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CLÍNICA

Diabetic foot care before and after an educative intervention

Cuidado com os pés diabéticos antes e após intervenção educativa

Cuidado en los pies diabéticos antes y después de intervención educativa

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Palabras clave: Pie diabético; Diabetes Mellitus; Autocuidado; Prevención y control; Educación en Salud; Enfermería

ABSTRACT

Knowledge about foot care among diabetes mellitus (DM) patients contributes to avoid future complications. A quasi-experimental study undertaken at health centers in San Luís Potosí, Mexico, aimed at describing the sociodemographic and clinical profile of DM patients and their foot care habits before and after an educative intervention, based on participatory and traditional communication. The study was developed in two groups. The experimental group participated in the foot care education program using participatory communication, while the control group used the traditional communication method. For data collection, interviews were held at three different times: before the start, at the end of the program and six months after the end of the intervention. Most subjects were female, with a mean age of 52 years, had not finished primary education and, besides DM, suffered from arterial hypertension. As regards foot care habits, statistical tests showed a significant difference ($p < 0.001$) between the first and second measure, which may be due to the effect of the course and the better results achieved through the education program that used participatory communication. Thus, it was concluded that the effect of the educative intervention based on participatory communication entailed positive changes in the diabetic patients' foot care, and also favored learning and the choice of care conducts.

RESUMO

O conhecimento sobre o cuidados com os pés entre os indivíduos com diabetes mellitus (DM) contribui para evitar futuras complicações. Estudo quase experimental realizado nos centros de saúde da cidade de San Luís Potosí, México, com o objetivo de descrever o perfil sócio-demográfico e clínico de pacientes com DM e os seus hábitos de cuidados com os pés antes e após uma intervenção educativa, baseado na comunicação participativa e tradicional. O estudo foi realizado com dois grupos. O grupo experimental participou do programa de ensino para cuidados com os pés utilizando a comunicação participativa e o grupo controle utilizou o método de comunicação tradicional. Para a coleta de dados foram realizadas entrevistas em três momentos: antes do início, no final do programa e seis meses após o término da intervenção. A maioria dos sujeitos eram do sexo feminino, idade média de 52 anos, com nível de escolaridade fundamental incompleto e além de DM apresentavam hipertensão arterial. Em relação aos hábitos de cuidados com os pés, os testes estatísticos mostraram diferença significativa (p <0,001) entre a primeira medição e a segunda, o que pode ser devido ao efeito do curso e os melhores resultados obtidos através do programa de ensino utilizando comunicação participativa. Assim, concluiu-se que o efeito da intervenção educativa baseada na comunicação participativa proporcionou mudanças positivas em relação aos cuidados com os pés dos pacientes diabéticos, favoreceu a aprendizagem e a escolha de condutas para os cuidados.

RESUMEN

El conocimiento sobre cuidados con los pies entre individuos con diabetes mellitus (DM) contribuye para evitar futuras complicaciones. Un estudio casi experimental fue llevado a cabo en los centros de salud de la ciudad de San Luís Potosí, México, con objeto de describir el perfil sociodemográfico y clínico de pacientes con DM y sus hábitos de cuidados con los pies antes y después de una intervención educativa, basada en la comunicación participativa y tradicional. El estudio fue desarrollado con dos grupos. El grupo experimental participó del programa de enseñanza para cuidados con los pies utilizando la comunicación participativa y el grupo control utilizó el método de comunicación tradicional. Para la recolecta de datos fueron organizadas entrevistas en tres momentos: antes del inicio, al final del programa y seis meses después del término de la intervención. La mayoría de los sujetos eran del sexo femenino, edad promedia de 52 años, con nivel de escolaridad fundamental incompleto y, además de DM, sufrían de hipertensión arterial. Respecto a los hábitos de cuidados con los pies, los test estadísticos mostraron diferencia significativa (p<0,001) entre la primera y la segunda medición, lo que puede ser debido al efecto del curso y los mejores resultados alcanzados a través del programa de enseñanza mediante la comunicación participativa. Así, se concluyó que el efecto de la intervención educativa basada en la comunicación participativa proporcionó cambios positivos respecto a los cuidados con los pies de los pacientes diabéticos, favoreció el aprendizaje y la elección de conductas para los cuidados.

