

FACTORS ASSOCIATED WITH KNOWLEDGE AND ATTITUDE OF DIABETIC INDIVIDUALS TOWARDS DIABETES MELLITUS*

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ABSTRACT: The present study aimed to identify factors associated to the knowledge and attitude of individuals with diabetes towards the disease. Cross-sectional study in which 288 individuals were interviewed between March and September 2014, in six basic health units in the state of Paraná. Poor knowledge of the disease (n = 194, 67.4%) and negative attitude (n=211, 73,4%) were predominant. Factors associated with unsatisfactory knowledge were female gender (p = 0.004), low educational level, absence of complications (p = 0.011), individuals who had no appointments with an endocrinologist over the last twelve months (p = 0.009). A monthly income higher than two minimum wages (p = 0.002), abnormal waist circumference (p = 0.001) and who had not taken blood tests over the last six months (p = 0.005) were associated with a negative attitude towards the disease. The study highlights the need for interventions to improve the population's knowledge about the disease and encourage the adoption of appropriate behaviors to face this chronic condition.

DESCRIPTORS: Diabetes mellitus; Chronic illness; Knowledge; Attitude; Self-care.

FATORES ASSOCIADOS AO CONHECIMENTO E À ATITUDE EM RELAÇÃO AO DIABETES MELLITUS

RESUMO: O objetivo deste estudo foi identificar fatores associados ao conhecimento e à atitude diante da doença em indivíduos com diabetes. Estudo transversal com 288 indivíduos, mediante entrevista, entre março e setembro de 2014, em seis unidades básicas de saúde no estado do Paraná. O conhecimento insatisfatório sobre a doença (n=194, 67,4%) e a atitude negativa (n=211, 73,4%) foram predominantes. Os fatores associados ao conhecimento insatisfatório foram sexo feminino (p=0,004), baixa escolaridade, ausência de complicações (p=0,011), sem consulta com endocrinologista nos últimos doze meses (p=0,009). Renda maior que dois salários mínimos (p=0,002), circunferência abdominal alterada (p=0,001) e sem realização de exames de sangue nos últimos seis meses (p=0,005) estiveram associados à atitude negativa diante da doença. Evidencia-se a necessidade de intervenções que melhorem o conhecimento dos indivíduos sobre a doença, e que reforcem e estimulem o desenvolvimento e a adoção de comportamentos adequados para o enfrentamento dessa condição crônica.

DESCRIPTORIOS: Diabetes mellitus; Doença crônica; Conhecimento; Atitude; Autocuidado.

FACTORES ASOCIADOS AL CONOCIMIENTO Y A LA ACTITUD ACERCA DEL DIABETES MELLITUS

RESUMEN: Fue objetivo de este estudio identificar factores asociados al conocimiento y a la actitud delante de la enfermedad por individuos con diabetes. Estudio transversal con 288 individuos, hecho por medio de entrevista, entre marzo y septiembre de 2014, en seis unidades básicas de salud en estado de Paraná. El insuficiente conocimiento acerca de la enfermedad (n=194, 67,4%) y la actitud negativa (n=211, 73,4%) predominaron. Los factores asociados al conocimiento insuficiente fueron sexo femenino (p=0,004), poca escolaridad, ausencia de complicaciones (p=0,011), falta de consulta con endocrinologista en los últimos doce meses (p=0,009). Renta mayor que dos sueldos mínimos (p=0,002), circunferencia abdominal alterada (p=0,001) y falta de realización de pruebas de sangre en los últimos seis meses (p=0,005) también se relacionan a la actitud negativa delante de la enfermedad. Se evidencia la necesidad de intervenciones para perfeccionar el conocimiento de los individuos acerca de la enfermedad, además de resaltar y estimular el desarrollo y la adopción de comportamientos adecuados para afrontar esa condición crónica.

DESCRIPTORIOS: Diabetes mellitus; Enfermedad crónica; Conocimiento; Actitud; Autocuidado.

