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Original Article

Epidemiological profile of people with type 2 diabetes and characterization of the foot: a cross-sectional study

Perfil epidemiológico de pessoas com diabetes tipo 2 e caracterização do pé: um estudo transversal
Perfil epidemiológico de las personas con diabetes de tipo 2 y caracterizacióndel pie: unestudio transversal

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ABSTRACT

Background and Objectives: To identify more vulnerable population groups and guides preventive actions, the study aimed to understand the epidemiological profile, characterize the foot and identify the presence of neuropathy in individuals with type 2 diabetes at an outpatient clinic in the Federal District. **Methods:** This was a cross-sectional, quantitative and descriptive study. Data were collected through therapeutic evaluation and analysis of medical records of people with type 2 diabetes at the Specialized Outpatient Clinic of the Health Department of the Federal District, in the period between 2022 and 2023, using convenience sampling. **Results:** 67 people were included, of whom were female 35 (52,2%), elderly 41 (61,1%) and on a low income 47 (64,1%). The following characteristics were observed: glycated hemoglobin ≥7% (87,5%) and the presence of integumentary and circulatory alterations. In addition, 31 (46,2%) of the individuals showed signs of diabetic peripheral neuropathy. **Conclusion:** It was observed that women, the elderly and people on low incomes had diabetes in a state of decompensation, and almost half of the sample had peripheral neuropathy.

Keywords: *Diabetes Mellitus, Type 2. Epidemiology. Secondary Care. Diabetic Neuropathies. Diabetic Foot.*

RESUMO

Justificativa e Objetivos: Para identificar grupos populacionais mais vulneráveis e direcionar ações preventivas, o estudo teve como objetivo conhecer o perfil epidemiológico, caracterizar o pé e identificar a presença de neuropatia em indivíduos com diabetes tipo 2 em um ambulatório no Distrito Federal. **Métodos:** Estudo transversal, quantitativo e descritivo. Os dados foram coletados através de avaliação terapêutica e análise de prontuários de pessoas com diabetes tipo 2 do Ambulatório Especializado da Secretaria de Saúde do Distrito Federal, no período entre 2022 e 2023, a partir de amostragem por conveniência. **Resultados:** Foram incluídos 67 pessoas, sendo a maioria do sexo feminino 35 (52,2%), idosos 41 (61,1%) e baixa renda 47 (64,1%). Observou-se as seguintes características: hemoglobina glicada ≥7% (87,5%) e destacou-se a presença de alterações tegumentares e circulatórias relacionadas ao exame do pé. Além disso, 31 (46,2%) dos indivíduos apresentaram sinais de neuropatia periférica diabética. **Conclusão:** Observou-se que mulheres, idosos e pessoas de baixa renda apresentaram diabetes em estado de descompensação, quase metade da amostra apresentou neuropatia periférica.

Descritores: *Diabetes Mellitus Tipo 2. Epidemiologia. Atenção Secundária à Saúde. Neuropatias Diabéticas. Pé Diabético.*

RESUMEN

Justificación y Objetivos: Para identificar grupos de población más vulnerables y dirigir acciones preventivas, el estudio tuvo como objetivo comprender el perfil epidemiológico, caracterizar el pie e identificar la presencia de neuropatia em indivíduos con diabetes tipo 2 em um ambulatório del Distrito Federal. **Método:** Se trata de un estudio transversal, cuantitativo y descriptivo. Los datos se recolectaron a través de la evaluación terapéutica y el análisis de las historias clínicas de las personas con diabetes tipo 2 en la Consulta Externa Especializada de la Secretaría de Salud del Distrito Federal, en el período comprendido entre 2022 y 2023, utilizando un muestreo de conveniencia. **Resultados:** Fueron incluidas 67 personas, siendodel sexo femenino 35 (52,2%), ancianos 41 (61,1%) y de baja renta 47 (64,1%). Se observaronlassiguientes características: destacaba una hemoglobina glucosilada ≥7% (87,5%) y la presencia de alteraciones tegumentarias y circulatorias. Además, 31 (46,2%) de los individuos presentaban signos de neuropatía periférica diabética. **Conclusión:** Se observó que las mujeres, los ancianos y las personas con bajo singresostenían diabetes en estado de descompensación, y casi la mitad de la muestra presentaba neuropatía periférica.

