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Knowledge and attitude: profile of diabetics in dialysis

Conhecimento e Atitude: perfil de pessoas com diabetes em diálise

Conocimiento y actitud: perfil de personas con diabetes en diálisis

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ABSTRACT

Objective: to identify knowledge of, and coping with, diabetes mellitus among diabetics undergoing dialysis. **Method**: in this cross-sectional study of patients with type 2 diabetes, the instruments used were the Diabetes Knowledge Scale Questionnaire (DKN-A) and Diabetes Attitude Questionnaire (ATT-19). **Results**: mean age of the 71 participants was 61.81 ± 14.93 years. The most prevalent complication was diabetic retinopathy (81.69%), and the most prevalent comorbidity was systemic arterial hypertension (83.09%). Median fasting glycemia and glycated hemoglobin were 152 (124-228.5) mg/dl and 7,5 (6,42-8,27) mg/dl, respectively. Average DKN-A score was 7.84 ± 2.55; the highest success rate was on how to respond to hypoglycemia; the lowest was about ketones in urine and substitute foods. Mean ATT-19 score was 50.26 ± 11.7. **Conclusion**: the diabetics in dialysis showed deficient knowledge of diabetes and had negative attitudes to the disease.

Descriptors: Kidney Failure, Chronic; Diabetes Mellitus; Nephrology Nursing; Health Education; Knowledge.

RESUMO

Objetivo: identificar o conhecimento e o enfrentamento do diabetes junto a pessoas com diabetes em diálise. **Método:** estudo transversal, realizado com pacientes com diabetes tipo 2. Os instrumentos utilizados foram o *Diabetes Knowledge Scale Questionnaire* (DKN-A) e o *Diabetes Attitude Questionnaire* (ATT-19). **Resultados**: participaram 71 pacientes, com idade média de 61,81±14,93 anos. A retinopatia diabética foi a complicação prevalente (81,69%); hipertensão arterial sistêmica foi a comorbidade (83,09%). A glicemia em jejum apresentou mediana de 152 (124-228,5) mg/dl e a hemoglobina glicada de 7,5 (6,42-8,27) mg/dl. O DKN-A apresentou escore médio de 7,84±2,55 pontos; seu item com maior número de acertos foi a conduta em caso de hipoglicemia; enquanto o com menor número de acertos foi em relação à cetonúria e substituições alimentares. O instrumento ATT-19 obteve média de 50,26±11,7 pontos. **Conclusão**: pessoas com diabetes, em diálise, apresentam conhecimento deficiente em relação ao diabetes, assim como baixo enfrentamento da doença.

Descritores: Insuficiência Renal Crônica; Diabetes Mellitus; Enfermagem em Nefrologia; Educação em Saúde; Conhecimento.

RESUMEN

Objetivo: identificar el conocimiento y el afrontamiento de la diabetes mellitus entre los diabéticos en diálisis. **Método:** en este estudio transversal de pacientes con diabetes tipo 2, los instrumentos utilizados fueron el Diabetes Knowledge Scale Questionnaire (DKN-A) y Diabetes Attitude Questionnaire (ATT-19). **Resultados:** la edad media de los 71 participantes fue de 61,81 ± 14,93 años. La complicación más prevalente fue la retinopatía diabética (81,69%) y la comorbilidad más prevalente fue la hipertensión arterial sistémica (83,09%). La mediana de la glucemia en ayunas y la hemoglobina glucosilada fueron 152 (124-228,5) mg / dl y 7,5 (6,42-8,27) mg / dl, respectivamente. La puntuación promedio de DKN-A fue de 7,84 ± 2,55; la tasa de éxito más alta fue sobre cómo responder a la hipoglucemia; el más bajo fue sobre las cetonas en la orina y los alimentos sustitutos. La puntuación media de ATT-19 fue 50,26 ± 11,7. **Conclusión:** los diabéticos en diálisis mostraban un conocimiento deficiente de la diabetes y actitudes negativas hacia la enfermedad.

Descriptores: Fallo Renal Crónico; Diabetes Mellitus; Enfermería en Nefrología; Educación en Salud; Conocimento.

INTRODUCTION

Diabetes Mellitus (DM) is one of the most common chronic diseases in the world, affecting nearly 425 million people[1]. In Brazil, it reaches around 7.6% of the population, representing more than 15 million individuals[2].

