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Original Article

Knowledge about preventive measures for the development of diabetic foot*

Conhecimento sobre medidas preventivas para desenvolvimento do pé diabético

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ABSTRACT

Objective: to analyze the knowledge of people with diabetes mellitus about preventive measures for the development of diabetic foot. **Methods:** cross-sectional study, carried out with 171 diabetic people treated in the Family Health Strategy. A form was applied to obtain sociodemographic and clinical variables and a scale to assess the level of knowledge. For analysis, descriptive and inferential statistics were used. **Results:** 65.5% had little knowledge. The question with the highest rate of correct answers was the non-use of a hot water bag on the feet (92.3%), however, the question with the highest rate of errors was: use open shoes at home and to go out, (66.8 %). The score of the instrument's total score was influenced by gender (p≤0.001). **Conclusion:** the participants had a low level of knowledge about preventive measures and were unaware of important self-care habits, such as using appropriate footwear and not hydrating between the toes.

Descriptors: Diabetic Foot; Diabetes Mellitus; Primary Prevention; Knowledge.

RESUMO

Objetivo: analisar o conhecimento de pessoas com diabetes mellitus acerca das medidas preventivas para o desenvolvimento do pé diabético. **Métodos:** estudo transversal, realizado com 171 pessoas diabéticas atendidas na Estratégia Saúde da Família. Aplicou-se formulário para obtenção das variáveis sociodemográficas e clínicas e escala para avaliar o nível de conhecimento. Para análise, utilizou-se das estatísticas descritiva e inferencial. **Resultados:** 65,5% apresentaram pouco nível de conhecimento. A questão que obteve maior índice de acertos foi o não uso de bolsa de água quente nos pés (92,3%), todavia, a questão com maior índice de erros foi: utilizar calçado aberto em casa e para sair, (66,8%). O escore da pontuação total do instrumento foi influenciado pelo sexo (p≤0,001). **Conclusão:** os participantes apresentaram baixo nível de conhecimento acerca das medidas preventivas e desconheciam hábitos importantes de autocuidado, como uso de calçado adequado e não hidratação entre os dedos dos pés.

Descritores: Pé Diabético; Diabetes Mellitus; Prevenção Primária; Conhecimento.

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Introduction

Diabetes Mellitus (DM) is considered an epidemic worldwide, being one of the most important problems, as it has a lot of social and economic repercussions. It is estimated that in 2030 diabetes will be the seventh leading cause of death, being associated with several risks, among them, neuropathy in the feet, associated with reduced blood flow, progressing to foot ulcers, infection and, in more severe cases, amputation[1].

The diabetic foot is among the most recurrent chronic complications of the disease, being a problem formed by infection, ulceration, destruction of soft tissues, associated with neurological changes, and peripheral arterial disease. As the limb is compromised, the diabetic foot has been considered the cause of the increase in hospitalizations and incapacitating amputations[2-3]. Diabetic neuropathy is considered the main risk factor for diabetic foot, affecting 50.0% of cases of individuals with diabetes mellitus over 60 years of age. This complication can be reversible or not[4].

Thus, to avoid complications, it is of utmost importance that the person with diabetes modifies risky behaviors, including inappropriate foot habits, and it is necessary that the examination of the feet be included in the routine of care by the health professional, as this way, early identification of the risk of ulceration will be possible[5]. In view of this, it is possible to observe that the knowledge and practices of foot care of people with diabetes are directly associated, as, upon receiving the appropriate guidance, this helps them to understand that the performance of such practices can prevent the appearance of complications from the disease[6].

For this, the communication between the professional and the person with diabetes must be effective, so that they understand the importance of self-care and practice it. In this sense, the nurse professional stands out as a health educator, since the prevention of diabetic foot is the line of defense against the development of diabetic ulcers[7]. In this way, it is relevant to analyze the knowledge that the person with diabetes mellitus has about preventive measures, since the appropriate transfer of guidance by professionals and the practice of self-care by the person culminate in fewer chances of developing the diabetic foot and the respective complications.

