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Cases of amputation in patients with type 2 diabetes in the state of Piauí during the years 2002 to 2013

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Abstract

Diabetes Mellitus or Type 2 Diabetes is a disease characterized by a deficient production of insulin by the pancreas, leading to an increase in the level of glucose in the blood. Due to the high epidemiological rates and the negative impact on society, it is considered an important health problem in Brazil and worldwide. Diabetes Mellitus is associated with several complications, such as difficulty in wound healing, which can evolve into a serious case of amputation, especially of the lower limbs. Thus, the present work aims to present the epidemiological profile of patients with this disease, who suffered amputations during the years 2002 to 2013 in the state of Piauí, aiming to clarify the seriousness of the disease. A quantitative retrospective descriptive cross-sectional study was carried out, using data from the Department of Informatics of the Unified Health System (DATASUS). In the analyzed period, 81 cases of amputation due to Diabetes Mellitus were reported, with the predisposing factors being, mainly, sex, age, presence of diabetic foot, kidney disease, stroke, acute myocardial infarction and lifestyle, with emphasis on sedentary lifestyle, overweight and smoking. It is concluded that Type 2 Diabetes was a frequent problem in the population of the state in the period discussed, with the highest number of cases occurring in 2002 and the lowest in 2003. Thus, it is essential to understand the seriousness of this disease, with the purpose of treating it and reducing the number of people who suffer amputations as a result of it.

Keywords: Diabetes Mellitus; Sedentary lifestyle; Amputation for Diabetes; Diabetic foot

1. Introduction

Diabetes mellitus (DM) or Type 2 diabetes is a chronic metabolic disease that affects numerous individuals, and its prevalence continues to exceed expectations with each new screening. This disease occurs when the body is unable to produce sufficient insulin, resulting in an elevated level of glucose in the blood.

In Brazil, there is a growing occurrence of Diabetes Mellitus, which places the country among the top four in terms of the prevalence of this disease worldwide [1] reaching a figure of 14.3 million patients in 2015, with a projected number of 23.3 million by the year 2040. There are numerous factors associated with the high prevalence of DM, such as increased life expectancy, unhealthy habits and living conditions, as well as the migration of people from rural to urban areas, resulting in socioeconomic precariousness of certain social segments and epidemiological transition [2].

In accordance with the Brazilian Diabetes Society (2007), the increasing incidence and prevalence of type 2 diabetes worldwide are related to population aging, alarmingly high rates of obesity and sedentary lifestyle, as well as urbanization processes [1]. This scenario has generated a high socioeconomic cost for patients and the healthcare system, given that type 2 diabetes is also associated with complications such as renal insufficiency, lower limb

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amputation, blindness, cardiovascular disease, among others. These chronic complications result in functional impairment, reduced autonomy, and decreased quality of life for individuals, thus constituting a public health issue [3].

According to the Ministry of Health [4], chronic-degenerative diseases are related to the lifestyle and social and cultural habits that affect individuals over a long period of their lives. In this perspective, as mentioned before, environmental factors such as obesity and sedentary behavior have a significant interaction with genetic susceptibility, contributing to insulin resistance and an increased risk of developing diabetes [5]. Additionally, sedentary behavior promotes obesity, which in itself is a major risk factor for type 2 diabetes [4]. In this context, it is of utmost relevance to link disease improvement to regular physical exercise, which has a significant influence in combating Diabetes Mellitus.

The prevalence of Diabetes Mellitus in the Brazilian population increased by 61.8%, rising from 5.5% in the year 2006 to 8.9% in 2016. According to data from Brazilian research, there is a direct relationship with age, and the prevalence is nearly three times higher among individuals with lower education levels [6].

Diabetes Mellitus is considered a silent disease because symptoms often take time to manifest, and most of the time, patients discover the condition through routine exams and check-ups. As a result, the vast number of people who are unaware of having diabetes is mostly due to its asymptomatic nature. On average, half of the Brazilian individuals with diabetes are unaware of their condition, and about one-fifth of those who are aware do not undergo any form of treatment [7]. According to the Brazilian Diabetes Society, there are currently over 13 million people living with the disease, which corresponds to 6.9% of the national population.

The clinical severity of the disease and the time it takes for patients to seek therapeutic assistance, whether due to lack of access to healthcare services, fear, or unawareness of clinical repercussions, are associated with disease worsening. Patients falling into this situation are admitted with infectious and necrotic lesions that require surgical intervention, such as amputation, with a high risk of morbidity and mortality [8]. Therefore, it is important to undergo regular examinations to detect the disease early and prevent complications, given that with the correct diagnosis and appropriate treatment, it is possible to have a comfortable life.