It is well described that adequate glycemic control is fundamental for the reduction of harms and chronic complications. Major studies show that glycemic levels are directly proportional to the complications presented by DM carriers[3,4]. In this sense, the maintenance of acceptable levels of glucose has revealed benefits related to the complications, in special those associated with microvasculopathy and neuropathy[3,5,6].

One of most critical consequences of diabetes is Chronic Kidney Disease (CKD). For people with both these conditions, recommendations are that glycemic control be part of a multifactorial intervention strategy to prevent microvascular lesions and others injuries[7,8].

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For treatment success, it is important that the patient participates in the care process. In this way, it is believed that knowledge of the disease and its control alternatives are essential for minimizing adverse events and for better quality of life. In this context, health education emerges with potential for an improvement in patient empowerment. From the aforementioned, it is inferred that professionals are able to act as motivators, facilitators and promoters of the awareness of individuals, contributing to adherence to treatment, to the development of self-care capacity, and to lifestyle change[9,10].

This study aimed to identify the knowledge and attitudes of people with diabetes and chronic kidney disease on dialysis.

THEORETICAL REFERENTIAL

For healthcare professionals, being aware of how well patients understand their pathology and their attitude towards it is valuable. Such data may guide health education strategies and guidelines for adherence to treatment. Although there are few studies regarding the focus population of this study, a case study recommends interventions planned by the nurse[11].

In this sense, some instruments may support the decision-making of professionals by providing necessary information on the patients' knowledge about their own disease and the strategies they use to address it. Two of them are the Diabetes Knowledge Questionnaire (DKN-A)[12,13] and the Diabetes Attitude Questionnaire (ATT-19)[13,14], validated for the Brazilian reality.

DKN-A has 15 multiple-answer items and covers aspects related to general knowledge on diabetes mellitus. The questions are about basic physiology, food groups and DM management. The measuring scale used is from 0 to 15. A score of one (1) is attributed to the correct answer and of zero (0) for the incorrect answer. A score higher than eight (8) indicates knowledge about diabetes mellitus[15].

ATT-19 is an instrument that seeks to measure psychological adjustment for diabetes mellitus, developed in response to the needs of evaluation of the psychological and emotional aspects of the disease. It contains nineteen items that include six factors: a) DM-associated stress, b) treatment receptivity, c) trust in the treatment, d) personal efficiency, e) health perception, and f) social acceptance, with the answers measured using a five-point *Likert* scale (completely disagree - score 1; up to completely agree - score 5). The total value of the score can vary from 19 to 95 points. A score higher than 70 indicates a positive attitude towards the disease[15]. In this instrument, attitude is related to the decision of the individual to adopt or not the self-care measures for diabetes control[16].

These questionnaires have been referred to in a series of studies that measure the impact of interventions on people with diabetes, especially those involving health education, or which have investigated knowledge, coping and self-care as subsidiary data for health team actions[16-25]. Thus, assessing knowledge as well as emotional aspects is important to provide care and information consistent with the population served.

METHOD

This is a cross-sectional study, approved by the Ethics and Research Committee of *Pontifícia Universidade Católica do Rio Grande do Sul* (PUCRS) under Certificate of Presentation for Ethical Appreciation (*Certificado de Apresentação para Apreciação Ética*, CAAE) number 51381215.4.0000.5336.

The study was conducted in two dialysis services in the state of Rio Grande do Sul, Brazil. Data was collected between November 2016 and April 2017.

The population consisted of diabetics on dialysis (hemodialysis and peritoneal dialysis), linked to the aforementioned services: a total of 118 individuals. In the sample, the individuals included were those with type 2 diabetes, over 18 years of age, literate, and who agree to participate in the study by signing the free and informed consent form.

The patients excluded were those with a serious deficiency not corrected in hearing, speaking, and with total amaurosis or with degenerative neurological disease, reported in medical records. Also, all those who obtained less than 20 points in the Mini Mental State Examination (MMSE)[26].

The selection of the sample followed the diagram shown in Figure 1.

The patients who met the inclusion criteria were invited to participate and those who accepted signed the free and informed consent form and answered the MMSE.

