Journal of Nursing
Revista de Enfermagem
UFPE On Line
ISSN: 1981-8963

ORIGINAL ARTICLE

# CONTRIBUTING FACTORS TO THE EMERGENCE OF COMPLICATIONS FROM DIABETES MELLITUS

## FATORES DE RISCO PARA COMPLICAÇÕES DECORRENTES DO DIABETES MELLITUS

## LOS FACTORES QUE CONTRIBUYEN PARA LA APARICIÓN DE COMPLICACIONES DE LA DIABETES MELLITUS

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**ABSTRACT**

***Objective***: to identify the risk factors contributing to the onset of complications from diabetes, and to verify the knowledge of diabetic patients about diabetes, with emphasis on the diabetic foot. ***Method***: an exploratory, descriptive study, of quantitative and qualitative approach held in a Service of Primary Health Care with 30 diabetic users through a form during December 2011 to February 2012. Study approved by the CEP HULW / UFPB, CAAE No 0192.0.462.126/11. ***Results***: it was found that 83% of diabetics have hypertension, 7% consume legal drugs, 77% do not exercise, 33% have been diagnosed with diabetes for more than ten years. The participants' knowledge about diabetes, prevention of diabetic foot and the factors that contribute to its development seems insufficient and inadequate. ***Conclusion***: pointing up the need to carry out actions of diabetes education, to insert in their diabetic care process, avoiding the appearance of complications. ***Descriptors***: Diabetes Mellitus; Diabetes Complications; Nursing; Health Education.

**RESUMO**

***Objetivo***: identificar os fatores de risco contribuintes para o surgimento de complicações decorrentes do DM, e verificar o conhecimento dos pacientes diabéticos acerca do DM, com ênfase no pé diabético. ***Método***: estudo exploratório, descritivo, de abordagem quantiqualitativa, realizado em um Serviço de Atenção Básica em Saúde com 30 usuários diabéticos, através de um formulário, durante dezembro 2011 a fevereiro 2012. Estudo aprovado pelo CEP do HULW/UFPB, CAAE nº 0192.0.462.126/11. ***Resultados***: constatou-se que 83% dos diabéticos apresentam HAS, 7% consomem drogas lícitas, 77% não praticam atividade física, 33% têm o diagnóstico de DM há mais de dez anos. O conhecimento dos participantes acerca do DM, da prevenção do pé diabético e dos fatores que contribuem para o seu desenvolvimento, mostra-se insuficiente e inadequado. ***Conclusão***: aponta-se a necessidade de realização de ações de educação em diabetes, para inserir o diabético no seu processo de cuidado, evitando o surgimento de complicações. ***Descritores***: Diabetes Mellitus; Complicações do Diabetes; Enfermagem; Educação em Saúde.

**RESUMEN**

***Objetivo***: identificar los factores de riesgo que contribuyen para la aparición de las complicaciones de la diabetes, y verificar el conocimiento del paciente diabético sobre la diabetes, con énfasis en el pie diabético. ***Método***: estudio exploratorio y descriptivo, con enfoque quantiqualitativo, realizado en un Servicio de Atención Primaria de Salud con 30 usuarios diabéticos a través de un formulario en diciembre 2011-febrero 2012. Estudio aprobado por el CEP HULW / UFPB, CAAE No 0192.0.462.126/11. ***Resultados***: se encontró que el 83% de los diabéticos tienen hipertensión, 7% consumen drogas legales, el 77% no hacen ejercicio, el 33% han sido diagnosticados con diabetes durante más de diez años. El conocimiento de los participantes acerca de la diabetes, la prevención del pie diabético y de los factores que contribuyen a su desarrollo parece insuficiente e inadecuado. ***Conclusión***: recordar la necesidad de llevar a cabo acciones de educación en diabetes, para insertar en su proceso de cuidado de la diabetes, evitando la aparición de complicaciones. ***Descriptores***: Diabetes Mellitus; Complicaciones de la Diabetes; Enfermería; Educación para la Salud.