Amputation due to Diabetes Mellitus occurs worldwide, often in individuals with low socioeconomic status, associated with inadequate hygiene conditions and lack of access to healthcare facilities [9], being a detrimental consequence of untreated or inadequately treated diabetes. In Brazil, population-based information on diabetes complications is scarce. However, it is important to note that in 2001, the incidence of amputations in Brazil was 13.9 per 100,000 inhabitants/year, with 80,900 amputations attributed to the disease, of which 21,700 resulted in death [10]. Between 2011 and 2016, 102,056 amputation surgeries were performed by the Unified Health System (SUS), with 70% of them in individuals with diabetes mellitus, and the majority (94%) being lower limb amputations [11].

In the state of Piauí, from 2002 to 2013, several people underwent amputations due to complications of the disease. Thus, this situation leads us to reflect on the importance of hospital and outpatient medical care, as well as the need to prioritize it in public health programs. This is necessary to expand diabetes treatment and control.

The registration system for individuals with the disease, provided by the Department of Informatics of the Unified Health System (DATASUS) [12] of the Ministry of Health, serves as a tool for understanding the clinical and epidemiological profile of the population and enables modernization through information technology to support the SUS. Through the data available in the system, it is possible to support objective analyses of the problem's situation and, thus, facilitate the development of health action programs, as well as enable early intervention by healthcare professionals aimed at mitigating the negative consequences [13].

Therefore, the aim of this study is to present the epidemiological profile of amputation cases in diabetic patients in the state of Piauí from January 2002 to April 2013, with the goal of shedding light on the severity of the disease and providing a foundation for health policies and actions aimed at educating and guiding the population, while also alerting managers and healthcare professionals about the urgent needs for prevention, early diagnosis, and immediate treatment of diabetes mellitus, thereby preventing the progression of the disease and its potential complications.

1.1. Theoretical Reference

According to the Ministry of Health [6], diabetes mellitus is a syndrome of multiple etiologies, resulting from the lack of insulin and/or the inability of insulin to adequately perform its functions. It is considered a public health problem due to its chronic nature and because it is a disease that affects large proportions of the population [14].

The prevalence of diabetes mellitus is related to a range of factors, such as: age, sex, lifestyle, wage income, number of people in the household and education, in addition to peripheral arterial diseases, neuropathies and nephropathy [15]. These factors may demonstrate a high risk for amputation, as they constitute aggravating factors for the triggering of chronic complications such as diabetic foot and the limitation of access to information, due to the possible impairment of reading, writing and understanding skills in educational activities, which therefore compromises preventive self-care.

One of the main complications of diabetes mellitus is the “diabetic foot”, which is characterized by the presence of lesions on the feet. The lack of proposals for an early and adequate treatment of these chronic complications results in a high statistical rate of injuries, which, if left untreated, can lead to lower limb amputations [16].

Silva et al [17] point out this complication as being the result of risk factors associated with peripheral neuropathy, peripheral vascular disease and biomechanical modification, which trigger a series of changes that lead to infection, ulceration and/or destruction of deep tissues. In the feet of people with Diabetes Mellitus, characterizing the “diabetic foot”.

Peripheral neuropathy can compromise sensory, motor and autonomic fibers, leading to the appearance of ulcerations on the feet, since it is associated with the gradual loss of protective sensitivity, perception of plantar pressure, temperature and proprioception; atrophy and asthenia of the small dorsal muscles, in addition to osteoarticular deformities and alterations in the user's walking; and the reduction of feet sweating, leaving them dry and susceptible to the development of fissures or cracks, in addition to arteriovenous alterations. Peripheral Vascular Disease, in turn, when associated with neuropathy, becomes a risk factor, as it impairs blood circulation in the lower limbs due to atherosclerosis of the peripheral arteries, compromising the healing process of ulcers in people with diabetes and favoring the emergence of infectious processes, thanks to the fact that ischemic conditions reduce the action of antibiotic therapy. In addition, biomechanical changes are associated with increased risk of injuries [18].

Half of amputations in patients with diabetes mellitus can be prevented with early detection and timely treatment of clinical manifestations, such as metabolic control, patient education and good foot care [19].

Lucas et al [20] also emphasize that amputation does not only mean the loss of limbs, as it involves drastic changes in the individual's life, bringing with it a range of other damages that lead to a worsening of the person's quality of life. Thus, according to the same authors, preventive actions must be adopted to reduce the number of people with diabetes mellitus who may have their limbs amputated, since this procedure generates, in addition to expensive costs for the health sector, intense physical exhaustion. -psychosocial of the patient and his family.