Palabras Clave: *Diabetes Mellitus Tipo 2. Epidemiología. Atención Secundaria de Salud. Neuropatías Diabéticas. Pie Diabético.*

INTRODUCTION

Diabetes Mellitus is a metabolic condition characterized by the loss of glycemic homeostasis that culminates in chronic hyperglycemia, due to insufficient production and/or action of the hormone insulin.[1,2] In 2021, in the 10th edition of the International Diabetes Federation – Diabetes Atlas, it was estimated that 537 million adults aged between 20 and 79 years lived with diabetes in the world, and this number is expected to increase to 783 million by 2045. In the same period, in Brazil, there were approximately 15.7 million people living with diabetes, a prevalence of 10.5% in the adult population, therefore, it is a health problem of great epidemiological relevance.[1]

Currently, there are several types of diabetes, however, type 2 Diabetes Mellitus stands out, which accounts for approximately 90 to 95% of all cases of diabetes, characterized by the progressive loss of insulin secretion combined with insulin resistance, which leads to a state of chronic hyperglycemia.[3] The World Health Organization defines that chronic hyperglycemia is associated with significant micro and macrovascular complications, increased morbidity, reduced quality of life and increased mortality rates among people with diabetes.[4] It is also known that the development of complications related to diabetes is associated with both cultural, economic and social changes and the aging of the population.[5] In addition, the costs of diabetes and its complications have been increasing exponentially every year, directly impacting the Unified Health System and Brazilian society.[6]

Among the complications caused by diabetes, diabetic foot stands out, which manifests itself through infections, ulcerations and/or destruction of soft tissues and is considered the main cause of non-traumatic amputation of the lower limbs.[2] This occurs due to diabetic peripheral neuropathy that affects the peripheral nervous system and presents as a diffuse, symmetrical, distal and progressive lesion of the sensory-motor and autonomic fibers.[7] It is believed that diabetic peripheral neuropathy occurs due to chronic hyperglycemia which, in short, in the long term, causes changes in insulin balance that lead to a partial reduction in the activity of neuronal growth factors, which impacts the formation of neurofilaments and maintenance of axonal transport, leading to axonal degeneration and apoptosis of the neuronal body, causing neuropathy to gradually set in. In addition, diabetic foot can occur due to cardiovascular factors related to hyperglycemia, such as reduced blood flow, increased vascular resistance and decreased oxygen tension.[8]

Diabetic peripheral neuropathy is diagnosed clinically and is based on altered neurological tests or signs, based on the evaluation of fine nerve fibers (thermal and pain sensitivity and sudomotor function) and coarse nerve fibers (tendon reflexes, vibration and tactile sensitivity). The tests for checking for alterations in coarse fibers include: Diabetic Peripheral Neuropathy-Check, Bioesthesiometer, 10g Semmes-Weinstein Monofilament and 128 Hz Tuning Fork. And, for coarse and fine fibers: Modified Toronto Score, Neuropathic Impairment Score, Michigan Score and for fine fibers the NeuroPad test.[7]

Based on this, knowing the epidemiological profile of people with Type 2 Diabetes Mellitus is important to understand the distribution of risk factors related to the disease, as well as the tracking and monitoring of diabetic peripheral neuropathy through specific tests useful in the prevention and progression of the disease and, based on a clinical and functional diagnosis, it is possible to consider the best approach for individuals. Therefore, this study aims to characterize the epidemiological profile and identify the presence of neuropathy in individuals with type 2 diabetes, in an outpatient clinic in the Federal District.

METHODS

This is a cross-sectional, quantitative and descriptive study. Data collection was carried out at a Specialized Outpatient Clinic of the Health Department of the Federal District. The study obtained its data through convenience sampling from the outpatient clinic's own appointments for foot assessments of individuals with diabetes, during the years 2022 and 2023. People with diabetes, already scheduled for the outpatient clinic, were invited to participate in the project. After acceptance, they were informed about the ethical issues and, after signing the term, the pre-established assessments and analysis of medical records began.

