Esc Anna Nery 2017;21(4):e20170208

Knowledge and attitude of patients with diabetes mellitus in Primary Health Care

Conhecimento e atitude de pacientes com diabetes mellitus da Atenção Primária à Saúde

Conocimiento y actitud de pacientes con diabetes mellitus de la Atención Primaria a la Salud

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Abstract

Objective: To evaluate the knowledge and attitude of patients with diabetes mellitus in Primary Health Care and associated factors. **Methods:** Cross-sectional, quantitative and analytical study with 353 patients with type 2 diabetes mellitus in Family Health Strategy units. The Knowledge and Psychological Attitudes Questionnaires were used for data collection, as well as a script with sociodemographic, economic and clinical data. **Results:** The majority of the population was female (73.1%), aged more than 50 years (81.5%), diagnosed for more than five years (54.9%) and with a per capita income of up to half a minimum wage (59.3%). The scores of knowledge and attitude were low. Age ($p = 0.001$) and level of education ($p = 0.002$) were variables associated with knowledge about diabetes mellitus. **Conclusion:** Users had a low level of knowledge about diabetes, indicating an unsatisfactory result in self-care and mainly a negative attitude towards coping with this disease.

Keywords: Type 2 Diabetes Mellitus; Knowledge; Attitude to Health; Primary Health Care.

Resumo

Objetivo: Avaliar o conhecimento e a atitude de pacientes com diabetes mellitus da Atenção Primária à Saúde e fatores associados. **Métodos:** Estudo transversal, quantitativo e analítico realizado com 353 usuários com diabetes mellitus tipo 2 em unidades de Estratégia da Saúde. Para a coleta dos dados, foram utilizados os Questionários de Conhecimento e de Atitudes Psicológicas, além de roteiro com dados sociodemográficos, econômicos e clínicos. **Resultados:** A população foi constituída, na sua maioria, pelo sexo feminino (73,1%), com idade superior a 50 anos (81,5%), com tempo de diagnóstico superior a 5 anos (54,9%) e com renda per capita de até meio salário mínimo (59,3%). Os escores de conhecimento e atitude foram baixos. A idade ($p = 0,001$) e escolaridade ($p = 0,002$) foram variáveis associadas ao conhecimento sobre diabetes mellitus. **Conclusão:** Os usuários apresentaram baixo conhecimento sobre diabetes, indicando resultado insatisfatório no autocuidado e na sua maioria, atitude negativa no enfrentamento da doença.

Palavras-chave: Diabetes Mellitus tipo 2; Conhecimento; Atitude Frente a Saúde; Atenção Primária à Saúde.

Resumen

Objetivo: Avaliar el conocimiento y la atitud de los pacientes com de diabetes mellitus da Atención Primária en la Salud y los valores asociados. **Métodos:** Estudo transversal, cuantitativo y analítico con 353 usuarios diabéticos en unidades de Estratégia da Saúde. En la coleta de datos, se utilizaron los Cuestiones de Conocimiento y de Atitudes Psicológicas y Rótulo con Datos Sociodemográficos, Económicos y Clínicos. **Resultados:** La población fue constituida por su sexo femenino (73,1%), con superioridad a 50 años (81,5%), con tempo de diagnóstico superior a 5 años (54,9%) y com renda per Capita de hasta medio salario mínimo (59,3%). Los escores de conocimiento y la atitud foram baixos. A edad ($p = 0,001$) y escolaridad ($p = 0,002$) foram variáveis asociadas al conocimiento sobre la diabetes mellitus. **Conclusión:** Los pacientes presentan bajos conocimientos sobre la diabetes, indicando resultado insatisfactorio no autocuidado y en su mayoría, atitud negativa no enfrentamiento de la enfermedad.

Palabras clave: Diabetes Mellitus tipo 2; Conocimiento; Actitud Frente a la Salud; Atención Primaria de Salud.

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Submitted on 07/15/2017.
Accepted on 10/05/2017.

DOI: 10.1590/2177-9465-EAN-2017-0208

INTRODUCTION

Type 2 Diabetes Mellitus (DM2) is a disease characterized by chronic hyperglycemia, resulting from the decreased production or lack of insulin by the pancreas and/or peripheral resistance to the action of this hormone.[1] Among the existing types of diabetes, DM2 accounts for nearly 90% to 95% of all cases of this disease.[2] The number of patients with diabetes worldwide in 2015 was estimated to be 415 million by the International Diabetes Federation[1] and the projection is that this number will have increased to 673 million by 2040. Brazil ranks fourth in number of diabetes cases worldwide, totaling 14.3 million patients.

