

The nurse's role in the prevention of injuries in diabetic foot syndrome

El papel de la enfermera en la prevención de lesiones en el síndrome del pie diabético

O papel do enfermeiro na prevenção das lesões na síndrome do pé diabético

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Abstract

The aim was to identify the role of nurses in preventive care for Diabetic Foot injuries. Descriptive-exploratory study, of a quantitative nature. Carried out in a health clinic located in the city of São Paulo, with 65 diabetic patients, between 18 and 90 years old. Among the study participants, the highest percentage of those who showed signs and symptoms of Diabetic Foot Syndrome were among those who had the diagnosis a longer time ago, had greater resistance to changes in habits and adherence to treatment, did not follow the guidelines on foot care and/or had other associated chronic diseases. The nurse is fundamental in early diagnosis, interventions and education on preventive care. The prevention of Diabetic Foot complications depends on the commitment, communication and training of the multidisciplinary team to reduce amputations and morbidity and mortality of diabetics.

Descriptors: Nursing; Diabetic Foot; Diabetic Foot Ulcers; Peripheral Neuropathy; Diabetic Polyneuropathy.

Resumen

El objetivo fue identificar el papel de los enfermeros en la atención preventiva de las lesiones del Pie Diabético. Estudio descriptivo-exploratorio, de carácter cuantitativo. Realizado en una clínica de salud ubicada en la ciudad de São Paulo, con 65 pacientes diabéticos, entre 18 y 90 años. Entre los participantes del estudio, el mayor porcentaje de quienes presentaban signos y síntomas del Síndrome del Pie Diabético se encontraban entre los que habían sido diagnosticados hace más tiempo, presentaban mayor resistencia a los cambios de hábitos y adherencia al tratamiento, no seguían las pautas a pie cuidados y/o tenían otras enfermedades crónicas asociadas. El enfermero es fundamental en el diagnóstico precoz, las intervenciones y la educación en cuidados preventivos. La prevención de las complicaciones del Pie Diabético depende del compromiso, comunicación y capacitación del equipo multidisciplinario para disminuir las amputaciones y la morbimortalidad de los diabéticos.

Descriptoros: Enfermería; Pie Diabético; Úlceras del Pie Diabético; Neuropatía Periférica; Polineuropatía Diabética.

Resumo

Objetivou-se identificar o papel do enfermeiro nos cuidados preventivos das lesões do Pé Diabético. Estudo descritivo-exploratório, de natureza quantitativa. Realizado em uma clínica de saúde localizada no município de São Paulo, com 65 pacientes diabéticos, entre 18 e 90 anos. Entre os participantes do estudo, a maior porcentagem dos que apresentavam sinais e sintomas da Síndrome do Pé Diabético, estavam entre os que tiveram o diagnóstico há mais tempo, possuíam maior resistência a mudanças de hábito e adesão ao tratamento, não seguiam as orientações sobre os cuidados com os pés e/ou possuíam outras doenças crônicas associadas. O enfermeiro é fundamental no diagnóstico precoce, intervenções e educação sobre cuidados preventivos. A prevenção das complicações do Pé Diabético depende do empenho, comunicação e treinamento da equipe multidisciplinar para a redução das amputações e morbimortalidade dos diabéticos.

Descritores: Enfermagem; Pé Diabético; Úlceras do Pé Diabético; Neuropatia Periférica; Polineuropatia Diabética.



Introduction

Diabetes Mellitus (DM) is a syndrome of multiple etiologies, caused by lack of insulin production and/or inability to perform its functions properly. The disease is characterized by chronic hyperglycemia, disturbances in the metabolism of carbohydrates, proteins and lipids. In the long term, the consequences of DM involve the failure of organs such as the heart, kidneys, eyes, nerves and blood vessels. Some symptoms such as polydipsia, polyuria and weight loss may occur, and in the phase prior to the clinical picture of DM with maintained hyperglycemia, the syndrome goes through the glucose metabolism disorder stage, where glycemic values are between the standard normal and diabetic¹.