Thus, the study aimed to analyze the knowledge of people with diabetes mellitus about preventive measures for the development of diabetic foot.

Methods

Cross-sectional study, developed in the twenty-five Family Health Strategies in the urban area of the municipality of Picos, Piauí, Brazil. The population consisted of 1,319 people diagnosed with diabetes mellitus (types 1 and 2), registered and monitored in the municipality's Family Health Strategies.

To obtain the sample universe, we used the sample calculation for finite populations, with total population value (n=1,319). Parameters described in the literature for the prevalence of diabetic foot were used: p=0.15; where: t = is the value of the Student distribution (t5%=1.96); e = is the sampling error absolute (e=5%); n = is the sample, which corresponded to 171 people with diabetes. The prevalence of diabetic foot was used, as this study is part of a larger project that assessed the knowledge and prevalence of diabetic foot. The sample was distributed proportionally by the number of Family Health Strategies. Therefore, it is a stratified sample.

Inclusion criteria were established: being over 18, being assisted by one of the Family Health Strategies, in the urban area, in Picos, Piauí, Brazil, and having been diagnosed with diabetes mellitus for at least two years, because it is believed that this is a period of time in which the person has already lived through the requirements related to the treatment of diabetes. As exclusion criteria: having ulcers in the lower limbs or the diabetic foot installed. Data were collected from February to May 2018, in the referred health units, as well as through home visits previously scheduled by the community health agent.

To obtain the data, an evaluation form and instrument were applied. The form included sociodemographic variables: sex, age, education, color, marital status, housing, income and economic class; clinical variables: type of diabetes, time of diagnosis, presence of systemic arterial hypertension, treatment, smoking, frequency of physical exercise, alcoholism. Weight and height were also measured. In addition, body mass index for adults and the elderly[8] and capillary blood glucose[9] were calculated.

The instrument for assessing the level of knowledge about essential foot care was taken from the International Consensus on Diabetic Foot[10], which addresses issues such as: type of shoe, use of appropriate socks, care for nails, foot hygiene and protection, drying and hydration. Each question is equivalent to 0.5 point, totaling 20 questions, which corresponds to 10 points. Thus, the level of knowledge is classified into: no knowledge (0 points); very little knowledge (≥ 1 to 2.9); little knowledge (3 to 4.9); good knowledge (5 to 6.9); more than good knowledge (7 to 8.9) and very good knowledge (9 to 10.0)[11].

For data analysis, we used the software Statistical Package for the Social Sciences, version 20.0. In the descriptive analyzes, tables of absolute (n) and relative (%), mean and standard deviation tables were developed to characterize the sample of people with diabetes in the study. For inferential analysis, Pearson's Chi-square test and Mann-Whitney test were applied, with $p < 0.05$ (level of significance) and 95% confidence interval.

The study obtained 77900117,9,0000,8057 as protocol number of the presentation certificate for ethical appraisal, being approved by the research ethics committee of the Federal University of Piauí, Brazil, according to opinion 2,389,111/2017. The research followed the ethical precepts of Resolution No. 466/12 of the National Health Council.

Results

Of the total participants, 62.6% were female, with a mean age of 62.2 ± 11.4. As for education, the average of 5.7 ± 3.8 years was identified, with family income between one and two minimum wages, 70.2%. When considering the clinical characteristics, type 2 diabetes predominated (94.7%), with diagnosis time between two and five years, 68 (40.0%). Regarding treatment, oral hypoglycemic agents (38.1%) prevail and 54.4% had glycemia greater than or equal to 180mg/dl.

With regard to clinical data (Table 1), relevant to those who had hypertension (76.6%), 65.6% were women and 34.4% men. The variables that showed a significant association with the participants' sex were smoking and alcohol consumption, showing that smoking was more frequent among women (79.4%, p=0.023), while alcohol consumption was higher among men (59.3%, p=0.011). Regarding the prevalence of physical exercise, only 9.4% performed this practice every day. Regarding the body mass index, both men and women were overweight, 57.4% and 42.6%, respectively.