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## INTRODUCTION

Diabetes Mellitus (DM) is characterized as a group of metabolic disorders characterized by chronic hyperglycemia, caused by the destruction of pancreatic beta cells, resistance to the action and/or dysfunctions in insulin secretion.[1]

Currently, DM is classified according to its etiology, as proposed by the American Diabetes Association (ADA): DM type 1, characterized by the destruction of beta cells responsible for insulin production, type 2 diabetes, resulting in impaired secretion and / or insulin resistance in the tissues; gestational diabetes and other types of diabetes.[2]

These types, it emphasizes the DM type 1 and 2 that can cause acute and chronic complications, where the latter can affect several organs, even leading to its bankruptcy. Among these morbidities are nephropathy, retinopathy, neuropathy and macroangiopathies.[3]

It is estimated that worldwide, by 2025, 333 million people present positive diagnosis of diabetes, being thus a worldwide epidemic and thus a challenge to health care systems worldwide. Moreover, the human consequences, social and economic diabetes are devastating because they occur four million deaths per year worldwide, determined by this disease and its complications, which represents 9% of total deaths.[4-5] In Brazil, the DM is among the top ten causes of deaths.[6]

It is noteworthy that the increase in the number of people with diabetes is the result of a sum of factors, among which: growing and aging population, expanding urbanization, gradual prevalence of obesity and sedentary lifestyle, but also improved survival of patients with DM. [7]

Among the chronic complications include those related to the feet, through the development of diabetic foot which can lead to non-traumatic amputations, causing major socioeconomic impact and loss of productive capacity. This health problem is among the top ten causes of death in most countries, generating early deaths that could be avoided.[8-9]

Authors claim that the development of diabetic foot, as well as amputations are major causes of morbidity among people with diabetes and the risk for its development is estimated at 15%.[10]

Thus, it is considered that preventive actions should be taken to reduce the number of people with diabetes who may have their limbs amputated. Since the procedure generates costs related to amputation costly for the health sector, as well as irreversible damage to people who undergo this intervention. Therefore, the importance of its prevention has become increasingly because time and expense are small compared with the large drug and hospital costs generated by treatment besides minor physical wear-psychosocial patient and their family.[11-12]

Given this reality, the studies to identify risk factors for the onset of complications of diabetes, but also knowledge about the diabetic disease process that is involved, it is shown as an important tool in the development of actions educational as it provides essential information to health services on the reality that some patients diagnosed with DM, thus allowing the implementation of diabetes education according to the needs presented by this population.

## OBJECTIVES

- Identifying risk factors that contribute to the emergence of complications of DM.
- Verifying the knowledge of diabetic patients about diabetes, with emphasis on the diabetic foot

## METHOD

The present study was taken from the Final Report of the Research Project of Scientific Initiation/CNPq/PIBIC/UFPB << **Revalence, risk factors and preventive measures of practice for the diabetic foot in clients served in a District Integrated Unit III>>,** the current August 2011-2012.

This is an exploratory and descriptive study with quanti-qualitative approach held in a Service Primary Health Care in the city of João Pessoa - PB, which is chosen to be the training field faculty of the institution proposing the study. The period of the study occurred between December 2011 and February 2012.

The population consisted of all patients with DM entries in the System of Registration and Monitoring of Hypertensive Diabetics - HIPERDIA - of that service, represented by 60 users, and the sample comprised 50% of the equivalent of 30 diabetic users. For the selection of participants were followed the following inclusion criteria: be at least eighteen years old, be registered in HIPERDIA be the DM and agree to participate in the study by signing or placing the datiloscopic impression the Terms of Consent; exclusion criteria: women diagnosed with gestational

diabetes under eighteen and people without cognitive ability to answer the form.

