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ORIGINAL ARTICLE

Diabetic foot in patients at the Tulcán Sur and Tajamar health centers. 2023

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ABSTRACT

Introduction: Diabetic foot is one of the most relevant chronic complications of diabetes mellitus, increasing the risk of ulcers, infections, and amputations.
Objective: To characterize risk conditions and self-care practices related to diabetic foot in patients with diabetes mellitus treated at Tulcán Sur and Tajamar health centers during 2023.
Methods: An observational, descriptive, cross-sectional study was conducted with an intentional sample of 75 patients diagnosed with diabetes mellitus, treated at Tulcán Sur and Tajamar health centers. A structured questionnaire was administered to collect information on clinical history, self-care habits, and preventive practices. Data were processed through descriptive statistical analysis, respecting ethical principles of confidentiality and informed consent.
Results: Most patients had been diagnosed after five to ten years with the disease (59 %). Regarding physical activity, 51 % practice it occasionally, while 39 % do not meet fasting blood glucose targets. Concerning foot care, 84 % have never received a podiatric exam and 59 % do not regularly check the integrity of their feet; additionally, 55 % do not moisturize them and 40 % do not perform daily hygiene, although 81 % use appropriate footwear.
Conclusions: The findings reveal significant deficiencies in self-care and preventive attention for diabetic foot, which increases the risk of severe complications. Implementation of comprehensive promotion and prevention strategies and programs is required to strengthen therapeutic adherence, glycemic control, and podiatric monitoring of patients.

Keywords: Diabetes Complications; Diabetes Mellitus; Risk Factors; Diabetic Foot.

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INTRODUCTION

Diabetes mellitus (DM) is highly prevalent in older adults, and its incidence increases with age. In this population group, it often has a silent and atypical course, making early diagnosis difficult. Persistently elevated blood glucose levels cause metabolic disturbances and progressive damage to vital organs; therefore, adequate glycemic control is essential to prevent complications and preserve quality of life.[1]

Diabetes mellitus (DM) is a chronic condition with a high incidence in the elderly population; however, any patient with a family history, sedentary lifestyle, and poor self-care is a perfect candidate for developing this disease, which is characterized by high blood glucose levels, insulin resistance, and alterations in macronutrient metabolism. In this sense, self-care plays an important role in the proper control of DM, since if there is poor control for a prolonged time, multiple organ dysfunction can occur.[2]

Among the most relevant chronic complications of diabetes mellitus (DM) is diabetic foot, which affects a considerable proportion of people with this disease and is a major cause of morbidity. It is characterized by the presence of foot lesions that can progress to chronic ulcers, deep infections, and, in advanced stages, amputations. The development of diabetic foot is closely related to the interaction of three main pathophysiological mechanisms: diabetic neuropathy, peripheral arterial disease, and structural foot deformities. The combination of these factors explains the high frequency of ulcers and amputations in people with diabetes and underscores the importance of its prevention and comprehensive management.[3,4,5]

The pathophysiological factors involved in diabetic foot interact in a complex manner, generating a vicious cycle in which peripheral neuropathy decreases pain perception and promotes excessive pressure on the feet, while peripheral arterial disease reduces blood flow and tissue oxygenation, hindering healing and increasing the risk of infection. Several risk factors further contribute to the development of complications, including prolonged duration of diabetes, inadequate glycemic control, the presence of peripheral arterial disease, smoking, anatomical foot deformities, mechanical stress from excess weight, and advanced age. Taken together, these conditions reinforce the need for a comprehensive approach that includes prevention, education, and clinical follow-up to reduce the incidence of ulcers and amputations associated with diabetic foot.[6,7,8]

The importance of multidisciplinary approaches and collaboration among specialized teams in the treatment of diabetic foot has been recognized, with the aim of promoting wound healing, controlling infection, preventing complications, and reducing the risk of amputation. This approach includes strict metabolic control of blood glucose, offloading the affected area with orthotic devices or specialized footwear, and local wound care. Patient education in foot self-care, along with regular follow-up by a specialized healthcare team, is an essential pillar for preventing recurrences and reducing the incidence of amputations.[9,10,11] In relation to the above, the present research was conducted, which aimed to characterize the risk factors and self-care practices related to diabetic foot in patients with diabetes mellitus treated at the Tulcán Sur and Tajamar health centers during 2023.

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METHODS

An observational, descriptive, cross-sectional study was conducted at the Tulcán Sur and Tajamar Health Centers during the established data collection period. The study population consisted of patients with a prior medical diagnosis of diabetes mellitus (DM) who attended consultations at these health units and voluntarily agreed to participate in the research.

The sample was non-probabilistic and based on convenience sampling. It included 75 patients who met the inclusion criteria, which were adult patients with a confirmed diagnosis of diabetes, under follow-up at the selected health centers, capable of completing the instrument, and who provided their informed consent. Patients with cognitive impairment, communication difficulties, or who refused to participate were excluded.