For those with a score of 20 or more on the MMSE, an instrument was applied to collect sociodemographic and clinical variables, which included age, skin color, gender, marital status, schooling, income, distance from home in relation to the dialysis service, time of diabetes diagnosis, medications, chronic complications and comorbidities, laboratory values

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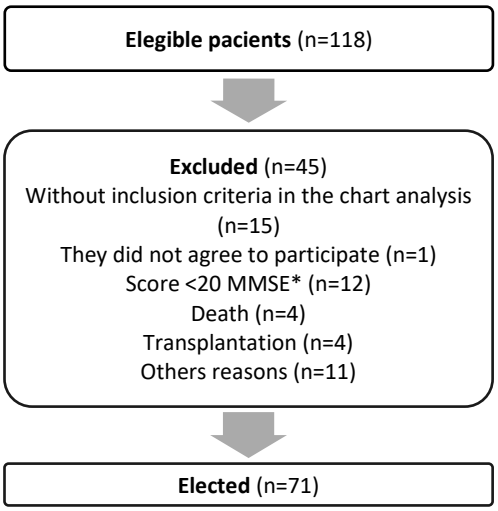
of fasting blood glucose, glycated hemoglobin, cholesterol and triglycerides. Sociodemographic data were collected at the bedside, during a dialysis session, by the researcher. Clinical data were obtained by consulting the medical record.



*MMSE: Mini Mental State Examination
FIGURE 1: Sample selection diagram.

On the same occasion of the collection of sociodemographic data, the participants answered the DKN-A and ATT-19 questionnaires[15]. For that, the Survey Monkey® application was used, via a tablet with Internet access. The patients themselves, with the equipment offered by the researcher, answered the questionnaires, after being explained how to fill them out.

The data were extracted directly from the Survey Monkey software, to an Excel file. After organizing the spreadsheets, statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) software, version 20.0. The results were presented using descriptive statistics - absolute and relative distribution (n - %), measures of central tendency and variability (mean ± standard deviation, median (1^{st} - 3^{rd} quartile). The confidence interval was 95% ($p<0.05$).

RESULTS

A total of 71 patients participated in the study, with a mean age of 61.81±14.93 years old, 62 (87.32%) were white-skinned, 37 (52.11%) were male and 37 (52.11%) were married or in a stable relationship. Among the participants, the median schooling time was 5 (3.5-8.5) years; and 6 (8.45%) had a university degree. Sixty nine (69) participants were retired or received state pensions from the *Instituto Nacional de Seguridade Social* (INSS) and the mean family income was 3.22 (2-4) times the minimum wage; 2 (2.81%) participants were still working. The median distance from the dialysis center to the participants' residences was 19.25 (5-24.5) km.

The median time since the diagnosis of Diabetes Mellitus was 17.88 (10-25) years and, for CKD, 4 (2-8) years. Regarding the antidiabetic agents, 53 (74.64%) participants reported insulin application associated with dietary control as a form of DM treatment. None of the participants took oral hypoglycemic agents.

Regarding chronic complications, in addition to CKD, which affects 100% of the participants, diabetic retinopathy was diagnosed in 58 (81.69%), neuropathy in 48 (67.60%), diabetic foot in 10 (14.08%), vasculopathy in 23 (32.39%), cerebral vascular disease in 17 (23.94%), coronary heart disease in 29 (40.84%) and amputation due to diabetes mellitus in 9 (12.67%) participants.

In relation to comorbidities and risk factors, hypertension was identified in 59 (83.09%) participants, dyslipidemia in 32 (45.07%), obesity in 24 (33.8%), sedentary lifestyle in 41 (57.74%) and smoking in 6 (8.45%).

The median values for fasting glycaemia and glycated hemoglobin were 152 (124-228.5) mg/dl and 7.5 (6.42-8.27) mg/dl, respectively.

In relation to total cholesterol values, the mean was 167±43.9 mg/dl. Concerning triglycerides, the median was 157 (108.5-235) mg/dl; and, in 38 (53.52%) participants, these values were above 150 mg/dl.

Regarding knowledge about diabetes, Figure 2 shows a dispersion of the scores from the DKN-A questionnaire. The mean score was .84±2.55 points, and 24 (33.80%) participants had a score higher than 8.