Individuals with diabetes experience a reduction in quality of life, compared to healthy ones.[3] This is mainly due to the fact that this disease forces them to undergo changes in their life habits that are required to maintain good metabolic control, such as adherence to drug therapy, diet and physical activity.[4] Diabetes can lead to a loss of personal income and productivity, due to the restrictions to the amount and type of work performed by patients. Additionally, retirement can be anticipated as a result of disease-related problems.[1]

Adherence to treatment is the greatest challenge of patients with DM2, due to the great change in lifestyle imposed by the treatment itself. Thus, such patients need to receive full support from a multi-professional health team, so that they can adhere to the treatment and manage this disease adequately and, as a result, improve their clinical status and quality of life.[1]

Aiming to assume responsibility for their therapeutic role, diabetic patients need to acquire knowledge and develop abilities that qualify them for self-care. Health education is one of the primary care strategies that can contribute to self-care qualification, enable normal or almost normal glycemic control and reduce the high prevalence of complications resulting from an uncontrolled disease.[4]

Considering the previously mentioned questions, the present study aimed to assess the knowledge about and attitude towards diabetes mellitus among users of primary health care services in the city of Montes Claros, Minas Gerais, and correlate this knowledge with socio-demographic, economic and clinical variables.

METHODS

A quantitative, cross-sectional and analytical study was performed with individuals with DM2 in a Primary Care Center in the city of Montes Claros, Minas Gerais state. Primary Care coverage in the city included nearly 54% of the population, provided by 67 Family Health Care teams located in urban areas and ten others in rural areas.

The sample size (n = 346) was calculated based on the following parameters: an estimated proportion of diabetic patients without knowledge about diseases of 65%,[5] confidence level of 95%, error of 6% and a population of individuals with DM2 in Primary Care in the city of 4,640 individuals. Moreover, correction was made through design effect (deff = 1.5).

Participants were selected through two-stage cluster random sampling. In the first stage, 22 units of the *Estratégia Saúde da Família* (ESF - Family Health Strategy) were selected through sampling proportional to size. In the second stage, based on the list of diabetic patients from each ESF, a total of 16 patients were selected from each unit through simple random sampling. The following individuals were included in the present study: users with DM2, whose condition was diagnosed and confirmed through medical records filed in the health unit; aged 18 years and older; of both sexes; with conditions to respond to the questions asked; without neuro-linguistic disorders; and who accepted to participate in this study and signed an Informed Consent Form.

Data were collected in 2015 with a systematized questionnaire, considering socio-demographic (sex, ethnicity, age, marital status, level of education, profession, family income, number of residents in the household, number of children, participation in diabetes group and visit from the home care agent); clinical and laboratorial variables (length of time with the disease; number of consultations per year; current treatment; physical activity; chronic conditions; presence of systemic arterial hypertension (SAH); dyslipidemia; smoking; body mass index (BMI); systolic arterial pressure (SAP) and waist circumference (WC) taken during data collection; serum blood sugar and glycated hemoglobin (HbA1c) obtained from medical records or laboratory exams shown to patients; and the Portuguese versions, validated in Brazil, of the Diabetes Mellitus Knowledge (DKN-A) and Diabetes Attitudes Questionnaires (ATT-19)).[6]

Aiming to collect data on socio-demographic, clinical and knowledge and attitude variables, a guided interview was performed individually and in person, lasting 30 minutes on average. The study objectives were described, the Informed Consent Form was signed and the interviews were subsequently conducted.

The data obtained were analyzed with the Statistical Package for the Social Sciences software (SPSS®) for Windows®, version 18.0, and the results were shown in simple frequencies (n) and percentages (%). Laboratorial variables (fasting capillary blood sugar, fasting plasma blood sugar and HbA1C) were shown as mean, minimum and maximum values.

Bivariate analyses and multiple analyses were conducted through logistic regression, so that knowledge, calculated from the DKN-A score, was considered as a dependent variable, whereas the remaining characteristics of diabetics were considered to be independent variables. Age group, ethnicity, marital status and level of education were dichotomized into bivariate and multivariate analyses. Dichotomization considered ≤ 60 years or > 61 years as age groups; mixed (black and white) was included into black and white into Asian descendant; in

terms of marital status, single was associated with widowed, while divorced and married were associated with cohabiting; and in terms of level of education, illiterate was included into incomplete primary education, whereas complete primary education was included into the other categories. Family income was turned into per capita income (from 0.5 to one or more than one minimum wage) and the minimum wage at the time of this study was R$788.00.