In this sense, the emergence of new challenges for public managers and, more directly for primary care professionals, of which nurses stand out, is highlighted, who will need to make efforts for new strategies related to this social context that surrounds them, such as diagnostic actions intensive and early interventions, identification of patients at risk through qualified clinical practice and, above all, the creative use of educational strategies aimed at the needy population and supervision of self-care actions [15].

Based on the above, it is important to emphasize the importance of humanization in care so that health professionals can perform their activities more effectively and completely. Looking at the amputee, from their perspective, allows for care directed at the uniqueness of the person and the particularity of the experience they go through [21].

2. Material and methods

This is a cross-sectional, descriptive, retrospective study with a quantitative analysis of amputation cases in patients with type 2 diabetes in the state of Piauí from 2002 to 2013.

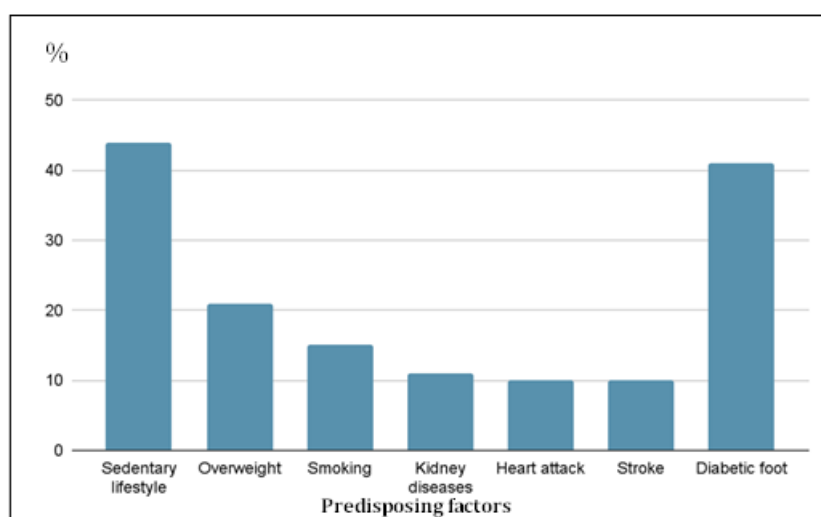
In the search for information, the Department of Informatics of the Unified Health System (DATASUS) was used as a database, in which the following variables were considered: type of diabetes, age group, gender, diabetic foot factor and lifestyle.

3. Results and discussion

It was found that during the period from January 2002 to April 2013, 81 cases of amputation due to diabetes mellitus were reported in Piauí, with an incidence in the following counties: Acauã (10,0%), Alegrete do Piauí (9,0%), Alto Longá (4,5%), Amarante (3,5%), Angical do Piauí (3,0%), Barra D'Alcântara (5,0%), Bom Princípio do Piauí (11,0%), Campo

Maior (2,0%), Canto do Buriti (6,0%), Castelo do Piauí (3,0%), Cocal (2,3%), Currais (100,0%), Eliseu Martins (6,7%), Esperantina (1,3%), Floriano (0,7%), Teresina (1,0%), Parnaíba (2,0%), Inhuma (1,8%), Itaueira (5,9%), Itainópolis (2,8%), Joca Marques (6,7%), Lagoa de São Francisco (7,7%), Luis Correia (0,9%), Marcos Parente (25%), Pedro II (2,0%), Picos (1,4%), Piracuruca (4,2%), Piripiri (0,6%), São Felix do Piauí (3,1%), São João do Piauí (12,5%), São José do Peixe (25,0%), São José do Piauí (3,2%), São Raimundo Nonato (3,5%), Sebastião Leal (10,0%), Simões (5,9%), União (0,7%), Valença do Piauí (2,7%), Vila Nova do Piauí (12,5%), Bocaina (18,2%), Campo Grande (1,9%), Caxingo (11,1%), José de Freitas (2,7%), Luzilândia (3,1%), Matias Olimpio (4,44%) and Monsenhor Hipolito (4,1%).