For the procedure for conducting the research, we considered the ethical observances contemplated in the guidelines and regulatory standards for research involving human subjects - Resolution No. 196/96 of the National Health Council, particularly with regard to the application of the Instrument of Consent participants, as well as the secrecy and confidentiality of the data.

It is emphasized that the research project was approved by the Ethics in Human Research Lauro Wanderley University Hospital of the Federal University of Paraiba and by CAAE No. 0192.0.462.126/11, getting favorable opinion for publication under Protocol No. 254/11.

To enable the collection of data from this study, we used a form containing objective and subjective questions pertaining to the proposed objectives.

Data analysis was performed by quantitative-approach. The data from the objective questions were quantitatively by simple frequency and percentage through the program Microsoft Office Excel 2010, presented in tables and graphs. As to data related to subjective questions were qualitatively analyzed by the technique of analysis of the Collective Subject Discourse (CSD).[13] This is a technique for organizing data that enables rescue discursive understanding of a given phenomenon in a given universe. This technique is operationalized in four steps shown below:

First stage - this stage are selected key phrases of each individual speech obtained from each subjective issue proposed for study, and the second step corresponds to the identification of the core ideas that each of the participants involved in the study presented in his speech and key phrases for each response of a given issue, thus forming a summary of the content of these expressions, whereas in the third stage, the group is the central ideas similar or complementary, involving the same answers to a particular question, and finally the fourth step comprises the structuring of DSC, by grouping similar central ideas, which represents a single speech, as if everyone had been uttered by one subject.

## RESULTS

The study included 30 diabetic users. Of these, 77% (n=23) were female, 60% (n=18) are above 60 years, and 53% (n=16) were married, and 53% (n=16) are represented by retirees, 60% (n=18) have only the elementary school and 37% (n=11) have only one minimum wage as income.

Regarding the factors that favor the development of complications arising from the DM, it was identified that 83% (n=25) of the sample present framework hypertension, while only 17% (n=5) are not diagnosed with hypertension, as is shown in Figure 1.

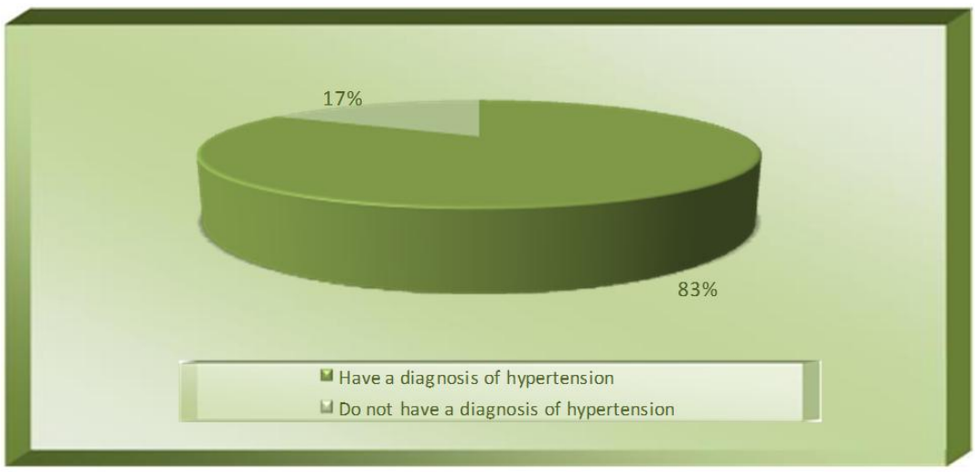


**Figure 1.** Distribution of participants of the study according to diagnosis of hypertensive framework. João Pessoa/PB 2012

Given this information, the blood pressure of the study participants was measured, their values being sorted according to V Classification of Blood Pressure Casual s Office in the Major Eighteen Years, contained in the VI Brazilian Guidelines on Hypertension.[12] Thus, it was revealed that the majority of participants, 47% (n=14) had optimal blood pressure in the period in which the survey was conducted, while 17% (n=5) were classified in stage two hypertension, as well as 13% (n=4) were classified as borderline, according to data presented in Table 1.