Table 1 - Distribution of people with diabetes mellitus, according to clinical data. Picos, PI, Brazil, 2018. n=171

Clinical variables	Gender		Total	p-value*
	Female	Male		
	n (%)	n (%)	n (%)	
Systemic arterial hypertension				
Yes	86 (65.6)	45 (34.4)	131 (76.6)	0.133
No	21 (25.5)	19 (47.5)	40 (23.4)	
Smoking				
Yes	27 (79.4)	7 (20.6)	34 (19.9)	0.023
No	80 (58.4)	57 (41.6)	137 (80.1)	
Physical exercise				
Never	50 (61.0)	32 (39.0)	82 (48.0)	0.914
1 to 2 times	25 (61.0)	16 (39.0)	41 (24.0)	
3 to 5 times	21 (65.6)	11 (34.4)	32 (18.7)	
5 to 7 times	11 (68.8)	5 (31.2)	16 (9.4)	
Alcoholism				
Never	96 (66.7)	48 (33.3)	144 (84.2)	0.011
1 to 2 times	11 (40.7)	16 (59.3)	27 (15.8)	
Body mass index				
Eutrophy	39 (36.8)	19 (29.7)	58 (34.1)	0.510
Pre obesity	39 (36.8)	29 (45.3)	68 (40.0)	
Obesity	28 (26.4)	16 (25.0)	44 (25.9)	

*Chi-square test

Regarding the level of knowledge about essential foot care, 13.5% of patients had very little knowledge, 65.5% little knowledge and 21.1% good knowledge about preventive measures for the development of diabetic foot. The average of the total score of the score was 3.9 ± 1.1. The minimum and maximum values were 0.5 and 6.5, respectively.

Regarding the distribution of correct answers and errors in each question that dealt with essential foot care, in more than half of the questions there was a percentage of errors equal to or greater than 50.0%. The question with the most errors was number 3 (Should open shoes be used?), and the one that got more hits was number 6 (Should the person with diabetes use a hot water bottle?).

With regard to the list of the five questions that had the highest percentage of errors regarding essential foot care (Table 2), concerning wearing open shoes at home and going out; 70.1% and 59.4% between women and men, respectively. There was no statistically significant association between sex and essential foot care.

Regarding the five questions that had the highest percentage of correct answers, the use of a hot water bag showed a significant amount of positive responses, 89.7% among women and 96.9% among men. The score of the instrument's total score was influenced by gender (p≤0.001), noting that the average of the scores between the groups was different, as shown in Table 3.

Table 2 - Distribution of people with diabetes mellitus, according to knowledge about prevention of diabetic foot. Picos, PI, Brazil, 2018. n=171

Variables	Gender		p-value*
	Female n (%)	Male n (%)	
Should you wear open shoes?			
Only at home	22 (20.6)	23 (35.9)	0.712
At home and out	75 (70.1)	38 (59.4)	
Just to go out	9 (8.4)	2 (3.1)	
Do not wear	1 (0.9)	1 (1.6)	
Should moisturizer be applied?			
Between the toes and on the soles of the feet	10 (9.3)	16 (25.0)	0.732
Up and on the soles of the feet	17 (15.9)	9 (14.1)	
Upper, sole and heel	10 (9.3)	4 (6.2)	
Upper, sole, between toes and heel	70 (65.5)	35 (54.7)	
What time should you go out to buy new shoes?			
In the morning	66 (61.7)	33 (51.6)	0.137
Any time	24 (22.4)	26 (40.6)	
Early afternoon	10 (9.3)	4 (6.2)	
Late afternoon	7 (6.6)	1 (1.6)	
Should you wash your feet with?			
Coconut soap	32 (29.9)	15 (23.4)	0.282
Common soap	59 (55.1)	40 (62.5)	
Neutral soap	12 (11.2)	4 (6.3)	
Water	4 (3.8)	5 (7.8)	
What should you use to rub your feet?			
Normal bushing	28 (26.1)	21 (32.8)	0.748
Soft bushing	17 (15.9)	9 (14.1)	
Rough bush	31 (29.0)	13 (20.3)	
Sponge	5 (4.7)	8 (12.5)	
The hands themselves	26 (24.3)	13 (20.3)	