Diabetes is typically classified as either type 2 diabetes, characterized by relative insulin deficiency in a setting of insulin resistance and accounting for >90% of all diabetes cases, or as type 1 diabetes, characterized by absolute insulin deficiency. Diabetes is among the most common chronic diseases in the world, affecting an estimated 180 million people in 2008².

Adding to this high global burden is the growing incidence and prevalence of type 2 diabetes induced by the increasing age of the population, obesity and physical inactivity, as well as the increased longevity of patients with diabetes. Estimates project that more than 360 million people will be affected by diabetes in 2030².

Cardiovascular and cerebrovascular diseases are the main causes of morbidity and mortality in the context of diabetes, mainly in the form of coronary heart disease (CHD), increasing the risk of stroke, diabetic peripheral polyneuropathy (DNP) and peripheral artery disease (DAP)³.

Among patients with symptomatic PAD, the prevalence of diabetes ranges from 20% to 30%, accounting for approximately 50% of all lower limb amputations⁴.

The disease is considered a serious public health problem due to its prevalence and complications, as they interfere with the quality of life, survival and productivity of individuals, in addition to the high costs of its treatment⁵.

The incidence of complications and morbidities in general of diabetic patients are related to the progressive loss of skin sensitivity, where about 15% of the referred population will develop ulcerations in the lower limbs, generated mainly by complications such as infections and slow healing⁶.

Decreased progressive skin sensitivity results from the loss of myelin sheath and the number of functional nerve fibers caused by the accumulation of glucose breakdown products⁷.

Diabetic ulcers, known as "Diabetic Feet" are frequent complications and are among the main health problems, affecting several countries in the world and causing great socioeconomic impact, and can be defined as an infection, ulceration and/or destruction of associated soft tissues. to neurological changes and various degrees of peripheral arterial disease in the lower limbs⁸.

Ulcers are caused by neuropathy as a result of the underlying pathology (Diabetes Mellitus), compromise peripheral nerves, and develop lesions in motor, autonomic

and sensitive fibers, which may lead to primary lesions, such as foot drop and ankylosis (hardened joints); and secondary, such as plantar ulcers, traumatic injuries, fissures and muscle paralysis. When the autonomic fibers responsible for maintaining the sebaceous and sweat glands are injured, they result in a decrease in the production of their secretions, and the skin becomes dry, causing the appearance of cracks that can compromise the structures of the feet, favoring the risk of infection⁸.

The term "Diabetic Foot Syndrome" emerged from the diverse and complex presentation related to the etiology of the Diabetic Foot, in which it brings together the syndromes that attack the autonomic, motor and sensitive peripheral nervous system, manifesting itself symptomatically or silently, where several factors can be the reason for its cause and its complications⁹.

The early diagnosis of DPS by the health team can modify the natural history of the disease, since the orientation and awareness of the patient and his family about the importance of care and the result that the lack of it may cause are essential for the prevention of complications. Care ranges from self-examination guidelines, daily hygiene, use of appropriate shoes, to the indication of tailored shoes for the prevention of initial ulcerations⁹.

Measures to prevent DM complications are important to minimize the impacts of the disease, and can be evaluated using data obtained from Ministry of Health sources, regional surveys and associations¹⁰.

Diabetic Neuropathy (DN) is the set of diseases that most compromise organs and is among the most common complications of Diabetes Mellitus, presenting itself through various symptomatic or asymptomatic clinical manifestations and affecting different parts of the nervous system, requiring a complete physical examination and specific tests for its diagnosis¹¹.

DN involve multiple conditions in their pathophysiology such as metabolic disorders, inflammatory, vascular, ischemic, autoimmune and neuronal deficiencies. The most common form is Diabetic Polyneuropathy (DNP), defined as typical, due to its frequency, also known as Peripheral Diabetic Neuropathy (DNP)¹¹.