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● INTRODUCTION

Diabetes mellitus is a chronic condition with prevalence, morbidity and mortality in Brazil and worldwide ⁽¹⁾. Brazil alone has more than 12 million people with diabetes, i.e. 6.2% of the general population ⁽²⁾.

Type 2 diabetes mellitus (DM2) is the most common form of diabetes. The disease accounts for 90 to 95% of the cases and affects individuals of any age, although it is more prevalent after 40 years ⁽³⁾. In addition to genetic predisposition and the presence of comorbidities, diabetes is associated with modifiable risk factors such as overweight, obesity and physical inactivity ⁽⁴⁾. Health professionals can help the patients to manage the risk factors involved, guiding them on proper self-care ⁽⁵⁻⁶⁾.

Knowledge about the disease is essential for the appropriate management of the chronic condition, but it is not sufficient to generate a change in behavior ⁽⁷⁻⁸⁾ because knowledge is influenced by individual characteristics, by the meaning that individuals assign to a chronic condition and by their attitudes towards the disease ⁽⁹⁾. Studies suggest that individuals with adequate knowledge about DM2 are more able to control the disease, avoiding long-term related complications ^(5,10). However, not everyone is prepared to take all the measures necessary for the proper control of DM2 ⁽¹¹⁾. Therefore, health professionals must encourage the acquisition of knowledge about the disease and the ways to manage it among this population.

Identifying the factors that impact the knowledge and attitude of individuals with DM2 towards the disease may help the health care team implement effective care strategies. It may also provide the individuals with better conditions to face their chronic condition, by promoting interventions aimed to improve their knowledge on self-care measures, improved clinical outcomes, appropriate use of health services and hence, efficient use of public resources ⁽⁶⁻⁹⁾.

In view of the aforementioned, the present study aimed to identify the factors associated with knowledge and attitude of diabetic individuals towards the disease.

● METHOD

Cross-sectional study conducted in a city of Paraná that has a population of 20,269 inhabitants, assisted by six teams of the Family Health Strategy, one of them in the countryside ⁽¹²⁾. At the ESF, care to people with type 2 diabetes is not planned. Medical consultations are scheduled spontaneously by the individuals.

The calculation of the sample size was based on the number of individuals with DM2 registered at the UBS that met the inclusion criteria (n=791), margin of error of 5%, confidence level of 95%, and 10% was added to the sample size to compensate for possible losses and refusals, resulting in a final sample of 288 individuals.

The inclusion criteria were subjects aged 40 years or older, diagnosed with DM2 for at least two years and registered in one of the six teams of the Family Health Strategy (n=791). In turn, the exclusion criteria were subjects with problems that impaired or prevented verbal communication and subjects who could not be reached after three attempts in different days of the week and at different times of the day.

Random sampling was used with probability proportional to the size, so that the same number of individuals with DM2 was sampled in each family health strategy unit, after assessment of inclusion and exclusion criteria. Twelve replacements were necessary, since four individuals were not reached after three successive attempts of contact, and eight had problems that impaired or prevented verbal communication.

Data collection was performed from March to September 2014, through semi-structured interviews conducted in the participants' households. During the interviews, the main researcher applied two instruments previously validated in Brazil: the Diabetes Knowledge Scale Questionnaire (DKN-A) and the Diabetes Attitudes Questionnaire (ATT-19) ⁽¹³⁾. The DKN-A measures the degree of knowledge

about the disease and consists of 15 items. Its scores ranges from 0 to 15, and each item is assigned a point if correctly answered. Scores lower than eight indicate unsatisfactory knowledge. The ATT-19, in turn, measures the attitude of the individual towards DM2. It consists of 19 items to be answered on a 5-point Likert type scale⁽¹³⁾. The total score ranges from 19 to 95 points, and scores lower than 70 points indicate a negative attitude⁽¹³⁾.