**Table 1.** Distribution of diabetic users according to the Classification of Blood Pressure (BP) according to Measure Casual s Office (> 18 Years) – Systolic/Diastolic (N = 30). João Pessoa/PB 2012

| Variables | n | % |
|---|---|---|
| Optimum: <120/<80 | 14 | 47 |
| Normal: <130/<85 | 1 | 3 |
| Limitrophe: 130-139/85-89 | 4 | 13 |
| Hipertension stage 1: 140-159/90-99 | 3 | 10 |
| Hipertension stage 2: 160-179/100-109 | 5 | 17 |
| Hipertenion stage 3: ≥ 180/≥ 110 | - | - |
| Isolated systolic hypertension: ≥ 140/ <90 | 3 | 10 |
| **Total** | 30 | 100 |

With regard to the habits harmful to health and can contribute negatively in the evolution of DM, was questioned participants about the consumption of licit drugs: tobacco and alcohol, 93% (n=28) of respondents did not consume drugs such as 7% (n=2) reported use, as can be seen in Figure 2. These two participants, one consumes alcohol and tobacco and other tobacco only.

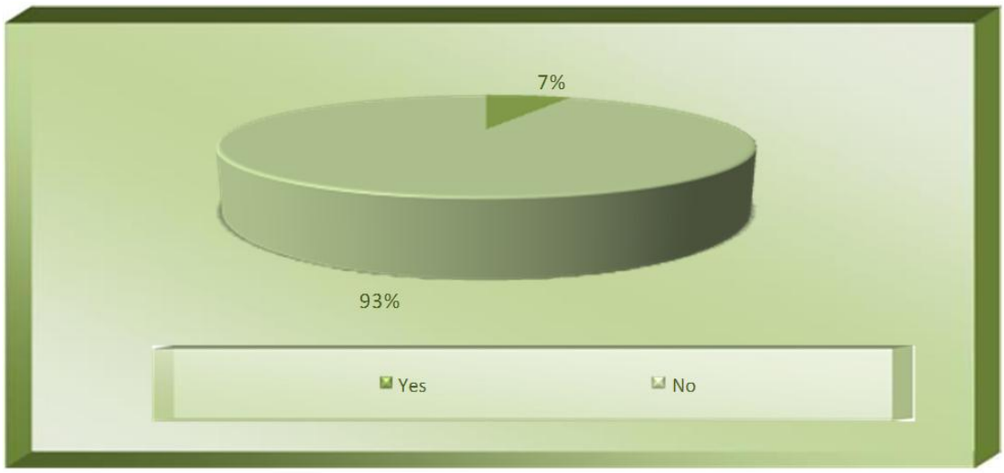


**Figure** 2. Distribution of participants as illicit drug use (n = 30). João Pessoa/PB, 2012.

Regarding physical exercises, a significant number of participants, represented by 77% (n=23) answered no physical exercise, while 23% (n=7) stated practice them, according to data presented in Figure 3.