Diabetic patients with PDN are more likely to present sequelae and amputations preceded by ulcers involving the tips of the toes or regions that suffer pressure such as the calcaneus, which represents the most common cause of hospitalization in Western countries¹².

Complications and other sequelae of PDN are indicators not only of increased risk for amputation, but also increased risk for morbidity and mortality. Patients with Diabetes Mellitus are two to four times more likely to develop vascular diseases, which can progress to arterial calcification, most frequently affecting the tibial arteries. In addition to the loss and progressive hypertrophy of nerve fibers, which is the cause of insensitivity in the lower limbs^{13,14}.

The epidemiology of NPD is still poorly defined due to the various diagnostic criteria and ill-structured study populations, as well as the quantity and quality of data,



hampered by the inconsistency of definitions related to the pathology and the lack of studies that can exclude the neurological diseases that affect it. are not part of the scope of DM pathology¹⁵.

Diabetic Foot is the presence of infection, ulceration and/or destruction of deep tissues associated with neurological abnormalities and various degrees of peripheral vascular disease in people with DM¹⁶.

The neurological and vascular alterations in the extremities, caused by DM, produce distortions in the normal anatomy and physiology of the feet. Alteration of muscle trophism and bone anatomy of the feet causes the appearance of pressure points, while skin dryness impairs the skin's protective elasticity and damage to local circulation makes healing slower and ineffective. Together, these changes increase the risk of foot ulcers, which can progress to more serious complications, such as infections and amputations¹⁶.

The risk factors for the development of ulcers and amputations are the main complications of the Diabetic Foot: duration of DM disease, unsatisfactory glycemic control, micro and macrovascular complications, Peripheral Neuropathy, Peripheral Vascular Disease, ulceration or previous amputations, smoking, pain or lower limb discomfort, foot deformity, low visual acuity and Diabetic Nephropathy¹⁷.

The duration of DM disease is directly related to the risk of developing complications such as neuropathy and vasculopathy, as well as failure to achieve goals for glycemic control¹⁷.

From the changes identified in the Diabetic Foot assessment, the best counseling, treatment and follow-up conduct is defined. It should be considered that some behaviors must be adapted to different realities, taking into account the local protocols and the supplies available in the health services of the Health Care Network¹⁸.

Approaches and treatment of the Diabetic Foot that should be centered on the individual, starting from a broader perspective that encompasses the context in which the patient lives, in the social, economic, cultural, temporal and family spheres. The difficulties faced in the individual's daily life, such as their activities of daily living, work and leisure, should be considered. The therapeutic plan should be, whenever possible, shared, encouraging the individual to take responsibility for their self-care and promoting their autonomy, considering the necessary and available social support¹⁸.

After collecting the evaluation data and establishing the context of this individual and the impact of the disease and the illness on his routine life, the professional should focus his attention on the changes in the Diabetic Foot and on the risk factors that can be modified, in order to avoid ulcerations, infections and subsequent amputations¹⁸.

It is up to the health professional to proceed with the individual Risk Classification for each evaluation, according to the clinical findings, and to offer the appropriate care for the situation, so that the therapeutic goals are achieved.

Neuropathy may manifest with the symptom of numbness and loss of sensation (hypoesthesia). The symptom of cramp-like pain or heaviness when walking, which is relieved at rest, raises the suspicion of ischemic pain due to peripheral vascular disease¹⁷.

The neuropathic foot is characterized by the progressive loss of sensitivity, where the decrease in sensitivity can present as painless traumatic lesions. The most common symptoms are tingling and burning sensation. Ischemic foot is characterized by a history of intermittent claudication and/or pain when lifting the limb¹⁷.

Loss of protective sensitivity in the feet due to Diabetic Neuropathy accounts for more than 80% of cases of diabetic foot ulcers. An expressive number of complications can be avoided with the use of simple techniques of self-care with the feet, where the health professional has the important role of carrying out health education and encouraging the patient to follow the recommended guidelines¹⁸.