Regarding the eligibility of the study population, the inclusion criteria were: people with type 2 diabetes, of both genders, who were over 18 years old with at least 5 years since the diagnosis. Besides this, the exclusion criteria were: active ulcers on the feet at the time of the assessment, amputation of the lower limb and/or incomplete medical records. Two forms were used during data collection. The first was the "*Functional Assessment of the Diabetic Foot*", which is an adapted form that contains variables related to sociodemographic characteristics: gender, age, self-reported skin color, education, occupation, family income, and marital status. The following are also related to clinical characteristics: time since diagnosis, weight, height, body mass index, glycated hemoglobin, blood glucose monitoring, associated diseases, and medications.[3,4,7]

The second is the "*Form for Assessment of Neuropathy and Peripheral Arterial Disease*", which is a form used by the outpatient clinic itself to diagnose diabetic peripheral neuropathy and peripheral arterial

disease. This study used the following variables: Skin aspects (Dry skin, cracks, fissures; Altered skin color; Mycoses (interdigital and nail); Absence of hair; Calluses). Structural aspects (High-arched foot; Collapsed arch; Valgus; Claw toes; Reduced joint mobility; Previous ulcer). Neurological aspects (Absent 10g monofilament in any area of the test; Absent Achilles reflex (reflex hammer); Diminished or absent sensitivity (vibration, pain and heat). Circulatory aspects (Edema; Dilated dorsal vessels; Diminished or absent bilateral pulses (posterior tibial and pedal).[3,4,7]

With this form it was also possible to establish the Neuropathic Symptom Score and the Neuropathic Impairment Score, the latter being recommended by the Brazilian Diabetes Society for the definitive diagnosis of diabetic peripheral neuropathy. The first score is scored through questions related to the most frequent symptoms and the second is scored based on neurological tests, which were tested on both feet, with the subject's eyes closed, so that there would be no interference in the result.[7] All procedures were performed after invitation, consent and signing of the Free and Informed Consent Form.

The collected data were typed and organized in spreadsheets using a double-entry validation technique. For analysis, the information was distributed in tables containing the quantitative variables with calculation of absolute and relative frequency, mean and standard deviation. For the qualitative variables, the absolute and relative frequency values were calculated. Microsoft Office Excel 10® software and the EPI INFO program version 7.2.5.0 were used.

This study was approved on January 31st, 2022 by the Institutional Ethics Committee of the University of Brasília and the Foundation for Teaching and Research in Health Sciences through opinion number 5,217,470.

RESULTS

Although there were 80 recruited individuals, and due to the eligibility criteria, 13 individuals were excluded for the following reasons: active foot ulcer (4), lower limb amputation (4), and failure to complete the assessment (5). Finally, 67 individuals with Type 2 Diabetes Mellitus were included.

The sociodemographic variables that presented the highest percentages were: female gender (52.2%), age ≥60 years (61.1%), self-declared white skin color (38.8%), complete or incomplete primary education (50.7%), retired (59.7%), family income between one and two minimum wages (64.1%), and married marital status (61.1%) (Table 1).

Table 1. Descriptive analysis of sociodemographic variables of the Outpatient Clinic of the Health Department of the Federal District, 2022-2023.

Variables	N (%)	Mean (standard deviation)
Gender (n=67)		
Female	35 (52.2)	
Male	32 (47.7)	
Age (n=67)		62.6 (±8.24)
< 60 years old	26 (38.8)	
≥ 60	41 (61.1)	
Self-declared skin color (n=67)		
Yellow	3 (4.4)	
White	26 (38.8)	
Brown	16 (23.8)	
Other	2 (2.9)	
Black	20 (29.8)	
Education (n=67)		
Illiterate	7 (10.4)	
Complete or incomplete primary education	34 (50.7)	
Complete or incomplete secondary education	16 (23.8)	
Complete or incomplete higher education	10 (14.9)	
Occupation (n=67)		
Retired	40 (59.7)	
Unemployed	10 (14.9)	
Employed	17 (25.3)	
Family income (n=67)		
1 to 2 minimum wages	47 (64.1)	
3 to 4 minimum wages	9 (13.4)	
More than 4 minimum wages	15 (22.3)	
Marital Status (n=67)		
Married	41 (61.1)	
Divorced	6 (8.9)	
Single	12 (17.9)	
Widow	8 (11.9)	