For sociodemographic characterization the following variables were considered: gender, age range, marital status, education and per capita income. The clinical conditions included time elapsed since diagnosis, complications of DM2, hypertension, dyslipidemia, hypoglycemia (low blood sugar level) and hyperglycemia (high blood sugar levels) in the previous month; hospitalization in the last 12 months; overweight and obesity, classified by the body mass index (BMI) with BMI ≥ 25 up to 29.9kg/m² indicating overweight, and BMI ≥ 30 kg/m² indicating obesity; and abnormal waist circumference (> 102 cm for men and > 88 cm for women)⁽¹⁴⁾.

The weight was determined with the use of a portable digital weighing scale with a maximum capacity of 150kg. Height was measured with an anthropometric tape. Waste circumference was measured at the midpoint between the costal margin and the iliac crest, using a measuring tape.

The variables related to health behaviors were frequent glucose monitoring (at least once a month); appointment with ophthalmologist and endocrinologist over the past 12 months; glucose control tests over the past six months; food control (adequate, when no or almost no intake of sweets, sugars, various carbohydrates and high-fat foods is reported; always or almost always eat five or more servings of fruits, vegetables and legumes; exclusive or almost exclusive use of sweetener; and have five or more daily meals; and inadequate when three or less than these items were reported)⁽¹⁵⁾; smoking; alcohol intake; physical activity (dynamic exercise activities such as walking, cycling, gymnastics, among others, at least three times a week and for about 30 minutes at each session)⁽¹⁶⁾.

The data were analyzed using the Statistical Package for Social Sciences (SPSS)[®] version 20. Pearson chi-square test was performed to assess association between the independent variables and variables of interest (unsatisfactory knowledge and negative attitude towards the disease). The variables that presented p-value < 0.20 were inserted in a multiple linear regression model (stepwise method). Odds ratio (OR) with a confidence interval of 95% was used as a measure of association. Significance was established when $p < 0.05$ for all the tests. The adjustment level of the model was assessed with Hosmer and Lemeshow test.

The study was approved by the Permanent Ethics Committee in Research with Humans of Universidade Estadual de Maringá (Statement No 449.686).

● RESULTS

Of the 288 subjects, 65.3% (n=188) were women, 36.1% (n=104) were aged 40-59 years and 34.7% (n=100) were aged 60-69 years; 59.0% (n=170) did not live with a partner; and 65.6% (n=189) earned less than two minimum wages. Most of them reported low educational level, as follows: 48.6% (n=140) had less than four years of schooling and 19.8% (n=57) were illiterate.

Regarding the study variables, the prevalent were unsatisfactory knowledge (n=194, 67.4%) and negative attitude towards the disease (n=214, 74.3%). Bivariate analysis showed association between unsatisfactory knowledge and female gender, low educational level (less than four years of schooling) and no appointments with an endocrinologist over the past 12 months. Negative attitude was only associated with a monthly income higher than two minimum wages (Table 1).

Table 1 – Unsatisfactory knowledge and negative attitude towards the disease, according to sociodemographic variables and health behavior of individuals with DM2. Jandaia do Sul, PR, Brazil, 2014