Nursing is faced daily with the limitations and injuries that diseases cause, such as difficulties in locomotion, loss of autonomy, dignity, physical and psychosocial well-being. The professional's performance must reflect a greater objective than the technical work that involves the conception of the health and disease process, where preventive care is aimed at a common objective, of comprehensive care, control and rehabilitation actions, has an educational and educational role. awareness of the patient and their family members regarding the importance of preventive care in order to avoid DPS injuries.

The objective was to identify the role of nurses in preventive care for DPS injuries focused on early diagnosis, interventions and practice of health education aimed at raising awareness of patients and their families, especially regarding the need for changes in habits and self-care.

Methodology

A descriptive-exploratory field study of a quantitative nature was developed to investigate the risk of developing lesions related to DPS in the group of patients surveyed, through interviews and non-invasive examination of the feet.

The research was carried out in a Health Clinic that accompanies diabetic patients participating in the support group, located in the city of São Paulo.

The population of this study consisted of 65 diabetic patients, aged between 18 and 90 years, of both sexes, regardless of comorbidities and who did not present any cognitive impairment.

Diabetic patients aged between 18 and 90 years old, both genders, regardless of comorbidities and who agreed to participate in the research, were included in the study. Patients who presented some cognitive deficit or who did not accept to participate in the research were excluded from the study.

After approval by the Ethics Committee for Research with Human Beings of Universidade Paulista under Opinion 2,213,282, the researcher in charge went to the Health Clinic with the purpose of the research and the



patients who agreed to participate signed the Term of Free and Informed Consent, so that patients could be interviewed and examined according to the instruments for data collection. The interview and examination of the feet were carried out by the researcher himself.

The interview was divided into two parts, where the first consisted of applying a questionnaire with questions referring to the sociodemographic profile of the sample, according to the variables: sex, age, marital status, education, addictions, physical activities, time since DM diagnosis, diseases chronic pain, amputated limb, injuries to nails or feet, difficulties in following advice given through support group meetings, and regular foot care. The second part consisted of a non-invasive examination of the feet, focused on the inspection of tissue characteristics, palpation to detect the presence of dorsalis pedis and tibial pulses, a test of plantar protective sensitivity (PPS) using a 10g Simmes-Weinstein Monofilament and a threshold test for vibration sensitivity (LSV) using a 125 Hz Diapason Biothesiometer.

The data collection instrument was a semi-structured questionnaire containing closed-type questions related to the patients' sociodemographic conditions. For the examination of the feet, an adapted form containing the items for inspection according to the research objectives was used.

The information obtained was stored in Microsoft Excel© software and analyzed in a simple descriptive way for later presentation of tables and graphs.

This study did not imply risks to the subjects. Its benefits were indirectly translated into an increase in knowledge for the researched people, the institution and the studied population, through the dissemination of the results for the coordination of the Health Clinic, which included it in its educational proposals.

Results and Discussion

65 people with diabetes aged between 18 and 89 years participated in the survey. Regarding age, it was observed that 20% of people were concentrated in the age group between 38 and 47 years old, 19% in the age groups between 18 and 27 years old, 15% between 28 and 37 years old, 12% between 68 and 77 years old, 11% between 48 and 67 years old and 6% between 78 and 97 years old. Regarding the analysis of the feet exam, it was observed that 54 (100%) of the interviewees in the age groups between 48 and 97 years old had lesions on the nails or feet, 7 (58%) of the interviewees between 38 and 47 years old and 11 (50%) between 18 and 37 years old.

Among the participants, 37 were female (57%) and 28 (43%) male. It was also found that 25 females, representing 68% of respondents, had some type of injury to their nails or feet, while 23 males, representing 82% of respondents, had some type of injury.