Aiming to incorporate the structure of the sampling plan per cluster in the data analysis, each participant was associated with a weight, which corresponded to the inverse of the probability of inclusion in the sample. The probability of inclusion was obtained from the product of probability of inclusion in each of the two stages. The larger health units (with a higher number of diabetics) were more likely to be selected in the first stage, while individuals from smaller health units (with a lower number of diabetics) were more likely to be selected in the second stage. This process controlled the sample size and maintained it self-weighted, so that each individual had the same probability of belonging to the sample and, consequently, equal weights (weight = 9.7).

The magnitude of association between dependent and independent variables was assessed through odds ratio (OR) with their respective confidence intervals of 95% (95%CI). The variables whose statistical significance was lower than 20% in the bivariate analysis were selected for multiple analysis with the backward stepwise selection method. The final model was comprised of factors that remained associated with dependent variables with an error of 5%. The quality of the adjustment of the model was assessed through the Hosmer and Lemeshow test and the determination coefficient was calculated with the Nagelkerke test.

The present study was approved by the Research Ethics Committee of the State University of Montes Claros, under official opinion 851642 issued on October 23rd 2014 and it was conducted in accordance with the ethical principles of beneficence, justice, autonomy and no harm included in Resolution 466 issued on December 12th 2012 by the National Health Council.

RESULTS

A total of 353 individuals with DM2 participated in the present study. The majority of them were females (73.1%) and married (60%), aged more than 50 years (81.5%) and self-reported black or mixed ethnicity (53.3%). Regarding level of education, the majority of participants were illiterate or had incomplete primary education (51.8%). In terms of occupation, 85.1% did not work out of home and the majority had a per capita income of up to half a minimum wage (59.3%) (Table 1).

Table 2 shows the clinical characteristics of the group. The majority of participants showed a time of diagnosis longer than five years (54.9%), had between two to three consultations per year on average (42.3%) and used oral medication for treatment (75.5%), whereas only 34.9% of individuals practiced regular

Table 1. Socio-demographic characteristics (n = 353). City of Montes Claros, Minas Gerais, Brazil, 2015.

Variable	n	%‡
Gender		
Male	95	26.9
Female	258	73.1
Age group		
21-30	09	2.6
31-50	56	15.9
51-60	100	28.4
61-80	176	50.0
≥ 81	11	3.1
Ethnicity		
Mixed	186	53.3
Black	60	17.2
White	88	25.2
Asian descendant	15	
Marital status		
Single	21	6.0
Married/Cohabiting	210	60.0
Divorced/Separated	34	9.7
Widowed	85	24.3
Level of education		
Illiterate/incomplete primary education 1	175	51.8
Complete primary education 1/incomplete primary education 2	88	26.0
Complete primary education 2/incomplete secondary education	28	8.3
Complete secondary education/incomplete higher education	41	12.1
Incomplete higher education	06	1.8
Occupation		
Works out of home	52	14.9
Does not work out of home	298	85.1
Number of children		
0	09	2.6
1	31	9.0
2	68	19.8
3	81	23.5
≥ 4	155	45.1
Per capita income		
≤ R$ 399.00 (0.5 MW*)	195	59.3
R$ 400.00 to R$ 788.00 (>0.5 MW*)	99	30.1
> R$ 788.00 (>1 MW*)	35	10.6
Participates in the DM education group†		
Yes	135	38.5
No	216	61.5
Visit from the Community Health Agent		
Yes	337	96.0
No	14	4.0

* MW: Minimum wage in 2015 = R$ 788.00; † DM: Diabetes Mellitus;
‡ Correction made through design effect.

physical activity. The presence of SAH, dyslipidemia and smoking was reported in 71.7%, 57.2% and 6.1% of patients, respectively. A total of 40.9% of patients were overweight and 31.1% were obese, whereas 26.2% had a BMI within the normal range. Measurement of waist circumference (WC) was increased in 92.1% of users.

Regarding the health problems reported, ophthalmological complications were the most frequent (15%), followed by cardiovascular (3.7%), neurological (1.7%) and renal complications (2.3%) (Table 2).

Participants showed mean values of fasting capillary blood sugar of 167mg/dL (74-572 mg/dL), fasting plasma blood sugar of 157 mg/dL (58-391 mg/dL) and HbA1C of 8.67% (3.70-16.10%).

Regarding users' knowledge about diabetes, as assessed through DKN-A, only 155 users (43.9%) reached a score higher than eight, which represents satisfactory knowledge about diabetes. In contrast, when the ATT-19 questionnaire was applied, users' attitude towards coping with diabetes showed that 345 (97.7%) participants obtained scores ≤ 70, indicating a negative attitude towards this disease.