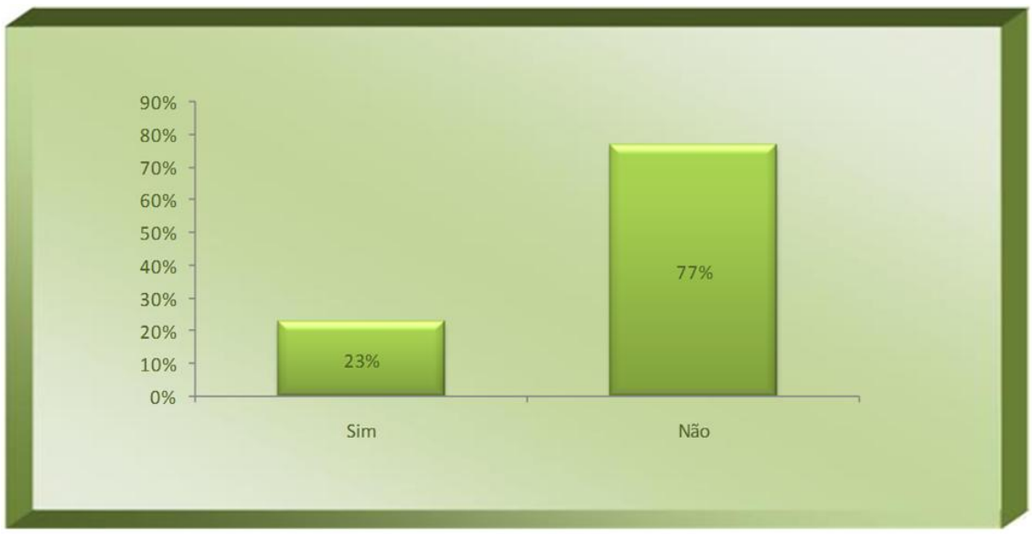


**Figure 3.** Distribution of study participants as physical exercises (n = 30). João Pessoa/PB 2012

To the time elapsed between diagnosis confirmed that the DM and the timing of the survey it was found that no participant reported being diagnosed with a chronic illness that less than six months, on the other hand, 10% (n=3) reported making more six months, 07% (n=2) have been diagnosed a year ago, 27% (n=8) of one to five years, 23% (n=7) five to ten years and 33% (n=10) over ten years in accordance with osdados shown in Table 2.

**Table 2.** Distribution of participants according to time of diagnosis for DM (n = 30). João Pessoa/PB 2012

| Time of diagnosis | n | % |
|---|---|---|
| Less than six months | - | - |
| More than six months | 3 | 10 |
| A year ago | 2 | 7 |
| From one to five years | 8 | 27 |
| Five to tem years | 7 | 23 |
| More than ten years | 10 | 33 |
| **Total** | 30 | 100 |

As regards the qualitative data of the study, subjective questions were applied to the participants. Among these, in order to know what signs and symptoms reported by the study subjects at the time they were diagnosed with DM, was questioned: *"What (the) Lord (a) was feeling when he was diagnosed (a) with DM? "*. This question gave rise to three central ideas with their DSC.

**Central Idea 1** - **Signs and Symptoms Classics DM** produced the following DSC: *You wanted to take plenty of water and pee straight; [...] hunger was great and so ate a lot, but not sated [...] I lost a lot of weight and could not gain weight [...]; was also feeling weak and tired.*

**Central Idea 2** - **Signs and nonspecific symptoms**. DSC: His heart accelerating, pain in the joints and spine [...] *had numbness and pain in the legs [...], under my foot hurt so much; also had dizziness, fainting, headache [.. .] vomited and coughed a lot. Moreover, felt itchy vagina and legs [...] everything was inflamed.*

**Central Idea 3** - **Asymptomatic**. DSC*: I felt nothing [...] nothing at all. I only found that DM was when I went to routine examinations.*

Regarding the participants' knowledge about DM, was asked: What does Mr (Mrs) know about DM? With this question we obtained five core ideas, with the corresponding DSC.

**Central Idea 1** - **Concept of DM**. DSC: *Diabetes is the accumulation of blood sugar [...] is a disease that has no cure mad [...] is the worst disease in the world.*

**Idea Central 2** - **Pathophysiology**. DSC: *A person get diabetes when you eat lots of sugar [...] there is sugar in the blood and accumulates [...] that why sick with diabetes.*

**Central Idea 3** - **Signs and symptoms**. DSC: *When sugar is high, the person is very pee [...] can also give weakness, blurred vision, dizziness [...] can also get very hungry and thirsty, losing weight and having leg weakness.*

**Central Idea 4** - **Complications of DM**. DSC: *Diabetes will eventually organs of the person inside [...] because it may lead to blindness, wounds that cost appears to heal, to kidney problems and feet and even having to need to cut the leg [. ..] pressure can also be changed. I also know that if not careful can cause death.*