Regarding marital status, the highest proportion was among married people, 27 representing 42%, followed by 19 singles (29%), 10 divorced (15%) and 9 widowed. Regarding the analysis of the foot examination, it was observed that 19 (100%) of the respondents among

widowers and divorced persons had some type of injury to their nails or feet, 21 (78%) of the married respondents and 7 (37%) of the single had some type of injury.

As for the distribution of education, this was composed of 43% of respondents who attended higher education, of these, 11 (17%) completed higher education and 17 (26%) have incomplete higher education; 19% of respondents attended high school, with 7 (11%) having completed high school and 12 (18%) having incomplete high school; 17% of respondents attended elementary school, with 12 (18%) having completed elementary school and 5 (8%) having incomplete elementary school; 2% of respondents are illiterate.

Regarding vices, 48 (74%) of the interviewees answered that they do not have them, while 17 (26%) claim to have them. Of these, 13 (20%) have a smoking habit, while 4 (6%) drink alcohol. Regarding the analysis of the foot examination, it was observed that 12 (92%) of the smokers and 2 (50%) of the alcoholics had some type of injury to their nails or feet. Regarding the habit of smoking and presentation of injuries, it was observed that smokers represented 26% of the total number of respondents and of these, 76% had some type of injury to their nails and feet. Disease progression to critical limb ischemia and limb loss is more likely in patients who continue to smoke than in those who stop smoking. Data from observational studies indicate a two- to three-fold increase in the risk of developing PAD among smokers.⁶ About 84% to 90% of patients with claudication are smokers or ex-smokers¹⁹.

Regarding the practice of physical activities, 38 (59%) of the interviewees answered that they do not practice, while 27 (41%) claimed to practice. Regarding the practice of physical activities, 38 (59%) of the interviewees answered that they do not practice, while 27 (41%) claimed to practice. Regarding the analysis of the feet examination, it was found that 32 (84%) of the interviewees who declared themselves not practicing physical activities have some type of injury to their nails or feet, while 16 (59%) of those who practice have some type of injury. lesion.

According to data from the Diabetes Prevention Program (DPP, Diabetes Prevention Program) suggest that a lifestyle modification focusing on a balanced diet and regular physical activity is associated with a significant increase in nerve fiber density, resulting in improvements related to reduced risk of PDN with long-term follow-up.

Regarding the time of diagnosis of diabetes mellitus, 54 (83%) were diagnosed between 1 and 10 years, 8 (11%) between 11 and 20 years, and 3 (6%) between 21 and 40 years. Regarding the analysis of the examination of the feet, it was observed that, of the interviewees who had some type of injury to the nails or feet, 11 (100%) had a diagnosis time between 11 and 40 years after the diagnosis of DM, while 37 (69%) between 1 and 10 years.

The most frequent form of Neuropathy is PND, representing 90% of cases that can evolve symptomatic or asymptomatic, with or without deformities, prevalent in diabetic individuals with a diagnosis period of more than 10 years, but may be present at any time of the evolution of the disease. pathology. According to studies, the greater risk of



developing PDN is linked to the time of diagnosis, according to population data involving 15,000 people with diabetes mellitus, the involvement of PDN is associated with severe PND in 60% of patients of longer duration¹⁶.

Older data on the prevalence of chronic complications related to PDN were collected through analyzes of 540 diabetic patients in Ribeirão Preto, São Paulo, where the study demonstrated a prevalence of PND of 51%, representing the most frequent complication between the intervals of DM duration¹⁷.

As for the occurrence of other chronic diseases, 35 (54%) claimed to have them, while 30 (46%) answered that they did not. Regarding the type of chronic diseases, 24 (69%) have Systemic Arterial Hypertension, 9 (26%) Respiratory Diseases, 5 (14%) Vascular Diseases, 4 (11%) Heart Diseases, 3 (9%) Diseases Renal and Ocular, 2 (6%) between Neurological and Musculoskeletal Diseases. Regarding the analysis of the foot examination, it was found that 3 (100%) had kidney diseases, 20 (83%) hypertension, 4 (80%) vascular diseases, 3 (75%) heart diseases, 2 (50%) diseases neurological and musculoskeletal disorders, 4 (44%) respiratory diseases and 1 (33%) ocular disease.