In the bivariate analysis, aiming to test the associations between knowledge about diabetes and socio-demographic and clinical variables, the following variables showed significant associations at the 0.20 level and were included in the multiple analysis: age group ($p < 0.001$), ethnicity ($p = 0.062$), level of education ($p < 0.001$), occupation ($p = 0.016$) and number of consultations per year ($p = 0.003$) (Table 3).

After the multiple analysis through binary logistic regression was performed, the following variables remained associated with knowledge about diabetes according to the DKN-A score: age (OR = 2.08; 95%CI = 1.32-3.25, $p = 0.001$) and level of education ($p = 0.002$; OR = 2.24; 95%CI = 1.33-3.76). The model showed high goodness of fit, as assessed by the Hosmer and Lemeshow test ($p = 0.827$), and coefficient of determination of 0.106, calculated with the Nagelkerke test.

DISCUSSION

In the present study, the majority of patients with DM2 showed low scores of knowledge about and attitude towards this disease. These results can indicate a reduction in quality of self-care and difficulties to cope with this disease, as reported in other studies.[4,7,8]

Regarding the profile of individuals with DM2, there was a greater predominance of females, as observed in other studies.[7,9,10] This result can be explained by the fact that Brazilian women live longer and tend to seek health services more frequently, thus leading to a higher probability of being diagnosed with this disease.[11]

The predominance of patients aged more than 61 years suggests that the prevalence of DM2 increases with age, as it has been shown in previous studies.[12] A multicenter study on the

Table 2. Clinical characteristics (n = 353). Montes Claros, Minas Gerais, Brazil, 2015.

Variable	n	%*
Time of diagnosis		
Up to 5 years	159	45.0
≥ 6 years	184	55.0
Number of consultations/year		
1 consultation	90	26.1
2-3 consultations	146	42.3
≥ 4 consultations	109	31.6
Type of treatment		
Only diet	21	6.0
Oral medication	264	75.5
Partial/full insulin treatment	65	18.5
Regular physical activity		
Yes	123	34.9
No	229	65.1
Ophthalmological complications		
Yes	53	15.0
No	300	85.0
Cardiovascular complications		
Yes	13	3.7
No	340	96.3
Neurological complications		
Yes	6	1.7
No	347	98.3
Renal complications		
Yes	8	2.3
No	345	97.7
Presence of dyslipidemia		
Yes	199	57.2
No	149	42.8
Presence of hypertension		
Yes	251	71.7
No	99	28.3
Smoking habit		
Yes	21	6.1
No	322	93.9
Nutritional status		
Malnourished	6	1.8
Eutrophic	89	26.2
Overweight	139	40.9
Obese	106	31.1
Waist circumference		
≤ 90cm (male) or ≤ 80cm (female)	28	7.9
> 90cm (male) or > 80cm (female)	325	92.1

* Correction made through design effect.

Table 3. Association between socio-demographic and clinical variables and the classification of knowledge about Diabetes Mellitus, according to the DKN-A score*. Montes Claros, Minas Gerais, Brazil, 2015.

	Knowledge about DKN-A score*			
Variable	**≤ 8n (%)**	**> 8n (%)**	**OR† (95%CI‡)**	***p* value**
Age group				
≤ 60 years	124 (66.3)	63 (33.7)	1.00	< 0.001
≥ 61 years	74 (44.6)	92 (55.4)	2.45 (1.59-3.77)	
Ethnicity				
White/Asian descendant	68 (63.6)	39 (36.4)	1.00	0.062
Black/Mixed	130 (52.8)	116 (47.7)	0.64 (0.40-1.03)	
Level of education				
Complete primary education or higher	35 (38.9)	55 (61.1)	1.00	< 0.001
Illiterate/incomplete primary education	163 (62.0)	100 (38.0)	2.56 (1.57-4.19)	
Occupation				
Works out of home	21 (40.4)	31 (59.6)	1.00	0.016
Does not work out of home	174 (58.4)	124 (41.6)	2.07 (1.14-3.77)	
Number of consultations/year				
≥ 4 consultations	53 (58.9)	37 (41.1)	1.00	0.053
2-3 consultations	70 (47.9)	76 (52.1)	0.56 (0.34-0.92)	
1 consultation	68 (62.4)	41 (37.6)	0.86 (0.49-1.53)	

* DKN-A: Questionnaire about knowledge; † OR: Odds Ratio; ‡ CI: Confidence interval.

prevalence of diabetes in Brazil revealed the influence of age on this prevalence and an increase of 6.4 times in the prevalence of diabetes from the 30-to-59-year age group to the 60-to-69-year age group.[2] Low level of education, low income, retirement, and "married" and "cohabiting" marital status were also found in patients with diabetes cared for in Primary Care Centers of other cities,[9-11] thus confirming basic characteristics of this population in most of the country.

