality in this vulnerable population.

Table 2. Medicines used by elderly diabetic patients on admission to hospital between 2015 and 2022.

Medicine	N (%)	Medicine	N (%)	Medicine	N (%)	Medicine	N (%)
SINVASTATINA	7 (5.30%)	LOSARTANA	5 (3.79%)	METFORMINA	4 (3.03%)	AAS	4 (3.03%)
GLIFAGE	4 (3.03%)	PROLOPA	4 (3.03%)	MARITAL STATUS	n	RACE	n
RELIGION	n	PROFESSION	n	SCHOOLING	n	Divorced	2
Yellow	0	No data	2	No data	3	No data	5
Married	23	White	32	Baptist	1	Home	5
Illiterate	2	Single	0	Black	0	Catholic	29
Farmer	3	Complete Fundamental	6	Stable union	2	Brown	5
Evangelical	2	Retired	24	Incomplete Fundamental	2	Widower	10
RETENIC	1 (0.76%)	Other	3	Autonomous	1	Complete High School	10
HIDROCLOROTIAZIDA	1 (0.76%)	DESVENLAFAXINA	1 (0.76%)	GLIBENCLAMIDA	1 (0.76%)	Seamstress	1
Incomplete high school	2	DOXASOZINA	1 (0.76%)	PRIMADONA	1 (0.76%)	MIRTAZARPINA	1 (0.76%)
Agricultural Technician	1	Primary	9	OMEGA 3	1 (0.76%)	FENOBARBITAL	1 (0.76%)
TAVOK	1 (0.76%)	FLUIMICIL	1 (0.76%)	Full Superior	1	ATACAND	1 (0.76%)
GALVUS	1 (0.76%)	GIARDIANCE	1 (0.76%)	LIPITOR	1 (0.76%)	EFEXOR	1 (0.76%)
DECADRON	1 (0.76%)	MANTIDAN	1 (0.76%)	DEPAKENE	1 (0.76%)	NESINA MET	Medicament

N (%)	Medicament	N (%)	Medicament	N (%)	Medicament	N (%)	SINVASTATIN
7 (5.30%)	LOSARTANA	5 (3.79%)	METFORMIN	4 (3.03%)	AAS	4 (3.03%)	GLOSSING
4 (3.03%)	PROLOPA	4 (3.03%)	LEVOTHYROXINE	3 (2.27%)	NPH INSULIN	3 (2.27%)	FUROSEMIDE
3 (2.27%)	SERTRALINE	3 (2.27%)	QUETIAPINA	3 (2.27%)	OMEPRAZOLE	3 (2.27%)	AMITRIPTILINA
2 (1.52%)	LASIS	2 (1.52%)	ATENOLOL	2 (1.52%)	ANLODIPINO	2 (1.52%)	HOLMES
2 (1.52%)	SELOZOK	2 (1.52%)	READY	2 (1.52%)	BISOPROLOL	2 (1.52%)	ROSUVASTATINA
2 (1.52%)	TANSULOSIN	2 (1.52%)	PANTOPRAZOLE	2 (1.52%)	PREDNISONE	2 (1.52%)	INSULIN
2 (1.52%)	CONCOR	2 (1.52%)	CALCIUM	2 (1.52%)	VITAMIN D	2 (1.52%)	SIVACTATINA
1 (0.76%)	DIOVAM	1 (0.76%)	GABAPENTINA	1 (0.76%)	CARVEDILOL	1 (0.76%)	RETENIC
1 (0.76%)	CODATA	1 (0.76%)	CYPROFIBRATE	1 (0.76%)	HALOPERIDOL	1 (0.76%)	HYDROCHLOROTHIAZIDE

Source: Authors (2024).

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