Analyzing the relationship between DM and other chronic diseases, it was observed that 24 (69%) of the interviewees had SAH, and of these, 20 (83%) had some type of injury to the nails or feet, predisposing to foot complications diabetic. Hypertension increases arterial resistance in the affected limb and limits blood flow. In the case of venous insufficiency, the increased extravascular pressure caused by interstitial edema further decreases capillary perfusion. Treatment of hypertension reduces perfusion pressure to extremities already compromised by peripheral arterial stenoses¹⁹.

Hypertension is common in diabetics and tends to be more persistent, with a lower than usual nighttime drop. In the absence of a nocturnal pressure drop, patients who have a reading above 130/85 are more likely to reflect neuropathy and other complications¹⁸.

Regarding the occurrence of amputated limbs, 2 (3%) of the interviewees had amputated limbs due to foot complications, 63 (97%) did not have amputated limbs. Regarding the analysis of the foot examination, it was observed that 2 (100%) of the interviewees who had amputated limbs and 3 (100%) who had ulcers and diabetic foot had some type of injury to their nails or feet. The evolution towards amputation brings, in addition to increased costs for health and society as a whole, physical disability and a marked reduction in the quality of life of patients¹⁹.

Regarding the interviewees' self-perception related to the presence of lesions on their nails or feet, 35 (54%) answered that they have, while 30 (46%) claim not to have any type of lesion. As for the classification of lesions, of the 35 interviewees who answered that they had it, 32 (91%) of the interviewees claimed dryness, 30 (86%) callus, 29 (83%) mycosis and 19 (54%) fissure. Regarding the analysis of the foot examination, it was found that of the 35 respondents who claimed to have some type of injury, 31 (89%) had them, while of the 30 respondents who claimed not to have one,

13 (43%) had some type of injury. . As for the classification in the analysis of the examination of the feet of the 31 respondents who have some type of injury to the nails or feet, it was found that 29 (83%) of the respondents had dryness, 22 (63%) mycosis, 17 (49%) callus and 4 (11%) cracks.

Regarding difficulties in following self-care guidelines, 47 (72%) of respondents said they had difficulties, while 18 (28%) claimed they had no difficulties. As for the types of difficulties related to self-care, 43 (91%) of the interviewees claimed to refer to diet, 17 (36%) medication and 8 (17%) foot care. Regarding the analysis of the foot examination, it was observed that 8 (100%) of the interviewees who claimed to have difficulties in taking care of their feet had injuries to their nails or feet, 15 (88%) had difficulties with medication and 30 (70%) with the diet. Regarding performing foot care regularly, 59 (91%) of the interviewees answered that they have, while 6 (9%) claimed not to have. Regarding the analysis of the foot examination, it was found that 6 (100%) of the interviewees who answered that they did not have regular care for their feet had injuries to their nails or feet, 35 (54%) of those who claimed to perform the care had injuries.

As for the type of foot care, of the 59 respondents who answered that they performed it regularly, 54 (92%) answered hygiene, 28 (47%) hydration, 18 (31%) use of appropriate footwear and 16 (27%) self-examination. Regarding the analysis of the foot examination, it was observed that 39 (72%) of the interviewees who claimed to have regular hygiene care had injuries to their nails or feet, 16 (57%) regular care with hydration, 7 (39%) care with the use of suitable shoes and 4 (25%) self-examination.

As for the quality of foot hygiene of the interviewees, 35 (54%) had good hygiene quality, 26 (40%) regular and 4 (6%) poor quality. Regarding the analysis of the examination of feet relating the quality of hygiene and the presentation of lesions, 18 (51%) of those who presented good quality of hygiene presented lesions on the nails or feet, while 30 (100%) among the interviewees with regular or bad showed injuries.