INTRODUCTION

Diabetes Mellitus (DM) is one of the most frequent illnesses globally. It can be considered an ongoing epidemic, mainly concentrated in developing countries. In 1885, the number of DM patients around the world was estimated at 30 million people, which had risen to 130 million in 1995 and reached 173 million in 2002. It is estimated that the number of DM patients around the globe will have risen to 300 million by 2030[(1)].

In general, the evolution of type 2 DM is slow and asymptomatic in the initial phase, which can postpone its diagnosis for many years and enhance the development of chronic complications [(1,2)].

Among DM complications, diabetic neuropathy is highlighted, which is the most common cause of foot ulcers and is present in 60% of patients over 60 years of age. If not treated appropriately, a foot ulcer can evolve to a lower limb amputation. It is considered that, for every ten leg amputations, seven relate to DM patients [(1,3,4)] .

Health care quality research shows that diabetes patients' feet are not examined during most outpatient consultations, a situation that can partially explain the lack of early detection of foot problems, neuropathies, mycosis and ischemia problems. It is estimated that 85% of all amputations could be prevented if patients took care of their feet, including daily assessment and prevention measures, so as to decrease the range and incidence of the problem [4,5].

Systemic and permanent education about foot care could contribute to reduce hospital admissions and emergency care, especially in case of episodes that involve diabetic coma and amputations. This would postpone the appearance of chronic complications, further patients' quality of life and bring down costs for health institutions [4,6].

In a study undertaken in Curitiba, Brazil, about the prevention of secondary diabetes complications, the authors mentioned that patients need learning and lifestyle skills, conditions which health professionals, especially nurses should promote, granting freedom for patients to establish their own actions. The authors recommended the elaboration of educative proposals involving patients and the offering of appropriate conditions to reach the targets [7].

Teaching should provide not only information, but also make patients incorporate and gain knowledge, turning it into value and integrating it in their scale of values [8]. In that sense, nurses should practice leadership, the art of communication and value the diversities and initiatives of all stakeholders in the group, working to enhance the human force of all, mainly patients [9].

Thus, communication strategies used for teaching play a fundamental role and represent the base for the knowledge and skills that enable people to make positive and responsible choices in their self-care [10].

In that sense, health professionals should use these communication strategies according to the contents they intend to communicate, emphasizing the importance of considering patients as determinant subjects in the learning process, constructed together with the people who offer health care. These elements support the importance of putting in practice a teaching program, using a method that favors communication and permits appropriate information delivery, which means information adapted to each person's personal, social, cultural and economic circumstances, as well as to the type and evolution of the disease, also further people's actual participation in the process, in which all participants consider them as information and decision sources to analyze the problems and contribute to solutions.

In view of the above, the aim of this study was to describe the sociodemographic and clinical profile of DM patients and their foot care habits before and after an educative intervention, based on participatory and traditional communication.

MATERIAL AND METHOD

In this quasi-experimental study, the independent variable was manipulated (teaching program based on participatory communication), observing its effect and relation with the dependent variable (results of putting the program in practice).

The study was undertaken at health centers in San Luís Potosí, Mexico, after obtaining Institutional Review Board approval from the Faculty of Nursing and Midwifery at Universidad de Guanajuato, Mexico.

To select the study subjects, the following inclusion criteria were considered: patients diagnosed with type 2 DM for more than five years, between 40 and 65 years of age, without foot ulcers. A draft was used to form two groups (experimental and control), with 77 members each. Both addressed the same theme, but the control group worked with the foot care teaching program based on the traditional communication model, offered by the team responsible for the health center, while the participatory communication method was used in the experimental group, offered by the primary researcher.

Participatory communication is a method that permits not only knowledge gaining, but also allows participants to include this knowledge as a part of their daily care practice. The intent of this method is to cover important aspects like: a) analysis of the situation, patient needs and interactive group participation planning, and b) teaching-learning and training for participants.