The clinical variables that stand out are: time since diagnosis ≥10 years (82.0%), mean body mass index of 29.1 kg/m² (standard deviation ±5.7) with most people being overweight (43.2%), mean glycated hemoglobin of 8.8% (standard deviation ±1.7) with a predominance of glycated hemoglobin ≥7% (87.5%), capillary blood glucose monitoring <3 times a day (77.6%) and use of insulin (94.0%). Among the comorbidities associated with diabetes, hypertension stands out (71.6%) (Table 2).

Table 2. Descriptive analysis of clinical variables at the Outpatient Clinic of the Health Department of the Federal District, 2022-2023.

Variables (n=67)	N (%)	Mean (standard deviation)
Time since diagnosis (n=67)		16% (±7.62)
< 10 years	12 (17.9)	
≥ 10 years	55 (82.0)	
Weight (n=67)		77.7 (±16.4)
High (n=67)		1.63 (±0.1)
Body Mass Index (n=67)		29.15 (±5.7)
Normal	14 (20.9)	
Overweight	29 (43.2)	
Grade I Obesity	15 (22.3)	
Grade II Obesity	6 (8.9)	
Grade III Obesity	3 (4.4)	
Glycated hemoglobin (n=67)		8.8 (±1.7)
< 7%	8 (12.5)	
≥ 7%	56 (87.5)	
Glycemic monitoring (n=67)		
< 3x per day	52 (77.6)	
≥ 3x per day	10 (14.9)	
does not monitor	5 (7.4)	

Variables (n=67)	N (%)	Mean (standard deviation)
Associated comorbidities (n=67)		
Hypertension	48 (71.6)	
Dyslipidemia	26 (38.8)	
Former smoker	12 (17.9)	
Medications (n=67)		
Diabetes	57 (86.3)	
Cholesterol	36 (54.5)	
Hypertension	34 (50.7)	
Insulin	63 (94.0)	

Regarding the results related to the examination of the diabetic foot, among integumentary and structural characteristics, the following stand out: dry, cracked or fissured skin (95.5%), calluses (89.5%), nail mycosis (65.6%), in addition to limited joint mobility (47.7%). Regarding neurological characteristics, most of the volunteers (55.2%) had reduced or absent vibratory sensitivity, and 19 (28.3%) were classified as neuropathic through the 10g Semmes-Weinstein Monofilament test. Regarding the circulatory characteristics with the highest percentage were: dilated dorsal vessels (65.6%), decreased or absent right posterior tibial pulse (50.7%), decreased or absent left posterior tibial pulse (49.2%), decreased or absent pedal pulses in both feet (22.3%). Among the subjects who presented changes in their pulses, only six underwent the Ankle-Brachial Index test. Furthermore, only 1 (1.4%) person presented changes suggestive of cardiovascular disease risk due to the Ankle-Brachial Index result being >1.30º, which suggests the presence of calcification. The others were within the normal range without the presence of peripheral arterial disease (Table 3).

From this, through the score obtained with the evaluation of the Achilles reflex, vibration, pain and temperature, a total of 31 (46.2%) people with signs of diabetic peripheral neuropathy (>2) were observed, of which 23 (34.3%) presented mild signs, 8 (11.9%) presented moderate signs and no subject presented severe neuropathic signs, according to the Neuropathic Impairment Score.

Table 3. Descriptive analysis of foot characterization and identification of neuropathic signs at the Outpatient Clinic of the Health Department of the Federal District, 2022-2023.