Data collection was conducted through direct interviews, ensuring the confidentiality and anonymity of participants. A survey was used as the data collection technique, and the instrument was a structured questionnaire with 24 closed-ended questions, designed to gather sociodemographic, clinical, therapeutic, and foot care information, as well as knowledge about diabetic foot. The questionnaire included variables such as age, sex, ethnicity, educational level, income, nutritional status, time since diagnosis, type of pharmacological treatment, therapeutic adherence, reasons for discontinuing treatment, physical activity, hygiene and foot care habits, foot examinations during medical checkups, and level of knowledge about diabetic foot. Prior to its application, the instrument underwent content review to ensure clarity, relevance, and coherence with the study objectives.

The data obtained were recorded in a database and subsequently processed using descriptive statistics, including absolute and relative frequencies (percentages), which were presented in tables to facilitate analysis and interpretation. A descriptive comparative analysis was performed to explore the relationship between foot examinations during medical checkups and the level of knowledge about diabetic foot.

From an ethical standpoint, the study adhered to the principles of the Declaration of Helsinki. All participants were informed about the study's objectives, the voluntary nature of their participation, and the confidential handling of their information. Informed consent was obtained before the instrument was administered.

RESULTS

The study population was characterized by a higher concentration in the 50-59 age group (46,7 %), with a predominance of females (65,3 %) and of mixed ethnicity (96,0 %). Regarding educational level, the majority only completed primary school (60,0 %), with a smaller proportion having completed secondary school (37,3 %) and barely 2,7 % with higher education. Income was mostly below the unified basic salary (64,0 %), and in relation to nutritional status, overweight was the most frequent condition (46,7 %), as shown in Table 1.

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Table 1. Sample distribution according to demographic variables.

Variable		No.	%
Age	20-29 years	0	0
	30-39 years	4	5,3
	40-49 years	11	14,7
	50-59 years	35	46,7
	≥ 60 years	25	33,3
Sex	Male	26	34,7
	Female	49	65,3
Ethnicity	Mestizo	72	96,0
	White	2	2,7
	Black	1	1,3
Schooling	Primary	45	60,0
	Secondary	28	37,3
	Superior	2	2,7
Income	Unified basic salary	20	26,7
	Lower than the unified basic salary	48	64,0
	Higher than the unified basic salary	7	9,3
Nutritional status	Normal	28	37,3
	Overweight	35	46,7
	Obesity	12	16,0

Most patients had been diagnosed for between 5 and 9 years (48,0 %), with the majority using tablets exclusively (54,7 %), although a considerable proportion combined tablets and insulin (44,0 %). High therapeutic adherence was required, with 61,3 % of participants reporting that they always followed their prescriptions and 28,0 % that they almost always did. Among the reasons for discontinuing treatment, the most prominent were lack of medication availability at the health center (33,3 %) and financial limitations (26,7 %). Finally, regarding physical activity, half of the participants only exercised occasionally (50,7 %), while 20,0 % never exercised (Table 2).

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Table 2. Distribution of the sample according to clinical and therapeutic variables.

Variable		No.	%
Time since diagnosis of the disease	< 5 years	20	26,7
	5-9 years	36	48,0
	≥ 10 years	19	25,3
Type of pharmacological treatment	Tablets	41	54,7
	Insulin	1	1,3
	Tablets and insulin	33	44,0
Compliance with medical prescriptions	Always	46	61,3
	Almost always	21	28,0
	Sometimes	8	10,7
	Never	0	0,0
Reason for discontinuing treatment	The health center does not have any medications.	25	33,3
	She does not have the financial means to purchase the medication.	20	26,7
	Daily obligations do not allow it	0	0
	He forgets to administer the treatment.	2	2,7
	Other	28	37,3
Performing physical activity	Always	22	29,3
	Sometimes	38	50,7
	Never	15	20,0

The majority of patients in the sample had no foot deformities (70,7 %), and 60,0 % performed daily hygiene. Only 45,3 % reported using any type of moisturizing cream on their lower limbs daily, while 66,7 % reported drying them. Only 41,3 % of patients performed a daily examination of their lower limbs for any type of injury. Regarding the use of comfortable, soft, wide, round-toed shoes with breathable lining, 81,3 % wore them.

Foot examinations during medical checkups showed a strong association with the level of knowledge about diabetic foot (Table 3). All patients who always received a foot examination demonstrated adequate knowledge about the disease, while among those who only received one occasionally, 87,5 % maintained adequate knowledge and 12,5 % inadequate knowledge. In contrast, the vast majority of those who never had a foot examination (84,0 % of the sample) showed a lack of knowledge, with 74,6 % having inadequate knowledge compared to only 25,4 % having adequate knowledge. Overall, 64,0 % of patients demonstrated insufficient knowledge about diabetic foot, highlighting the importance of systematically performing foot examinations during consultations as an educational and preventive strategy.