For data collection, an instrument was used that contained items on the diabetic patients' sociodemographic and clinical characteristics, as well as questions about how patients usually take care of their feet. This specific part included data about type 2 DM patients' daily foot care, aimed at preventing the appearance of injuries, and how they act when some kind of injury appears. This part consisted of ten single-choice items with three alternative answers each, representing an approximation of what patients do to take care of their feet and how frequently they perform care.

To measure patients' foot care level, the ten items were weighted as 1, 2 or 3, in which the highest score corresponded to a continuous or most appropriate care practice.

Both groups received ten hours of activities, divided in five weekly sessions.

Data were analyzed by comparing the groups with regard to the variables. Descriptive statistical analysis was applied, with absolute frequency and percentage calculations for each group. Multivariate analysis of the mean profiles was used. Student's t-test served to check for some parallel sequence at the three study times, as well as to compare the means in each condition assessed.

RESULTS AND DISCUSSION

In Table 1, the research participants' sociodemographic and clinical characteristics are presented.

Table 1 – Frequency distribution of sociodemographic and clinical variables in the experimental and control groups. San Luís Potosí, Mexico, 2007.

Intervention variables	Experimental Group		Control Group		TOTAL	
	N	%	N	%	N	%
Age range (years)						
40 l–l 45	21	47.7	23	52.2	44	100
46 l–l 50	14	45.1	17	54.8	31	100
51 l–l 55	14	66.6	7	33.3	21	100
56 l–l 60	10	43.4	13	56.5	23	100
61 l–l 65	18	51.4	17	48.5	35	100
Gender						
Female	68	49.2	70	50.7	138	100
Male	9	56.2	7	43.7	16	100
Marital status						
Married	52	46.9	59	53.1	111	100
Single	25	58.1	18	41.9	43	100
Education						
Unfinished primary	42	50.0	42	50	84	100
Finished primary	35	50.0	35	50	70	100
Occupation						
Housewife	59	48.3	63	51.6	122	100
Employed	18	56.2	14	43.7	32	100
Medical diagnosis						
Type 2 DM	46	51.1	44	48.8	90	100
DM and SAH*	31	48.4	33	51.5	64	100
Time with DM (years)						
5 l–l 10	63	52.9	56	47.0	119	100
11 l–l 15	9	39.2	14	60.8	23	100
>16	5	41.6	7	58.3	12	100

The sociodemographic and clinical characteristics identified in this research population support other studies in which most diabetic patients were female, over 40 years of

age, married, with unfinished primary education, without any paid job, who suffered from Arterial Hypertension as well as DM and had been diagnosed with DM between five and ten years [11,12,13].

The link between DM and Arterial Hypertension is common. About 40% of individuals with type 2 DM are hypertensive. Arterial hypertension, especially in diabetic individuals, needs to be treated to prevent the appearance of cardiovascular illnesses and minimize the progression of kidney disease and diabetic retinopathy [1].

As regards foot care, more than half of the experimental group reported previous knowledge on foot care (57.1%). Percentages were similar to the control group (53.2%). The patients informed that they had gained this knowledge in the mutual help group. The relevance of patients' previous knowledge is highlighted. Although research participants in both research groups had participated in this mutual help group over the years, only little more than half of them indicated knowledge on foot care. In general, during the sessions, difficulties were identified with regard to other basic issues, such as medication handling and the identification of disease signs and symptoms, among others.

In that sense, it should be highlighted that the help group method is that of an "open group", in which new members can be included at any time and stay as long as they decide to. People were identified who had participated in the group for more than five years, without a better control of their disease though. One issue that may be related and was identified in this research was that the group attends to another kind of need besides disease control and management, that is, the need for contact and belonging to a group. Other authors have studied this aspect and appointed its positive effects on self-esteem and social contact[14]. Thus, the objectives and methods of group work need to be reformulated, so as to article the institution's and the population's perspective and orient their efforts in the same direction.

In the following table, the DM patients' foot care habits are presented.

Table 2 – Foot care habits of experimental (n=77) and control groups (n=77) San Luís Potosí, Mexico, 2007.