Variables	Unsatisfactory knowledge (n=194)		Negative attitude (n =214)	
	n (%)	p-value*	n (%)	p-value*
Gender		0.006		0.873
Male	77 (39.7)		73 (34.1)	
Female	117 (60.3)		141 (65.9)	
Age range, years		0,106		0.98
40-59	62 (31.9)		77 (36)	
60-69	71 (36.6)		75 (35.1)	
>70	61 (31.5)		62 (28.9)	
Marital status		0.704		0.462
No companion	78 (40.2)		85 (39.7)	
With a companion	116 (59.8)		129 (60.3)	
Education, years of schooling		<0.001		0.823
Illiterate	40 (20.6)		40 (18.7)	
< 4	106 (54.6)		107 (50)	
4-7	27 (14)		29 (13.5)	
≥ 8	21 (10.8)		38 (17.8)	
Per capita income minimum wage		0.077		0.003
≤2	134 (69.1)		130 (68.8)	
>2	60 (30.9)		84 (44.8)	
Glucose monitoring		0.133		0.309
Yes	89 (45.8)		101 (60.7)	
No	105 (54.2)		113 (39.3)	
Appointment with an ophthalmologist		0.113		0.735
Yes	152 (78.3)		174 (81.3)	
No	42 (21.7)		40 (18.7)	
Appointment with an endocrinologist		0.001		0.633
Yes	82 (43.8)		103 (48.1)	
No	112 (56.2)		111 (51.9)	
Tests		0.196		0.096
Yes	33 (17.1)		36 (16.8)	
No	161 (82.9)		178 (83.2)	
Food control		0.525		0.93
Yes	117 (60.3)		126 (58.8)	
No	77 (39.7)		88 (41.2)	
Alcohol intake		0.674		0.108
Yes	37 (19.1)		44 (20.5)	
No	157 (80.9)		170 (79.5)	
Practice of physical activities		0.355		0,357
Yes	53 (27.3)		52 (24.3)	
No	141 (72.7)		162 (75.7)	
Smoking		0.635		0.185
Yes	23 (11.8)		30 (14)	
No	171 (88.2)		184 (86)	

Note: The minimum wage value on the day of the research was R\$724.00. *p-value: Pearson's chi-square.

Regarding the clinical variables, association was found between unsatisfactory knowledge and absence of DM-related complications, episode of de hypoglycemia over the past month and hospitalization over the past twelve months and association with abnormal waist circumference (Table 2). One possible explanation for these results is the fact that the individuals do not experience symptoms or discomfort, which is usually related to the presence of complications. Therefore, they tend to neglect the condition and do not seek more information about their health status. On the other hand, negative attitude towards the disease was not associated with any clinical variable (Table 2).

Table 2 – Unsatisfactory knowledge and negative attitude towards the disease, according to the clinical conditions of individuals with DM2. Jandaia do Sul, PR, Brazil, 2014

Variables	Unsatisfactory knowledge (n=194)		Negative attitude (n =214)	
	n (%)	p-value*	n (%)	p-value*
Time elapsed since diagnosis, years		0.285		0.366
<5	69 (35.5)		76 (35.5)	
5-10	31 (16)		33 (15.4)	
>10	94 (48.5)		105 (49.1)	
Complications		0.011		0.761
Yes	41 (21,1)		54 (25.2)	
No	153 (78,9)		160 (74.8)	
Hypertension		0.748		0.948
Yes	141 (72.6)		157 (73.3)	
No	53 (27.4)		57 (26.7)	
Dyslipidemia		0.659		0.983
Yes	127 (65.4)		142 (66.3)	
No	67 (34.6)		72 (33.7)	
Hypoglycemia		0.01		0.359
Yes	99 (51)		117 (54.6)	
No	95 (49)		97 (45.4)	
Hyperglycemia		0.875		0.295
Yes	79 (40.7)		90 (42)	
No	115 (59.3)		124 (58)	
Hospitalization		0.007		0.764
Yes	49 (25.2)		56 (26.1)	
No	145 (74.8)		158 (73.9)	
Overweight\obesity		0.803		0.894
Yes	53 (27.3)		59 (27.5)	
No	141 (72.7)		155 (72.5)	
Waist circumference		0.002		0.053
Normal	55 (28.3)		48 (22.4)	
Abnormal values	139 (71.7)		166 (77.6)	

*p-value: Pearson's chi-square.

Multiple linear regression analysis showed that the variables associated with unsatisfactory knowledge were female gender, low educational level, no appointment with an endocrinologist over the past year and DM2 related complications (Table 3). Such variables were not independent from the occurrence of hospitalization.