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Table 3. Relationship of patients according to foot examination in medical check-ups and knowledge about diabetic foot.

Foot examination during medical check-ups	Knowledge about diabetic foot				Total	
	Appropriate		Inappropriate			
	No.	%	No.	%	No.	%
Always	4	100	0	0	4	5,3
Sometimes	7	87,5	1	12,5	8	10,7
Never	16	25,4	47	74,6	63	84,0
Total	27	36	48	64	75	100,0

DISCUSSION

The sociodemographic characterization of the population revealed a predominance of female patients between 50 and 59 years of age, with low levels of education and economic limitations. This profile coincides with that reported in studies conducted in similar contexts in Latin America, where diabetes mellitus (DM) is concentrated in middle and older age groups, frequently associated with unfavorable socioeconomic conditions that limit access to information, therapeutic resources, and specialized preventive services. Low educational attainment has been identified as a relevant determinant of self-care deficits and poor metabolic control, increasing the risk of chronic complications such as diabetic foot.[12,13] Likewise, the high prevalence of overweight and obesity observed in this study is consistent with evidence recognizing excess weight as a factor that aggravates insulin resistance and increases the mechanical load on the feet, promoting skin lesions and biomechanical alterations.[14,15]

Regarding clinical and therapeutic variables, most patients had a diabetes duration of between 5 and 9 years, suggesting an intermediate stage of the disease in which microvascular complications can still be prevented or delayed through timely interventions. This finding differs somewhat from that described by Couselo Fernández and Rumbo-Prieto,[16] who report a higher proportion of patients with more than 10 years of disease duration and, consequently, a greater neuropathic and vascular risk.

However, the opportunity identified in the studied population reinforces the need to strengthen primary care actions to prevent progression to advanced stages of diabetic foot. Although self-reported therapeutic adherence was high, treatment interruption due to lack of medication and economic limitations reflects structural deficiencies in the health system, a situation widely documented in studies conducted in low- and middle-income countries.[1]

The insufficient physical activity observed in more than half of the participants is a relevant finding, given its direct impact on glycemic control and the prevention of complications. Similar results have been reported by Madero and Orgulloso, who demonstrate that physical inactivity is associated with persistently elevated glucose levels and a greater risk of diabetic foot.[17] The literature supports that regular physical activity improves insulin sensitivity, reduces cardiovascular risk, and contributes to the maintenance of neuromuscular integrity, fundamental aspects in the prevention of lower limb injuries.[18,19]

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Regarding specific foot self-care practices, the results reveal significant deficiencies, particularly in daily foot inspection, skin hydration, and daily hygiene. These findings are consistent with systematic reviews that identify self-care deficits as one of the main predisposing factors for the development of ulcers and amputations.[2] Despite this, a high percentage of appropriate footwear use was observed, which represents a positive and potentially protective aspect, coinciding with international recommendations that highlight therapeutic footwear as a key intervention to reduce the risk of foot injuries.[20]

A particularly relevant finding was the strong association between foot examinations during medical check-ups and the level of knowledge about diabetic foot. The majority of patients who never received a podiatric examination demonstrated inadequate knowledge, reinforcing the implicit educational role of the clinical examination. Several international studies and guidelines, such as those of the International Working Group on the Diabetic Foot (IWGDF), emphasize that regular foot assessments, including sensitivity tests such as the Semmes-Weinstein monofilament test, not only allow for the early detection of neuropathy but also improve patient awareness of their condition and encourage preventive behaviors.[5,9,10,11,21] The systematic omission of this practice in routine care represents a missed opportunity for the primary and secondary prevention of diabetic foot.

Taken together, the results demonstrate that, beyond pharmacological treatment, self-care and health education remain fundamental pillars in the comprehensive management of diabetes mellitus (DM). Scientific evidence supports the fact that structured educational programs, integrated into primary care and with the active participation of healthcare personnel, significantly reduce the incidence of ulcers, amputations, and hospitalizations related to diabetic foot.[22,23] Therefore, the findings of this study support the need to implement systematic strategies for education, follow-up, and podiatric surveillance, adapted to the sociocultural context of the population, in order to reduce the burden of this preventable complication.

CONCLUSIONS

Diabetes poses a growing challenge to healthcare systems, not only due to its high incidence but also because of the numerous complications it can cause throughout life. This situation demands a comprehensive approach that combines individual responsibility for self-care with the commitment of healthcare professionals to education, prevention, and timely follow-up. Promoting healthy habits, rigorous disease management, and continuous care are fundamental pillars for reducing risks and ensuring a better quality of life for those living with diabetes.

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