*Mann-Whitney test

Table 3 - Distribution of people with diabetes mellitus, according to knowledge about prevention of diabetic foot. Picos, PI, Brazil, 2018. n=171

Variables	Gender		p-value*
	Female n (%)	Male n (%)	
Should feet be washed every day?			
Yes	94 (87.9)	57 (89.1)	0.812
No	6 (5.6)	4 (6.2)	
Sometimes	7 (6.5)	3 (4.7)	
Should the person with diabetes use a hot water bottle?			
Yes	8 (7.5)	2 (3.1)	0.088
No	96 (89.7)	62 (96.9)	
Sometimes	3 (2.8)	0 (0.0)	
Should you check the shoe from the inside before wearing it?			
Yes	89 (83.2)	48 (75.0)	0.196
No	12 (11.2)	6 (9.4)	
Sometimes	6 (5.6)	10 (15.6)	
Can you walk barefoot?			
Only at home	28 (26.2)	17 (26.6)	0.493
At home and on the street	4 (3.7)	5 (7.8)	
In the street	1 (0.9)	0 (0.0)	
Never barefoot	74 (69.2)	42 (65.6)	
Should you wipe between your toes whenever your foot gets wet?			
Yes	77 (72.0)	43 (67.1)	0.510
No	11 (10.3)	12 (18.8)	
Sometimes	19 (17.7)	9 (14.1)	
Total score	107 (62.6)	64 (37.4)	<0.001

*Mann-Whitney test

Discussion

As a limitation of this study, the use of a small sample is pointed out as the sample calculation may have been influenced, due to the fact that in the municipality in question, the e-SUS Primary Care system, which aims to organize Primary Care information, was found if in the implementation phase, therefore not having full access to the number of people with diabetes assisted by the Family Health Strategy of that municipality.

The relevance of the study aims to contribute to the production of knowledge to be used in the care practice of nurses and other professionals who care for diabetic people and their complications, ensuring a better quality of life for this population.

The socioeconomic and demographic profile of diabetic people is in line with research carried out in other states in the Northeast Region of Brazil[12-13], the prevalence of women, the elderly and low level of education. In this sense, low education can negatively influence both access to information, such as understanding therapeutic guidelines, restricting opportunities to learn life habits that promote better quality of life[4].

As for the clinical characteristics, type 2 diabetes mellitus predominated, with high levels of capillary glycemia, considering that the glycemia levels, when controlled, decrease the complications arising from this disease. Therefore, strategies that assess the frequency of hyperglycemia are essential for successful treatment[9].

The presence of systemic arterial hypertension was prevalent among the participants, a fact that becomes worrying, since this morbidity constitutes a risk of cardiovascular disease, since heart disease ranks second among macro vascular complications and is strongly associated with mortality and morbidity in diabetic people[14].

Regarding the level of knowledge about foot care, knowledge was greater among women. In contrast, a study that described self-care practices with the feet concluded that adequate practices were more prevalent among men[6]. It is also noteworthy that the fact that women assume several roles; this can negatively influence the practices of self-care with the feet[7].

Among the questions of the instrument that evaluated the participants' knowledge about foot care, the one that got the highest rate of correct answers was: not applying a hot water bag to the feet, indicating a positive response, as there is a progressive loss of the protective sensation of the feet, making them vulnerable because, in the presence of trauma and exposure to inadequate water temperatures, for example, the affected person may not feel pain. Thus, one should avoid exposing the feet to several risk factors[15].