Table 3 – Factors associated with unsatisfactory knowledge and negative attitude of individuals with DM2, according to multiple regression models. Jandaia do Sul, PR, Brazil, 2014

Unsatisfactory knowledge*	OR (CI 95%)	p-value‡
Independent variables†		
Schooling, years		
Illiterate	3.31 (1.38-7.93)	0.007
1-4	4.70 (2.26-9.76)	<0.001
4-7	2.88 (1.13-7.33)	0.026
Appointment with an endocrinologist, no	2.10 (1.35-4.72)	0.009
Female gender	2.52 (1.35-4.72)	0.004
Complications, no	1.960 (1.07-3.57)	0.028
Negative attitude§		
Independent variables†		
Income > 2 minimum wages	2.76 (1.45-5.27)	0.002
Tests, no	1.94 (1.98-3.78)	0.005
Abnormal waist circumference	1.81 (1.99-3.31)	0.001

*Model adjusted by variable hospitalization. Goodness-of-fit test (Hosmer and Lemeshow test): $p=0.872$; †variables with significance <20% in bivariate analysis; ‡Wald test; §model adjusted by variable smoking. Goodness-of-fit test (Hosmer and Lemeshow test): $p=0.811$.

Individuals who earned more than two minimum wages, who did not have routine laboratory tests over the past six months and who had abnormal waist circumference were more likely to have a negative attitude towards the disease. These associations were not independent from the variable smoking.

● DISCUSSION

The identified prevalence of unsatisfactory knowledge and negative attitude towards the disease corroborates a study conducted in the inland of São Paulo (64.6% and 93.7%, respectively) ⁽¹⁷⁾. In Mongolia, a study found that one out of every two individuals with DM2 was aware of the progression of the disease and its complications, and one third of them did not know that DM2 could be prevented by changes in lifestyle, such as, healthy eating habits and physical activities ⁽¹⁸⁾.

Considering the time elapsed since diagnosis, it is possible to infer that the lack of health education group activities and the only partial compliance with recommendations of the Ministry of Health regarding the control of chronic diseases, e.g. those related to the frequency of medical visits, according to the degree of risk of the diabetic person, explain the results obtained ⁽¹⁹⁾. The care provided to individuals with DM2 is not systematized in the city; the medical appointments for disease monitoring are not regular, and are spontaneously scheduled by the population. Moreover, no health education group activities were provided to these patients.

The attitude towards the disease may or may not be influenced by unsatisfactory knowledge about it, as well as by the individual's understanding about a chronic condition ^(12,20-21). The motivation and the attitudes of diabetic patients towards the disease are not crystallized. They are rather influenced by cognitive, motivational and emotional components, as well as on knowledge about the disease ⁽²²⁾.

Moreover, the process of coping with a chronic condition involves different phases, which determine different motivations for change. These phases must be recognized and considered in the planning of self-care actions ^(6,23).

Therefore, the availability of spaces that allow individuals to share their distress may favor a change of attitude regarding healthy behaviors, when these individuals realize that they are not the only ones to face this situation ⁽²¹⁾.

The association between unsatisfactory knowledge about the disease and female gender may have been influenced by the predominance of women in the sample. However, it should be stressed that men seek primary health care services less frequently than women, and even attribute to their professional responsibilities their impossibility to properly deal with their chronic condition ⁽²⁴⁻²⁵⁾.

Thus, health education activities within the scope of primary health care, which are mostly attended by women (though their knowledge of the disease was found to be unsatisfactory) should also facilitate and encourage the access of working men to information and discussions about the disease and health behaviors. In this regard, whenever possible, health actions should be prioritized, especially preventive actions, at times and even different environments, such as the workplace, for example.

Few years of schooling were found to increase by four times the probability of an individual to have satisfactory knowledge about the disease. This factor may limit access to health-related information, because these individuals are not fully able to understand the recommendations, which are often explained by health professionals in a medical jargon ⁽²⁶⁾. The educational level also influences adherence to daily activities necessary for metabolic control and management of complications, e.g., reading food labels and packaging information and interpreting blood glucose results.