The epidemiological profile of amputees was composed of males (63%) aged between 55 and 59 years (19.7%). Lifestyle also appeared as a predisposing factor to the risk of amputation due to type 2 diabetes, since of the 81 cases of amputation analyzed, 44 were related to the presence of a sedentary lifestyle (54.3%), 21 cases were linked to the presence of overweight (25.9%) and 15 cases were related to smoking (18.5%). In addition, 11 cases were related to kidney diseases (13.5%), 10 cases were related to acute myocardial infarction (12.3%), 10 cases were related to stroke (12.3%) and 41 cases were related to the presence of diabetic foot (50.6%), which is a factor that can facilitate cases of lower limb amputation, as diabetes hinders the healing of skin wounds (Figure 1). It was not possible to analyze amputees who had more than one type of risk factor, since the DATASUS system does not allow correlating this type of information.



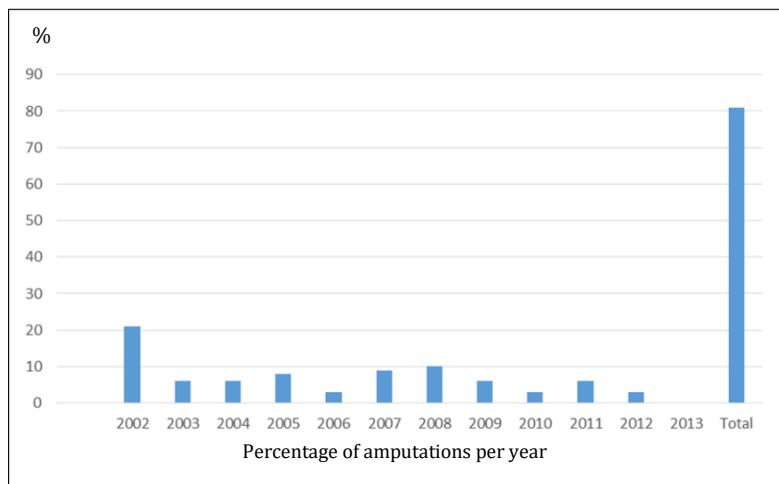
Source: Survey data (2023)

Figure 1 Predisposing factors to the risk of amputation due to type 2 diabetes in the state of Piauí from 2002 to 2013

These results are mainly due to the fact that a sedentary lifestyle negatively impacts the entire metabolism, including the immune system, since the inflammatory process underlying type 2 diabetes mellitus is responsible for signaling several inflammatory pathways, resulting in the recruitment of immune cells in insulin-sensitive tissues and in the stimulation and secretion of pro-inflammatory cytokines [22].

Furthermore, the regular practice of physical activity decreases the rate of glucose present in the blood, because glucose is the body's main energy fuel. Therefore, people with type 2 diabetes need to be extra careful and opt for a non-inflammatory diet, such as fish, grilled chicken, vegetables and fruits, and to practice regular physical activity.

It was possible to observe (Figure 2) that the year with the most records of amputations due to diabetes mellitus was the year 2002 with 21 cases (26.0%), except in the months of January, March, April, May and November in which no there were no records of cases of amputations due to type 2 diabetes. In second and third places, respectively, were the years 2008 with 10 cases (12.3%) and 2007 with 9 cases (11.1%). Also, in 2003, there was a huge decrease in the number of amputations due to diabetes, which was extremely important, since 2002 was the year with the most cases, reaching more than 20% of notifications. Thus, after this decrease, the year 2003 was only notified in 3 months throughout the year (January, February and August). Regarding the mortality rate, it was not possible to verify it during the years studied, as there were no notifications in this period in the DATASUS system.



Source: Survey data (2023)

Figure 2 Amputations due to type 2 diabetes in the state of Piauí from 2002 to 2013

4. Conclusion

It was possible to conclude that there was a varied distribution of cases of amputation due to diabetes in Piauí in the years 2002 to 2013. In this distribution, it appears that a group of individuals had diabetic foot, a condition that can progress to lower limb amputation, establishing a relationship with diabetes, as it hinders the healing process.

As for the epidemiological profile of the disease, there was a greater predominance in males in an age group between 55 and 59 years old, concentrating both in the extreme northeast and in the southeast region of the state. As for the lifestyle of these individuals, it was found that sedentary lifestyle, overweight and smoking are the main predisposing factors to the risk of amputation in people affected by diabetes.

It is suggested, therefore, to analyze the epidemiological profile of the disease, once it enters into surveillance, the areas with the highest incidence mentioned, in order to reduce the concentration in the results found. It is important to emphasize that the early diagnosis of the disease helps in the treatment of the disease and prevents possible complications in the future, such as, for example, the amputation of limbs. In addition, it is important to promote awareness about the disease and alert the population about the main factors that cause the disease, since the incidence of these conditions leaves the individual vulnerable to type 2 diabetes mellitus, as well as its impacts.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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