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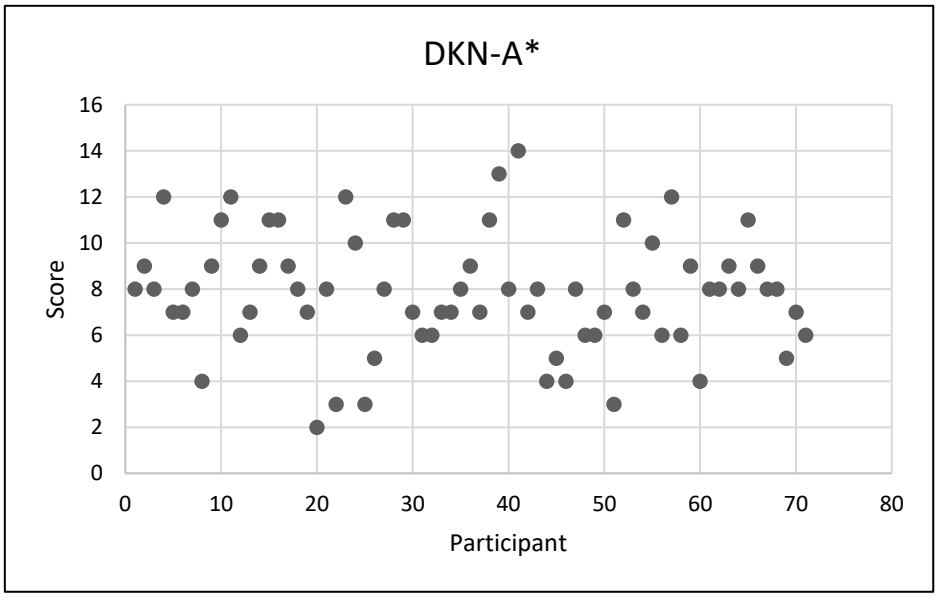

FIGURE 2: Dispersion of the scores from the DKN-A* questionnaire. Porto Alegre, RS, Brazil, 2017.
*DKN-A: Diabetes Knowledge Scale Questionnaire

Table 1 shows the DKN-A questions, grouped according to the attributes, and the number and percentage of correct and incorrect answers for each question.

TABLE 1: Distribution of participants according to the number of answers and errors of the DKN-A*, grouped by attributes (Basic physiology, Food groups and substitutions, DM† management in case of intercurrence and general principles of disease care). Porto Alegre, RS, Brazil, 2017.

nº	Question	Correct		Incorrect	
		n	%	n	%
	Basic Physiology				
1	Indication of blood sugar variation when uncontrolled DM† (normal / high / low)	56	78.87	15	21.13
3	Indication of the NORMAL range of blood glucose	52	73.23	19	26.77
6	Identification of ketonuria	4	5.63	67	94.37
7	Identification of complications due to DM† (vision. kidneys. lungs)	51	71.83	20	28.17
12	Cause of hypoglycaemia	17	23.94	54	76.06
	Food groups and substitutions				
4	Butter composition	41	57.74	30	42.26
5	Rice Composition	43	60.56	28	39.44
11	Food that you can eat at will	44	61.97	27	38.03
14	Correct substitutions (French bread / biscuit, egg / ground beef, milk / orange juice, noodles / vegetable soup)	23	32.39	48	67.61
15	Correct substitution of French bread (water and salt biscuit, cheese bread, slice of cheese, let it go)	20	28.16	51	71.84
	DM† management in case of intercurrence and general principles of disease care				
2	Identification of complications related to DM† (coma, glycosuria, late complications)	45	63,38	26	36,32
8	Conduct in case of hyperglycemia	36	50,70	35	49,30
9	Conduct for insulin application in case of illness or inappetence	37	52,11	34	47,89
10	Conduct in case of hypoglycaemia	58	81,69	13	18,31
13	Reference to unit of measure - one kilo	30	42,26	41	57,74

*DKN-A: *Diabetes Knowledge Scale Questionnaire*; †DM: *Diabetes Mellitus*

The attitudes towards diabetes can be observed from the values obtained in the ATT-19 questionnaire and shown in Figure 3. The scores ranged from 28 to 77 points, with a mean of 50.26±11.7. Four (5.63%) participants had a score above 70 points.