Variables	N (%)
Skin aspects	
Dry skin, cracks, fissures (n=67)	64 (95.5)
Changes in skin color (n=67)	12 (17.9)
Interdigital mycosis (n=67)	15 (22.3)
Ungual mycosis (n=67)	44 (65.6)
Absent hair (n=67)	24 (35.8)
Calluses (n=67)	60 (89.5)
Structural aspects	
High-arched foot (n=67)	5 (7.4)
Collapsed arch (n=67)	1 (1.4)
Valgus (n=67)	23 (34.3)
Claw toes (n=67)	20 (29.8)
Limited joint mobility (n=67)	32 (47.7)
Previous ulcer (n=67)	11 (16.4)
Neurological aspects	
Monofilament 10g absent in any test area (n=67)	19 (28.3)
Absent Achilles reflex (n=67)	19 (28.3)
Decreased or absent vibratory sensitivity (n=67)	37 (55.2)
Decreased or absent pain sensitivity (n=67)	15 (22.3)
Decreased or absent thermal sensitivity (n=67)	15 (22.3)
Circulatory aspects	
Edema (n=67)	16 (23.8)
Dorsal dilated vessels (n=67)	44 (65.6)
Decreased or absent right posterior tibial arterial pulse (n=67)	34 (50.7)
Decreased or absent left posterior tibial arterial pulse (n=67)	33 (49.2)
Decreased or absent right dorsalis pedis pulse (n=67)	15 (22.3)
Decreased or absent left dorsalis pedis pulse (n=67)	15 (22.3)
Change in ankle-brachial index (n=67)	1 (1.4)
Neuropathic Sign Score	
Normal (0-2)	36 (53.7)
Mild (3-5)	23 (34.3)
Moderate (6-9)	8 (11.9)
Severe (9-10)	0 (0.0)

Regarding the occurrence of neuropathic symptoms, there was a predominance of burning, numbness or tingling (61.1%), in the feet (61.1%), at night (49.2%) and, to alleviate the symptoms, the volunteers walked (61.1%). At the time of collection, more than half of the people were using inadequate footwear (53.7%). Based on the score obtained through the Neuropathic Symptom Score, the majority had severe symptoms (37.3%) (Table 4).

Table 4. Descriptive analysis of the identification of neuropathic symptoms at the Outpatient Clinic of the Health Department of the Federal District, 2022-2023.

Variables	N (%)
Neuropathic symptoms	
Burning, numbness, or tingling (n=67)	41 (61.1)
Fatigue, cramping, or pain (n=67)	17 (25.3)
Asymptomatic (n=67)	9 (13.4)
Most common location of symptoms	
Feet (n=67)	41 (61.1)
Legs (n=67)	17 (25.3)
Other (n=67)	9 (13.4)
Time of day when symptom occurs	
Night (n=67)	33 (49.2)
Day and night (n=67)	18 (26.8)
Day (n=67)	16 (23.8)
Have you ever woken up at night because of the symptom (n=67)	27 (40.3)
What relieves the symptom?	
Walking (n=67)	41 (61.1)
Standing up (n=67)	11 (16.4)
Sitting or lying down (n=67)	15 (22.3)
Inappropriate footwear (n=67)	36 (53.7)
Neuropathic Symptom Score	
Normal (0-2)	10 (14.9)
Mild (3-4)	10 (14.9)
Moderate (5-6)	22 (32.8)
Severe (7-9)	25 (37.3)

DISCUSSION

In the present study, it was observed that the majority of the sample was composed of women, which is similar to other findings in the literature, in studies that also characterize the epidemiological profile of people with Type 2 Diabetes Mellitus, treated in outpatient services, in which the percentage of more than 70% is composed of women. One of these findings was carried out in a

reference center in Aracaju - Sergipe and the other in an Endocrinology Outpatient Clinic of the Lauro Wanderley University Hospital, located in João Pessoa – Paraíba.[9,10] This can be attributed to the fact that women diagnosed with diabetes are the main users of health services, due to a greater concern regarding their own health when they present physical signs and symptoms of diseases.[10,11] In addition, elderly individuals aged ≥60 years are predominant in seeking medical services, considering that this is the period of life most affected by complications caused by type 2 diabetes.[10]