When asked about washing their feet, the majority reported washing their feet every day and wiping them, including between the toes. The good hygiene of the feet of these people and the habit of wiping between the toes reflects the prevention of the appearance of fungi, which can culminate in injuries[16]. Therefore, it is an important measure to prevent complications.

Regarding the issues of checking the shoe before using it, not walking barefoot and wiping interdigital spaces, these are essential measures against injuries to the feet of diabetic people. Checking the shoe before using it is a necessary intervention, in order to avoid accidents with poisonous animals, small stones or objects that may cause injury. Just as walking in and out of the house is a protective factor for the integrity of the feet, as it prevents the skin from becoming thick and dry, resulting in injuries, in addition to protecting the feet against possible trauma[9].

Exploratory research carried out in Curitiba, Brazil, with 40 people with diabetes mellitus and five nurses from a health service, verified the knowledge about preventive care for diabetic foot and the guidelines received by nurses and found that the appropriate type of footwear is the most approached guidance during nursing consultations, but that only, sometimes, the issue of checking the shoes before using them is addressed[17].

In relation to the question that obtained the highest percentage of error, we had: wear open shoes at home and to go out, as it is known that this public should avoid the use of flip flops, pointy shoes, tight or loose for the feet, habits that can favor foot trauma [9]. A study revealed that people with diabetes use inappropriate shoes, such as tight or point shoes, also highlighting that most participants used flip-flops most of the day[7].

On the other hand, the low purchasing power found in the present study raises the question that the user may have received guidance from health professionals; however, economic conditions do not allow them to follow them. However, research revealed that the group with the highest family income followed lifestyle habits similar to the group with the lowest income, concluding that diabetics neglect self-care practices with their feet[7].

Referring to the hydration of the feet of the person with diabetes mellitus, it is an important habit when done correctly; however, moisturizing the region between the fingers favors the proliferation of fungi, which can result in injuries[15]. Research revealed that diabetic people performed this practice frequently, including between the toes, also highlighting the presence of interdigital mycoses at the site[17]. The interdigital spaces must always be clean, dry and free from moisturizing creams[9].

Regarding the ideal time to buy new shoes, most participants believed that this question was not relevant and could be done at any part of the day. The result is in line with research, in which the evaluated people prioritized only comfort in shopping time[7].

In this context, the Diabetic Foot Manual provides guidance on the ideal type of shoe for people with diabetes, which can neither be tightened nor loosened, being the most appropriate time to buy new shoes in the afternoon, when feet tend to be swollen, as individuals may experience increased pressure in the foot regions and possible edema[15].

The aforementioned paradox showed superficial knowledge of diabetics about essential foot care, a fact that can be explained by the high level of low education and the elderly present in the study. Corroborating this result, another research, carried out in Tocantins, Brazil, found that the knowledge of people with diabetes mellitus about preventive measures for diabetic foot is limited and inadequate, in addition to statistically verifying that diabetics without education had less knowledge, when compared with literate[16].

Thus, the health professional who addresses this population in primary care, especially the nurse, must, during consultations, work with continuing health education, in order to interfere in modifiable risk factors, using clear and objective language.

Conclusion

The study demonstrated a low level of knowledge about preventive measures for diabetic foot among the participants. In more than half of the questions, there was a percentage of errors equal to or greater than 50.0%, in addition to ignoring important self-care habits, such as the use of proper footwear, no hydration between the toes and the ideal time to buy new shoes.

The results found reiterate the importance of health education focused on self-care. In this way, the multidisciplinary team, especially the nurse, has a crucial role in guiding the knowledge of people with diabetes mellitus about preventive measures for diabetic foot, in addition to performing interventions in modifiable risk factors, thus raising the quality of the public and preventing complications of the disease.

Collaborations

Sousa VM and Silva ARV contributed to the conception and design, analysis and interpretation of data and final approval of the version to be published. Sousa IA, Moura KR, Lacerda LSA and Ramos MGS collaborated with the writing of the article and relevant critical review of the intellectual content.

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