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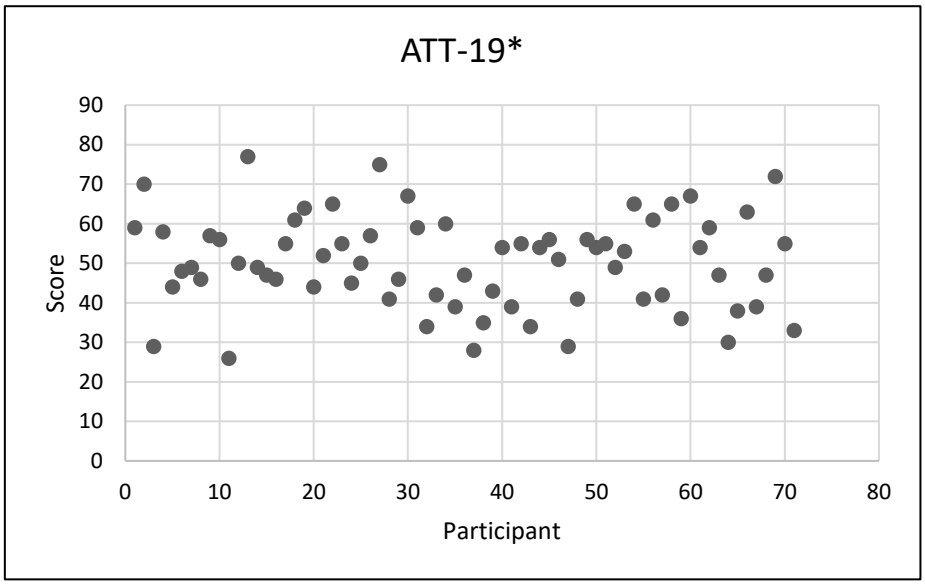

FIGURE 3: Dispersion of the scores from the ATT-19* questionnaire. Porto Alegre, RS, Brazil, 2017.

Table 2 shows the distribution of the answers to ATT-19 based on a Likert Scale, which goes from Completely Disagree to Completely Agree.

TABLE 2: Distribution of participants according to the ATT-19* Likert Scale. Porto Alegre, RS, Brazil, 2017.

Questions	Disagree completely	Disagree	I don't know	Agree	Agree completely
Stress associated to Diabetes					
1. If I did not have DIABETES I think I would be quite a different person	24	37	1	5	4
3. Diabetes is the worst thing that has ever happened to me	29	18	0	17	7
4. Most people would find it difficult to adjust to having diabetes	13	37	5	16	0
5. I often feel embarrassed about having diabetes	2	5	0	35	29
8. The proper control of diabetes involves a lot of sacrifice and inconvenience	8	38	1	14	10
10. Being told you have diabetes is like being sentenced to a life time of illness	4	27	1	19	20
11. My diabetic diet does not really spoil my social life	4	15	0	39	13
19. I often think it is unfair that I should have diabetes when other people are so healthy	4	8	2	31	26
Receptivity to treatment					
7. There is little hope of leading a normal life with diabetes	10	18	2	21	20
15. Diabetes is not really a problem because it can be controlled	0	3	2	51	15
18. I believe I have adjusted well to having diabetes	2	8	1	39	21
Trust in treatment					
2. I dislike being referred to as a DIABETIC	4	20	1	32	14
6. There is not much I seem to be able to do to control my diabetes	2	19	1	34	15
9. I try not to let people know about my diabetes	2	4	0	41	24
17. There is really no-one I feel I can talk to openly about my diabetes	2	9	2	35	23
Personal effectiveness					
12. In general, doctors need to be a lot more sympathetic in their treatment of people with diabetes	8	36	7	15	5
13. Having diabetes for a long period changes the personality	11	28	6	15	11
Perception about the health					
14. I often find it difficult to decide whether I feel sick or well	4	12	2	37	16
Social acceptance					
16. There is really nothing you can do if you have diabetes	3	18	1	30	19

*ATT-19: Diabetes Attitude Questionnaire

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DISCUSSION

This study presents results from patients with diabetes undergoing dialysis. Other investigations have been conducted with people with diabetes, but there is a gap related to people who also have CKD undergoing dialysis. In this context, it is important to look at the knowledge and attitude of the patients involved towards their disease.

In the present research, the participants presented a mean age similar to that of other studies that used the same DM knowledge and attitudes questionnaires[27-30]. However, unlike those, most of the participants in the present study are male. A plausible explanation for this is the fact that the study was carried out with diabetic patients on dialysis, where the number of males prevails in relation to the number of females (58% males)[31].

The data related to the schooling level corroborate the findings of other studies, which also indicate low levels of schooling[25,29,32,33]. There is evidence that the schooling level is not related to greater knowledge about DM or to a positive attitude to deal with it[32]. Nevertheless, schooling may interfere with the understanding of the instructions given, mechanisms related to the disease, and adherence to treatment. These facts constitute a challenge for health professionals, who need to devise strategies to strengthen the cognitive, motor and affective abilities of people with diabetes, so as to achieve satisfactory disease control[29].