It is believed that the low level of education seen among diabetics may be associated with modifiable risk factors, such as sedentary behavior, physical activity, BMI, smoking, and excessive television watching. A study conducted with the population of the United Kingdom demonstrated that directly intervening in the educational level contributes to the efficiency in improving health and reducing mortality.[12] A study conducted in João Pessoa - Paraíba is similar in that most of the individuals studied were elderly, retired, and with an income between 1 and 2 minimum wages, which corresponded to approximately more than 50% of the sample.[10] This fact may compromise the ability of elderly people to maintain care for a good diet, use of medications, undergo periodic examinations, issues that imply in the preservation of health and, directly, in the control of the disease.[10] It was identified in the sample that the majority were married, suggesting that marital cohabitation may be beneficial and perhaps contribute to health care, enabling chances of success in treatment and self-care.[10]

The predominance of time since diagnosis ≥10 years was quite pronounced, and the literature states that this may influence the treatment of these subjects, since, due to the longer time since diagnosis, it is assumed that experience with the disease provides more information about the pathology. On the other hand, the longer time may lead to a lack of motivation to follow diabetes care, as a consequence of the lack of effective results, given the chronic condition.[13] According to the World Health Organization classification, overweight individuals have a body mass index greater than 25 kg/m².[14] In this study, a considerable percentage was classified as overweight, which corroborates the literature, which indicates that obesity has a high prevalence in all age groups of both sexes and on a global scale, being a consequence of unhealthy diets, lack of physical activity and environmental factors.[15] In other words, obesity is one of the main risk factors, especially visceral obesity, thus aggravating cardiovascular risk and disturbances in glucose-insulin homeostasis.

It is considered that the diabetic individual with the greatest need for glycemic control is the one with glycated hemoglobin values ≥7%, this being an indirect measurement of glycemia used as a predictor parameter to avoid complications.[2] In this study, the average glycated hemoglobin values were higher, and it is described in the literature that the association between long-term glucose variability can induce cardiovascular complications. Oxidative stress, low-grade inflammation and endothelial dysfunction can be the main drivers.[16] Therefore, it is recommended that these people undergo laboratory tests at least every quarter to better control the disease.[2] For adults with Type 2 Diabetes Mellitus using basal insulin or oral hypoglycemic agents, there is little evidence on the number of capillary blood glucose tests required daily. However, it is suggested that capillary blood glucose monitoring in people undergoing insulin treatment be performed at least four times a day, demonstrating that the greater frequency of capillary blood glucose monitoring is associated with improved glycated hemoglobin.[2] Systemic Arterial Hypertension was observed in most individuals with type 2 diabetes.

In these cases, intensive blood pressure control is suggested, since the treatment of hypertension in diabetic individuals is a protective factor for micro and macrovascular outcomes.[2] Therefore, the coexistence of chronic diseases such as hypertension and diabetes is indicated as an important risk factor for systemic complications, increasing the percentage of mortality and generating higher costs for the health system.[17] A Korean study points to a high rate of patients with diabetes mellitus and hypertension, since hypertension is associated with a higher risk of heart failure, atrial fibrillation, chronic kidney disease, valvular and coronary heart disease, dementia and stroke, and adequate control of hypertension is necessary.[18]

Based on the descriptive analysis of the foot examination, dry skin, with cracks or fissures, as well as calluses and nail fungus stand out. The literature describes that dry skin and calluses can occur from ineffective care, such as not using oils or moisturizing creams and wearing inappropriate footwear. Thus, it is known that some daily care for the feet of individuals with diabetes is necessary to prevent such aspects. However, in the sample, risk factors for the development of diabetic foot were observed, thus corroborating a study that presents data similar to this one, with the main comorbidities found being dry feet, calluses and cracks.[19]

Mycoses were one of the most common findings, with nail mycosis being the most frequent, followed by interdigital mycosis. These results are similar to the findings of other authors who demonstrated similar data and that, despite the diagnosis of Type 2 Diabetes Mellitus, some foot care is not performed effectively, emphasizing the need for better training and approach of health professionals regarding foot care, as well as

encouraging the practice of self-care in individuals with Diabetes Mellitus.[20]