Variables	BEFORE STARTING THE COURSE				AT THE END OF THE COURSE				SIX MONTHS AFTER TERMINATING THE COURSE			
	Experimental group		Control group		Experimental group		Control group		Experimental group		Control group	
	N	%	N	%	N	%	N	%	N	%	N	%
At what interval do you wash your feet?												
Does not wash them	2	2.6	1	1.3	-	-	2	2.6	-	-	2	2.6
Sometimes	37	48.1	43	55.8	14	18.2	38	49.4	16	20.8	41	53.2
Every day	38	49.4	33	42.9	63	81.8	37	48.1	61	79.2	34	44.2
When you wash your feet, do you dry the space between your toes well?												
Does not dry	9	11.7	10	13.0	1	1.3	4	5.2	1	1.3	5	6.5
Sometimes	10	13.0	17	22.1	10	13.0	7	9.1	8	10.4	12	15.6
Always	58	75.3	50	64.9	66	85.7	66	85.7	68	88.3	60	77.9
Do you usually apply some foot cream?												
Does not apply	22	28.6	22	28.6	1	1.3	11	14.3	3	3.9	13	16.9
Sometimes	20	26.0	12	15.6	18	23.4	13	16.9	15	19.5	16	20.8
Every day	35	45.5	43	55.8	58	75.3	53	68.8	59	76.6	48	62.3
Do you usually massage your feet?												
Does not massage	37	48.1	40	51.9	6	7.8	25	32.5	6	7.8	27	35.1
Sometimes	32	41.6	30	39.0	44	57.1	38	49.4	52	67.5	36	46.8
Every day	8	10.4	7	9.1	27	35.1	14	18.2	19	24.7	14	18.2

Table 2 – Foot care habits of experimental (n=77) and control groups (n=77) San Luís Potosí, Mexico, 2007 (continued).

Variables	BEFORE STARTING THE COURSE				AT THE END OF THE COURSE				SIX MONTHS AFTER TERMINATING THE COURSE			
	Experimental group		Control group		Experimental group		Control group		Experimental group		Control group	
	N	%	N	%	N	%	N	%	N	%	N	%
Your shoes												
Are tight	9	11.7	8	10.4	4	5.2	9	11.7	2	2.6	11	14.3
Are comfortable and have high heels	9	11.7	11	14.3	3	3.9	8	10.4	5	6.5	8	10.4
Are comfortable and have no heels	59	76.6	58	75.3	70	90.9	60	77.9	70	90.9	58	75.3
Do you review or shake your shoes before putting them on?												
Does not	12	15.6	17	22.1	2	2.6	9	11.7	2	2.6	9	11.7
Sometimes	12	15.6	15	19.5	7	9.1	15	19.5	7	9.1	15	19.5
Every day	53	68.8	45	58.4	68	88.3	53	68.8	68	88.3	53	68.8
Do you usually walk barefoot?												
Always	1	1.3	5	6.5	2	2.6	4	5.2	-	-	3	3.9
Sometimes	13	16.9	9	11.7	4	5.2	14	18.2	5	6.5	16	20.8
Never	63	81.8	63	81.8	71	92.2	59	76.6	72	93.5	58	75.3
How do you cut your nails?												
The shape does not matter	20	26.0	31	40.3	3	3.9	24	31.2	4	5.2	24	31.2
Round	39	50.6	33	42.9	36	46.8	36	46.8	37	48.1	36	46.8
Straight or squared	18	23.4	13	16.9	38	49.4	17	22.1	36	46.8	17	22.1

Table 2 – Foot care habits of experimental (n=77) and control groups (n=77) San Luís Potosí, Mexico, 2007 (continued).