In addition to low schooling, a low family income was found, even if higher than that reported by a systematic review (1.5±2)[34]. It is believed that this fact can hinder people's access to basic services, which directly impact on health, such as adequate food, transportation, education and housing.

Regarding employment, other surveys reported occupation rates of 47.7%[32] and 30.5%[17], although not conducted among dialysis patients. By contrast, in the present study few participants reported being employed. People on dialysis, in addition to presenting important comorbidities, need to adapt their routine to attend the dialysis center three times a week, which makes it difficult for them to enter the labor market. Moreover, the distance from the residence to the dialysis center would influence the chance to work. This fact points to the need for a flexible schedule, since people spend time traveling, in addition to that related to dialysis treatment.

Regarding the time with the pathology, published studies indicate a wide range, with 9.5±7.9[32], 11.18±8.64[29], <10[25,28] and 11±8 years[27]. The longer time elapsed from the diagnosis of DM presented in this study may be related to the sample of participants (patients with diabetes on dialysis). Diabetic nephropathy is the main microvascular complication of diabetes, as well as the major cause of CKD in the world[35], with 30% of dialysis patients having CKD due to diabetes[31].

Regarding chronic complications, microvasculopathy is strongly associated with diabetes[36], when an imbalance occurs between pro-survival factors and inflammatory mediators. In this study, in addition to renal impairment, diabetic retinopathy had the highest prevalence, different from the results found in a study conducted at Primary Care, which found 15% of rethinopathy[37]. In addition to the impacts in terms of human suffering, the complications arising from diabetes directly impact on the cost to the health systems[36]. The most frequent comorbidity was hypertension, which corroborates the indicator published by the Brazilian Society of Nephrology, which points to hypertension as the major cause of CKD in Brazil[38].

The present study showed less obesity compared to a study conducted with older adults, in which 51%[25] were overweight. On the other hand, the values were similar with those found in Brazilian Primary Care (31.1%)[37]. Possibly, the participants of this study, being on dialysis treatment, present weight reduction, because end-stage kidney disease is associated with an increase of inflammatory cytokines and can result in cachexia, with the loss of muscle and fat reserves[39].

In relation to the glycaemia and glycated hemoglobin levels, they were found to denote poor glycemic control. A study conducted with 353 people detected a median of 157 mg/dL (58-391 mg/dL) and HbA1C of 8.67% (3.70 - 16.10%). A landmark study has shown that intense diabetes control prevents the progression of diabetes complications[3]. These data indicate the importance of establishing a multidisciplinary health education plan for better adherence to treatment and minimization of diabetes complications.

When investigating the knowledge about diabetes, the present study corroborates the findings which identified that 66.67% of the participants presented scores ≤ 8 in DKN-A[16], and which found scores ≤ 8 in 64.6% of the participants[40]. Scores below eight indicate insufficient knowledge about the disease.

On the other hand, a study carried out with users of a self-care education program in diabetes[17] found that 78.05% of the participants scored above 8, indicating adequate knowledge and understanding of the disease. Also in a study of

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diabetic patients in the Family Health Strategy, with a diabetes patient group[27], it was reported that 81.5% of the individuals scored over eight in the DKN-A questionnaire.

It is understood that the last two studies, with positive results regarding knowledge about the disease, are possibly related to the educational initiatives undertaken by the health teams to the diabetic groups. This perception is validated by the findings of studies[33,41], which obtained statistically significant differences in knowledge about diabetes, comparing the results before and after an educational program. The same was found by another research study[42], which concluded that education presents itself as an effective strategy, which contributes for diabetics to live better with their condition. Finally, a systematic review suggests that health education is related to a positive response, when comparing the physiological, psychological and educational parameters, initial and final results of the studies[34].