**Central Idea 5** - **Treatment**. DSC: *Cannot eat sweet things already that increase diabetes, or drink alcohol [...] need to decrease the food and eat simple things no sugar, no oil [...] eat more vegetables. When you need to have to use insulin and take medicine.*

To identify participants' knowledge about the prevention of diabetic foot and the factors that may contribute to its development, was asked first: "The (a) Mr (a) knows what attitudes people who are suffering from DM can take to prevent the diabetic foot? "in response to this question, the majority represented by 60% (n = 18) of diabetic users responded not knowing and only 40% (n=12) reported knowing prevention attitudes.

These responses led to **Idea Central 1** - **Knowledge about practical measures for prevention of diabetic foot**. DSC: *A person has to cut the nails straight, flush and straight foot, especially between the toes and always use moisturizer [...] always ride with boots and wear closed shoes, comfortable [...] can not wear tight shoes or flip-flops. Also can not fail to make the arrangements in food or stop taking the medicine [...] and always be careful not to get cuts and wounds form.*

With regard to knowledge of attitudes that can determine the appearance of the diabetic foot, asked himself: "What does (the) Lord know what can cause a person to have diabetic wounds / foot injuries?": This issue revealed that 80% (n = 24) did not hold that knowledge and that only 20% (n = 6) claimed to know how the diabetic foot can develop.

Thus, originated the **Central Idea 2** - **Knowledge about attitudes that contribute to the development of diabetic foot**. DSC: *Not sure how the diabetic foot comes up, but I know that walking barefoot, eating foods loaded [...] do not take care of the right foot,*

*can cause injury and even cause a person to have to cut his leg.*

## DISCUSSION

With regard to risk factors, considerable part of users diabetics are diagnosed with a condition of high blood pressure (HBP) which, when associated with DM, leverages micro and macrovascular damage caused, causing high cardiovascular morbidity and brain. It is noteworthy that hypertension and DM are part of a class of Chronic Noncommunicable Diseases (NCDs), representing a major cause of deaths across the country.[15-6]

As for the measurement of systemic blood pressure (SBP), it was found that most participants PAS great features, which can be considered as a positive factor in the treatment of diabetes, since diabetes education programs recommend that one should keep the systolic blood pressure values below 130 mm / Hg, but also save diastolic blood pressure with values approximate 80 mm / Hg.[17]

Furthermore, treatment of hypertension in diabetic patients reduces mortality to 76% cardiovascular, as well as reducing the risk of complications is continuous, and for each decrease of 10 mmHg in systolic blood pressure observed is an average reduction of 24% in the risk of any complications related to DM, 32% in DM-related mortality, 44% in strokes and 37% in microvascular complications of DM. It is noteworthy that evidence suggests that the control of SBP is more effective in reducing macrovascular complications of DM than glycemic control.[18-19]

On the use of legal drugs, the study revealed that a significant sample of diabetic users do not consume, meaning less likely to develop complications, since the literature suggests smoking, associated with other risk factors, as a determinant for the increased risk cardiovascular complications in people with diabetes. We also stress the importance of avoiding excessive consumption of alcoholic beverages in order to prevent brain vascular diseases and prevent the induction of hypoglycemia.[2]

In relation to physical exercise, most participants do not perform, which can have negative consequences in the health-disease diabetic, since the physical exercise, especially aerobic plays significant influence in combating DM2, through greater use of lipids as an energy source; also, by increasing the sensitivity of insulin action to the cell membrane, thereby decreasing the concentrations of circulating insulin and glucose. Thus, physiological changes triggered by physical activity, characterized as non-pharmacological means to combat diabetes.[4]