Regarding the quality of nail trimming, it was found that 41 (63%) of respondents had inadequate nail trimming, while 24 (37%) had adequate trimming. Regarding the analysis of the foot examination relating the quality of the nail cut to the presentation of lesions on the nails or feet, 41 (100%) of the interviewees presented some type of lesion, while 7 (29%) did not present any type of lesion.

As for the use of socks and their types, 51 (78%) of respondents use cotton socks, 9 (14%) synthetic socks and 5 (8%) do not use socks. Regarding the analysis of the foot examination relating the use of socks and their types to the presentation of lesions on the nails or feet, 14 (100%) of the interviewees who use synthetic socks or who do not use socks presented some type of injury, while 34 (67 %) wear cotton socks had some type of injury.

Patient education regarding self-care, such as hygiene and hydration of the feet and skin, correct nail cutting, use of appropriate shoes and socks, can reduce the occurrence of injuries that may result in UPD^{20,21}.



As for the presence of ulcers, 61 (84%) were not present, while 4 (6%) were present. Regarding the analysis of the examination of the feet of the interviewees in which the ulcers were identified, 3 (75%) were found in the region of the legs (tibia) and 1 (25%) in the region of the feet.

As for the presence of deformities in the fingers, 53 (82%) were not present, while 12 (18%) were present. Regarding the analysis of the examination of the feet of the interviewees in which the deformities of the fingers were identified, 7 (58%) were about Valgusism (overlapping of one finger over the other), while 5 (42%) were about Toes in Claw, 12 (100%) of the interviewees in whom the deformities were present had lesions on the nails or feet. PND results in insensible feet, which can present deformities, resulting from secondary trauma caused by uncomfortable shoes or walking barefoot, and can progress to an acute injury such as chronic ulcer and amputations²¹.

As for the presence of a pedal pulse, 61 (94%) of the interviewees had a pulse, while 4 (6%) had no pulse. Regarding the analysis of the foot examination, 3 (75%) of the interviewees in which the dorsalis pedis pulse was absent, presented lesions on the nails or feet, while 14 (23%) of the interviewees in which the dorsalis pedis pulse was present presented lesions.

As for the presence of a tibial pulse, 62 (95%) of the interviewees had a pulse, while 3 (5%) had no pulse. Regarding the analysis of the examination of the feet, 2 (75%) of the interviewees in whom the tibial pulse was absent had lesions on the nails or feet, while 16 (26%) of the interviewees in which the tibial pulse was present had lesions.

As for capillary refill, 50 (77%) of the interviewees had a capillary refill time of up to 3 seconds, while 15 (23%) had a refill time greater than 5 seconds. Regarding the analysis of the foot examination, 15 (100%) of the interviewees in which the capillary time was greater than 5 seconds had lesions on the nails or feet, while 33 (66%) of the interviewees in which the capillary refill time was longer than 5 seconds presented up to 3 seconds presented lesions¹⁹⁻²¹.

As for the Plantar Protective Sensitivity (PPS) test, it was carried out with the aid of a 10g Simmes-Weinstein Monofilament applied to 9 points in the locations posterior to the toes (upper tips of the Hallux, 3rd and 5th toes, median tips of the phalanges, mid and outer point of the soles of the feet) and 1 point on the dorsum) of both feet. The results showed that 57 (88%) of the respondents showed sensitivity of 8 points or more, while 8 (12%) of the respondents did not show sensitivity of 7 points or less. Regarding the analysis of the foot examination, 8 (100%) of the respondents who did not show sensitivity in 7 points or less had lesions on the nails or feet, while 57 (88%) of the respondents who had sensitivity in 8 points or more had lesions.

As for the Vibratory Sensitivity Threshold (LSV) test, it was performed with the aid of the Diapasão 125 Hz Biothesiometer on the Hallux of both toes. The results showed that 58 (89%) of the respondents were sensitive to the point, while 7 (11%) of the respondents were not

sensitive. Regarding the analysis of the foot examination, 7 (100%) of the interviewees who did not show sensitivity on the point had lesions on the nails or feet, while 39 (67%) of the respondents who had sensitivity had injuries.