Variables	BEFORE STARTING THE COURSE				AT THE END OF THE COURSE				SIX MONTHS AFTER TERMINATING THE COURSE			
	Experimental group		Control group		Experimental group		Control group		Experimental group		Control group	
	N	%	N	%	N	%	N	%	N	%	N	%
Do you usually exercise your feet												
Not usually	33	42.9	33	42.9	5	6.5	25	32.5	2	2.6	28	36.4
Sometimes	28	36.4	35	45.5	32	41.6	36	46.8	39	50.6	40	51.9
Every day	16	20.8	9	11.7	40	51.9	16	20.8	36	46.8	9	11.7
Do you usually get a medical examination of your feet in case of any problem?												
Not usually	52	67.5	52	67.5	33	42.9	54	70.1	28	36.4	51	66.2
Sometimes	12	15.6	13	16.9	27	35.1	14	18.2	29	37.7	11	14.3
Always	13	16.9	12	15.6	17	22.1	9	11.7	20	26.0	15	19.5

DM patients' foot problems are more frequent in the age range between 45 and 65 years. It is highlighted that increased age and longer diagnosis time come with a predisposition to diabetic foot development [(1)].

Traumas represent an important factor for the appearance of foot injuries/ulcers, often associated with the use of inappropriate footwear, falls, mycosis and wrong nail cuts [(1,14)].

In a study undertaken at a teaching hospital in a city in the state of Minas Gerais, Brazil, the researchers described foot care among hospitalized diabetic patients. The results showed that 15.5% of the interviewed patients reported the habit of walking barefoot and affirmed that they did not dry their feet well after bathing, 53.4% reported using hydrating cream or oils on their feet, 70.7% affirmed round toenail cutting, 58.6% indicated using open shoes more frequently and 72.4% affirmed that they analyze their

shoes internally before putting them on. The researchers concluded that most interviewed patients take appropriate care of their feet, except regarding nail cutting, the type of shoes used and skin dryness [15].

The same habits were identified in this study but, after the educative intervention, significant changes were observed, mainly when considering foot care in the experimental group.

Walking barefoot is a harmful habit, mainly when DM patients present structural deformities and loss of painful sensitivity. The use of appropriate footwear is important to protect the feet against harmful external agents, as well as the habit of inspecting the shoes before putting them on as preventive measures. As diabetic patients' plantar sensitivity may be problematic, any small object inside the shoe may not be felt and cause injuries if it is not removed [16].

Simple care, like hydrating legs and feet to avoid skin dryness and washing and drying the feet well, mainly between the toes, can avoid injuries and ulcers [17].

In a study involving diabetic patients, undertaken at the municipal health center in Rio de Janeiro, Brazil, the researchers identified calluses (37%), cracks (26%), pain (13%), limping (4%) and loss of sensitivity (3%) as the patients' main foot problems. They observed feet with precarious hygiene conditions in 9% and wheelchair use due to walking difficulties in 2.6% [11].

Another important care form relates to toenail cutting. In this study, before starting the course, most experimental group patients cut their nails in a rounded shape. This attitude changes at the end of the course, but increased in the control group. Cutting one's nails in a rounded shape contributes to the appearance of injuries on the toe corners, due to ingrown nails or sores caused by cutting objects. In case of infection, this can lead to delayed healing and even amputation [15].

One of the main challenges for the early diagnosis of DM patients at risk of developing diabetic foot is the inappropriate or non-accomplishment of a simple foot examination. Loss of protective sensitivity is the main factor in the appearance of foot ulcers and greater vulnerability to traumas (wrong nail cutting, use of inappropriate footwear, falls). Hence, appropriate prevention and intervention recommendations, which include the recognition of risk factors during the medical history, inspection, use of simple techniques and interventions, are extremely important to avoid complications that, if not treated appropriately, can lead to a much bigger problem: amputation [1].

In that sense, as health team members and educators, nurses should use appropriate methods and develop communication, discipline, creativity, respect and ethics skills, with a view to serving, delivering care and transmitting/communication, so as to offer high-quality health services to the population who demands and deserves this [18].

CONCLUSIONS

In comparison with the traditional method, the educative intervention strategy through the participatory communication method favored diabetic patients' learning and foot care conducts.

The participatory communication model created new possibilities for expression and interaction, which facilitated the exchange and creation of messages according to the diabetic patients' needs, permitting reflection, analysis, discussion of daily situations and identification of health needs together with all program participants.

Health professionals, especially nurses, need to adopt these educative strategies in their daily work to achieve

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