In terms of participation in DM2 educational groups, the majority of patients in this study reported not participating in such groups, although most of them received home visits from community health agents (CHA). It is known that educational interventions improve diabetic patients' knowledge about questions related to DM2.[13]

A previous study showed that groups of patients with diabetes not receiving care in Primary Care Centers had a low level of knowledge about this disease.[8] Negative emotional and psychological adaptations reduced patients' involvement with their treatment, concluding that changes in health education aimed at motivating patients and society in general are required. However, even in studies where diabetic individuals obtained high knowledge scores, their attitude towards coping with the disease adequately did not change.[7]

The majority of patients with DM2 in Primary Care included in this study had more than five years of disease development and poor metabolic and clinical control, as observed in the results of laboratory tests, BMI, AC and arterial pressure in agreement with other studies for the same group.[10,14] Multicenter studies also found that arterial pressure or HbA1c parameters in patients with DM2 did not meet the recommended standards.[15,16] Good metabolic control can delay or prevent the development of complications associated with diabetes.[2,17] Frequent follow-up of diabetic patients by a multi-professional team trained in management and self-care for DM is of great importance to prevent long-term complications.[14]

Altered glycemic control associated with the presence of comorbidities in study participants with dyslipidemia, SAH, obesity and increased WC promotes de onset of chronic complications associated with DM, in addition to interfering with self-care activities.[2] The present study showed reports of complications, of which ophthalmological ones were the most frequent. It is estimated that 7% of individuals with diabetes have one or more complications associated with this disease, including ulcers or amputation of a diabetic foot, renal disease or retinopathies.[14]

Behavioral changes are required for individuals with diabetes to obtain better health conditions and quality of life.[18,19] In this sense, the analysis of knowledge of diabetic patients is considered to be a relevant resource to guide the multi-professional team for clinical decision-making in the disease treatment and to prepare this team to teach users about knowledge about and adherence to self-care.[11] Based on the DKN-A questionnaire administered to

users with DM2, the majority of them, cared for in Primary Care in the city of Montes Claros, had a satisfactory level of knowledge, especially about questions related to hypoglycemia and food replacements in their diet. In other contexts in Brazil, patients with diabetes in Primary Care were also found to show low scores of knowledge about this disease and a possible positive influence on the therapeutic result, in view of the improvement in such indices.[18]

These data are important in future educational activities, so that the strategies used to improve quality of life can be better directed. It is well known that the greatest difficulties in treatment are associated with changes in lifestyle with the incorporation of healthy habits, an adequate diet and regular physical activity.

In the present study, there was a negative attitude towards this disease among individuals with DM2. Positive attitudes are directly associated with the improvement in self-care processes to better cope with this disease. Knowledge is only one of the variables that can change attitudes towards individuals' acceptance of diabetes management.[4,6,9]

Level of education and age were associated with a low level of knowledge in the multiple analysis of the present study. Level of education is directly associated with self-care, because the lower this level is, the less self-care is performed. Social inequality in access to and use of health services is associated with individuals' level of education, among other factors. As a result, individuals with a low level of education usually have more difficulty to access information and the learning process to perform self-care,[20] thus restricting both their learning opportunities and health care.

Studies have shown that age interferes with health requirements during the development of life and that this is a relevant variable which can influence adherence to the proposed treatment. A study aimed at determining the capacity of self-care of individuals with DM2 showed that age had an influence on self-care.[13] Additionally, age was associated with a low level of knowledge in other studies that used the same instruments.[4,7]

In the present study, the assessment of the attitude and knowledge of patients with DM2, based on information obtained from the questionnaire without the direction observation of these patients, was one of the limitations. In this sense, future studies in this area are recommended.

CONCLUSION

In conclusion, patients in the present study had a low level of knowledge about diabetes and difficulty to cope with this disease, which may lead to poorer self-care and, consequently, lower metabolic control with an increase in the indices of associated complications. It is expected that this study can contribute to health professionals and managers' reflection over the importance of health education, when caring for individuals with diabetes mellitus type 2 in Primary Health Care, and that it can support service reorganization through the implementation of more effective health policies. Furthermore, it can support public health policies aimed at the improvement of diabetic patients' health and quality of life in the city of Montes Claros.

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