With regard to the time that the study participants are diagnosed with diabetes, it appears that much time has diagnosed more than ten years, similar to other studies conducted in the states of São Paulo and Paraná.[20] This situation predisposes to higher risk of developing complications arising from the DM, since the longer the duration of diabetes, the greater the severity of the disease with the onset of chronic complications. Similarly, the longer the lower the diagnostic compliance.[21,3]

About the symptoms reported during the diagnosis of DM, it can be seen that some study participants had classic symptoms of DM, which includes "the three Ps": polyuria, polydipsia and polyphagia, being the first, the result of excessive loss of associated liquid osmotic diuresis, increased appetite as follows catabolism induced by insulin deficiency, and the lack of protein and lipid, weight loss, weakness, and fatigue.[22-3]

Other participants showed no manifestations of DM features, among them changes musculoskeletal, vulvovaginitis, tingling, numbness in hands and feet, and recurring skin infections.[24-5]

On the other hand, there were participants who did not show any sign and / or symptom related to DM, which is not unusual, since half the people with diabetes do not know they are carriers of this chronic disease, continuing undiagnosed until complications if manifest. As studies indicate that in most cases diagnosed DM is carried out late and there is a underdiagnosed disease.[20]

It is therefore considered that the correct and early diagnosis of DM allows them to adopt measures that can prevent and / or delay the onset of complications.[1]

Regarding the users' knowledge about diabetes DM, was revealed through their speeches, they have limited and superficial knowledge about the said NCDs. What can be considered as a negative factor and predisposing the onset of complications arising from diabetes. Since the knowledge of the disease allows the DM to change their behavior so as to obtain autonomy and join together with health professionals, decisions and attitudes related to their disease process and, moreover, the knowledge about the disease provides a way for diabetics to practice self-care.[26-7]

Regarding the participants' knowledge of attitudes and factors that may prevent

diabetic foot, but also about what can cause your appearance, it was found that the diabetic patients have deficient understanding. This may contribute negatively the evolution of the disease, leading to the appearance of lesions in the lower limbs, and thus further amputations.

Corroborating this assertion, the authors argue that the knowledge of the factors that contribute directly or indirectly to the development of lesions in feet, as well as prevention actions can contribute to decrease the prevalence of lesions and consequently the amputations.[9,26]

It is noteworthy that people with diabetes should know the mechanisms that can cause damage to lower limbs in order to become aware of the need to care for your feet, through measures of hygiene, hydration and protection with appropriate footwear, as well as through daily inspection of the feet for signs of injury, without forgetting the inspection of the interior of the shoes before using them.[3]

And to effect the prevention of lower limb injuries, the professional nursing must have the role of conducting the examination of the feet in all cases, including nursing consultations, hospitalizations, home visits, as well, to perform diabetes education actions in order to offer guidance on the DM and encourage attitudes to self-care.[3]

However, it is emphasized that behavior change to occur that benefit the health of the DM, should be considered not only the acquisition of knowledge, but also the entire context socioeconomic, cultural and motivational in which people are inserted, without forgetting is the existence of public policies aimed at promoting health.[13]

## CONCLUSION

The study showed that participants' knowledge regarding the DM is limited, superficial and inadequate. This reality associated risk factors, which are present in the sample, enhances the appearance of complications from diabetes. However, it is noteworthy that the acquisition of knowledge is not an isolated fact to change behaviors that may negatively influence the evolution of the disease, it is important to consider the economic, social and cultural environments in which these individuals are embedded.

In addition, large impacts biopsychosocial, spiritual and economic factors that cause the complications of diabetes, with emphasis on the development of diabetic foot, reveal the need to perform actions that provide prevention of injuries resulting from the DM.

Thus, it is understood that the professional nursing, which has among its main functions, the role of health educator, has a duty to promote diabetes education actions that provide guidance on the care associated with patients with clear language and objective, as well as with practical activities in order to stimulate the person diagnosed with Diabetes Mellitus to perform self-care, and be a protagonist in the process of care.

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Submission: 2013/02/12
Accepted: 2013/05/30
Publishing: 2013/08/01

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