Valgus and limited joint mobility may contribute to the increased risk of plantar ulceration, since they are associated with higher plantar pressure. A study shows that limited joint mobility is what promotes the highest rate of high plantar pressure, thus increasing the risk of ulceration when related to the existence of diabetic peripheral neuropathy.[21] Regarding loss of sensitivity, the present study shows that among the individuals evaluated, more than half have reduced or absent vibratory sensitivity, which demonstrates the importance of assessing this to identify risk factors and reduce the chances of amputation.[20]

In this study, the percentage of dilated dorsal vessels and reduced or absent right/left posterior tibial arterial pulse stand out. In other words, they are directly related to the high risk of foot ulceration and lower limb amputation.[22] The most frequent neuropathic symptoms in the sample were burning, numbness or tingling in the lower limbs, especially the feet, during the night. This confirms data from the literature that show the same neuropathic symptoms, and these can negatively influence the individual's quality of life or even nighttime disorders.[23]

Regarding the relief of symptoms of diabetic peripheral neuropathy, the most frequently reported variable was walking, followed by sitting or lying down. This supports the hypothesis of another study that presented physical activity as one of the viable non-pharmacological interventions, where a combination of resistance and sensorimotor training presents greater benefits for symptoms.[24] Thus, demonstrating that non-pharmacological strategies should not be underestimated.

None of the subjects were classified as having peripheral arterial disease, which may be related to the fact that it was not possible to perform the Ankle-Brachial Index test on all of them, due to problems with the unit's Doppler ultrasound. This is different from the findings of another study that indicates individuals with type 2 diabetes mellitus and peripheral arterial disease in a more severe manifestation, where patients have a higher prevalence of coronary artery disease, including risks to the lower limbs.[25] However, the vast majority of the sample presented changes in the pulses, which should be frequently monitored.

In the present study, a greater number of individuals diagnosed with diabetic peripheral neuropathy were also observed using the Neuropathic Impairment Score, in relation to the 10g Semmes-Weinstein Monofilament test. In the literature, a similar result was identified in an elderly population, using the same assessment instruments, in which it was seen that the 10g monofilament alone is capable of indicating the decrease or absence of protective sensitivity, which can generate plantar ulceration; however, it is not recommended that it be used alone for the diagnosis of diabetic peripheral neuropathy.[26]

Therefore, it is concluded that this study made it possible to understand the profile of people with type 2 diabetes, which is described as being composed, in its majority, of elderly women with low income, low level of education and with clinical characteristics of decompensated diabetes, which highlights the presence of glycated hemoglobin ≥7% and hypertension, conditions that are risk factors for the development and progression of diabetic peripheral neuropathy. In addition, important changes related to the feet were found, such as: dry skin, cracks and fissures, calluses, reduced joint mobility, reduced or absent vibratory sensitivity, dilated dorsal vessels and reduced posterior tibial pulses, aspects seen in the literature as a risk for ulceration and amputation. And, finally, through the use of the Neuropathic Impairment Score and Neuropathic Symptom Score for the diagnosis of diabetic peripheral neuropathy, it was possible to observe the presence of neuropathy with moderate and severe symptoms.

This study does not allow establishing cause and effect relationships due to its observational nature. The findings of this study can be used to develop preventive and management strategies for diabetes and diabetic foot; it is recommended that subsequent studies be carried out.

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AUTHORS' CONTRIBUTIONS

Mayanne Soares Camilo has substantially contributed to the design and planning of the project, data collection, analysis and interpretation of data; contributed significantly to the preparation of the draft and critical review of the content. **Maria da Graça Moreira Lorena** has substantially contributed to the design and planning of the project, data collection, analysis and interpretation of data; has also significantly contributed to the preparation of the draft and

critical review of the content. **Carol Lima Barros** has contributed to data collection, analysis and interpretation of data. **Felipe Macedo Soares** has contributed with the summary writing and the content critically reviewing. **Juliana Alburquerque Baltar** has contributed to the writing of the text and the preparation of tables. **Luísiane de Ávila Santana** has substantially contributed to the design and planning of the project, data collection, analysis and interpretation of data; contributed significantly to the preparation of the draft and critical review of the content.

All authors approved the final version to be published and are responsible for all aspects of the work, including ensuring its accuracy and integrity.

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