In the DKN-A questionnaire, the questions that obtained the highest number of correct answers are in agreement with the findings of a research study, which found 83.8% of correct answers in the questions related to glucose variation when uncontrolled DM, and 86% in relation to the normal glucose range[27]. Relative to complications due to DM and behavior towards hypoglycemia, the same study pointed out 67.6% and 60.3% of correct answers, respectively. Correct behavior in case of hypoglycemia is important, as it allows the individuals to return to their routine functions, overcoming the malaise installed due to the occurrence. Regarding the questions with the lowest number of correct answers, they were numbers 6 (on urinary ketones), 12 (causes of hypoglycemia) and 15 (substitution of French bread), with 5.63%, 23.94% and 28.16% of correct answers, respectively. When comparing with another studies, the percentages of correct answers were 39.2%, 27% and 39.9%/12.6%, respectively[27]. In the same sense, a study conducted with older people found 19.8%, 11.4% and 1%, respectively[25]. The findings of the present study are consistent with the Brazilian reality, since the urinary ketone test is not a common practice oriented in the health services. The low rate of correct answers regarding the causes of hypoglycemia indicates the lack of understanding that the participants have about their disease, which can impact on the management of the disease, as well as the complications inherent to the health status. Unsatisfactory indicators were also obtained in the group of questions related to DM management and the general principles of care for the disease.

The lack of knowledge about the food groups and the correct substitutions is evident in the results described in Table 1. These findings indicate the urgent need for initiatives in health education with this population. Due to their performance in different spaces, nurses have many opportunities to develop this work.

A number of authors pointed out that the identification of knowledge about DM is a relevant resource to direct the multi-professional team to make clinical decisions and propose a therapeutic plan[27]. Other authors defend the need to seek new educational strategies, which allow diabetic patients to acquire knowledge for the management of the disease, incorporating it into their daily life, with possibilities to transform their attitudes towards the disease[29]. A review on educational interventions and glycemic control concluded that the health education practices for the control and treatment of diabetes, around the world, indicate the involvement of health professionals in instrumentalising patients with a view to autonomy and the expansion of self-care, aiming to improve the clinical outcomes and quality of life[43].

Regarding attitudes towards the pathology, the present study found results that identified low readiness to face the disease, which corroborates the findings of other publications: 95.56%[29]; 52.7% in women and 50.7% in men[17], with 93.7%[28], 99.4%[32] and 85.9% in older people[25]. The results obtained in ATT-19 are in consonance with studies that identified a mean of 63.23 points[32], 67.90±8.0[44], 55.5±.8.0[32] and 58.(IQR 52-65) points[25]. There is evidence that knowledge about the pathology is directly proportional to the attitudes and self-care of diabetic patients on dialysis[45].

In the result of the ATT-19, it is observed that, although the participants consider that diabetes does not disturb social life and that it is not a problem, many report being ashamed of having the disease and not letting others know about the pathology. In addition, there seems to be some resignation with the disease, when they point out that there is nothing that can be done if you have diabetes, while many consider it unfair to have diabetes and other people have very good health. Although initiatives for patient education are necessary and emphasized by the Brazilian Diabetes Association and by the American Diabetes Association, it is required that health professionals draw strategies to increase patient empowerment, encouraging them to take the lead[43], since the expansion of knowledge does not necessarily imply the behavioral changes needed for the control of the disease[20].

In this sense, it is believed that the treatment of diabetes requires several self-care activities, and that emotional and cognitive aspects are directly related to the capacity for self-care and self-management of diabetes. However, the positive effects of health education are strongly impaired when the patient suffers from diabetes-related depression or distress. Thus, the health team needs to pay attention to the psychological aspects of the patients and, if necessary,

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psychological support must be integrated into the care of these people[46]. The involvement of the patients in their own care strongly contributes to a successful treatment but, often, the encouragement and support of health workers is necessary for the patients to find the motivation to take care of themselves[47] .

Study limitations

Although this study has produced important findings related to the knowledge and attitudes towards diabetes in those who concurrently undergo dialysis, some limitations are recognized. The first concerns the number of participants. Although two dialysis services have been included, there is a need for studies that incorporate a greater number of subjects in order to increase the generalization ability. The second limitation is the study design, cross-sectional; in this sense, prospective studies are necessary, with health education interventions, so that the results can better guide the clinical practice.

CONCLUSION

The participants in this study were shown to have insufficient knowledge about diabetes. This fact has an impact on the ability to self-care, also influenced by the psychological aspects, herein evidenced by the attitudes towards diabetes, which also proved to be unsatisfactory in most of the sample.

Considering that there is a relationship between schooling, knowledge about the disease and health status, it is understandable that the individuals have diverse levels of comprehension about their pathology and, consequently, different coping strategies. Health education processes undertaken in the clinical practice, therefore, should consider the patients' knowledge about the pathology they are carrying, as well as the psychological and emotional aspects related to the disease.

Among the strategies used by nurses, validated questionnaires can support health education as a way of tailoring care, empowering patients and making them co-responsible for their treatment and condition.

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