Absence of complications, in turn, increased the likelihood of unsatisfactory knowledge about the disease. It is believed that the absence of symptoms or discomfort may cause people to lose interest in gaining more knowledge about their health status. It should be stressed that diabetes-related complications may be delayed or even avoided when blood glucose levels are adequate, and such levels are influenced by control of overweight and other behaviors ⁽¹⁷⁻¹⁸⁾. Therefore, satisfactory knowledge about the disease may or may not favor a positive attitude about the disease.

The fact that the subjects had no appointments with an endocrinologist in the past twelve months increased by twice the probability of unsatisfactory knowledge. Thus, it can be inferred that lack of contact with professional experts may limit the opportunities of access to information. It should be stressed that the low income of this population also limits their access to these specialists, which are not available at the public health system.

Monthly income higher than two minimum wages was a factor associated to a negative attitude towards the disease. This has become more evident after the addition of other statistically associated variables, such as subjects who had no routine laboratory tests over the past six months and had abnormal waist circumference values. A study with individuals with DM2 and hypertension in Latin America found that income might be a key component in the mitigation of differences in the management of disease, as it affects schooling ⁽²¹⁾.

Abnormal waist circumference is a consequence of overweight/obesity and is associated with the onset of DM2, in addition to being a predictive factor of metabolic syndrome ⁽²⁷⁾. In the present study, the individuals with abnormal waist circumference were nearly twice more likely to have a negative attitude towards the disease compared to the others. It is believed that abnormal waist circumference may be a consequence of inappropriate habits such as lack of physical activity and poor diet.

Reduction in waist circumference values and weight control key strategies of the non-pharmacological management of DM2 ⁽²⁷⁾. Therefore, nutritional education and daily practice of physical activity are important factors to be addressed by health professionals that provide care to these patients ⁽²⁷⁾.

The association between no routine laboratory tests over the last six months and negative attitude may be related to unsatisfactory knowledge of the need for monitoring, which increases the probability of occurrence of future complications caused by the disease. A positive attitude towards the disease can be influenced by activities that encourage the acquisition of more information about diabetes and its impact on the quality of life.

Aware of these facts, the health team must be prepared to monitor individuals with chronic diseases, favoring the organization of the service and assessment of its needs, with emphasis on the identification of modifiable factors that lead to unsatisfactory knowledge and a negative attitude towards the disease.

Since abnormal waist circumference and infrequent routine laboratory tests are modifiable factors, we emphasize that health professionals should perform actions aimed to promote changes of behavior ⁽⁶⁾. Simple actions that can be performed at home may prevent acute complications, such as

hypoglycemia, or favor its early management.

On the other hand, health professionals must be well prepared and trained to help and monitor individuals with DM2 regarding the implementation of effective self-care measures. The management of chronic conditions by the individual itself is essential, as there may be discrepancies between the knowledge the health professionals deem relevant for self-care promotion and the individual's ability to promote self-care⁽²⁰⁾.

One limitation of the present study is its cross-sectional design, which does not facilitate assessment of cause-effect relationships. It also favors bias of information collected in interviews, since accuracy may be affected by memory problems of the respondents. Nevertheless, through the identification of modifiable factors that lead to unsatisfactory knowledge and negative attitude towards diabetes mellitus, the present study emphasizes the need for health professionals to develop effective actions to disseminate knowledge about the disease and promote changes of behavior among diabetic individuals.

● CONCLUSION

The factors associated with unsatisfactory knowledge were female gender, low educational level, absence of complications and no appointment with an endocrinologist over the past twelve months. Monthly income higher than two minimum wages, abnormal waist circumference and no blood tests taken in the last six months were associated with a negative attitude towards the disease.

Therefore, we suggest that health managers and professionals make efforts to implement appropriate care to these patients, as well as planned scheduled monitoring. We stress the need for interventions aimed to improve the knowledge of individuals about the disease and that reinforce and stimulate the development and adoption of appropriate behaviors to cope with the chronic condition.

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