As for the presence of claudication, it was observed that 59 (91%) of the interviewees did not present claudication, while 6 (9%) presented some degree of claudication. Regarding the analysis of the foot examination, it was found that 6 (100%) of the interviewees who had some degree of claudication also had lesions on their nails or feet, while 42 (71%) of the interviewees who did not have a claudication had injuries. The loss of sensitivity and deformity of the feet may be related to the occlusion of arteries by stenosis, resulting in reduced blood supply, which in DM is a predisposing factor for UPD, present in 50% of diabetic patients.

As for the presence of pain at rest, it was observed that 55 (85%) of the interviewees did not have the symptom of pain at rest, while 10 (15%) had such a symptom. Regarding the analysis of the foot examination, it was found that 10 (100%) of the interviewees who had the symptom of pain at rest had injuries to their nails or feet, while 38 (69%) of those who did not have such a symptom had injuries.

As for the presence of discomfort in the lower limbs, it was observed that 46 (71%) of the interviewees did not have the symptom of discomfort in the lower limbs, while 19 (29%) had such a symptom. Regarding the analysis of the foot examination, it was found that 4 (21%) of the interviewees who had the symptom of discomfort in the lower limbs had injuries to the nails or feet, while 5 (11%) of those who did not have such a symptom had injuries. As for the most frequent location of the symptom of discomfort in the lower limbs, it was found that 3 (75%) were found in the feet, while 1 (25%) was in the calves. Regarding the type of feeling of discomfort in the lower limbs of the interviewees, it was found that 2 (50%) of respondents complained of burning/numbness/tingling, and 2 (50%) reported feeling fatigue/cramping/itching.

As for performing the foot exam, it was found that 59 (91%) of the interviewees had never performed the exam, while 6 (9%) had already performed the foot exam at some point. Regarding the analysis of the foot examination, it was observed that of the interviewees who had already undergone the examination, 42 (71%) had lesions on their nails or feet, while 2 (33%) did not present lesions.

As for the presence of risk for the development of Peripheral Diabetic Neuropathy (PDN), according to the general analysis of the data collected through the interview and results of the foot examination, it was found that 57 (88%) of the interviewees were at risk for PDN, while 8 (12%) of respondents did not present such a risk at this time. Regarding the risk classification for the development of Peripheral Diabetic Neuropathy presented by the interviewees, 5 (62.5%) had a moderate risk, 2 (25%) a mild risk and 1 (12.5%) a severe risk.

Conclusion

Despite all the advances in the therapeutic arsenal obtained for the control of the disease and diabetic



complications, including the forms of DN and, above all, PND, there has not been a robust reduction in its incidence, which implies a drop in the deterioration of the quality of care. patients' lives and a large increase in treatment costs.

Adopting a healthy lifestyle, with a balanced diet, physical exercise, maintaining blood glucose and hypertension control, in addition to strict control of processes and progression of inflammation, can help control this complication.

New research will be necessary and investments in predictive tests of complications, which can early identify processes and patients at greater risk, to mitigate the devastating consequences of DN and, above all, of PND, such as diabetic foot and amputation.

Teaching diabetic patients the principles of foot self-examination and foot care has long been advocated as an essential prevention strategy and is largely linked to the daily practices of health professionals, who need to be trained and qualified to detect the signs and perform the necessary measures. interventions properly.

In view of this, Nursing plays an important role in the prevention of diabetic foot complications, in the clinical evaluation of the patient and the factors that may interfere with the evolution of their pathology, contributing with their scientific knowledge, diagnosing and identifying the dimensions of the complications, carrying out the interventions, and treating appropriately as early as possible, in order to reduce diabetic foot complications and thus the incidence of amputations.

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