FEEDING AND DIABETES MELLITUS: PERCEPTION AND FOOD CONSUMPTION BY ELDERLY PEOPLE IN THE HINTERLANDS OF PERNAMBUCO

Alimentação e Diabetes Mellitus: percepção e consumo alimentar de idosos no interior de Pernambuco

Alimentación y Diabetes Mellitus: percepción y consumo de alimentos de mayores del interior de Pernambuco

Original Article

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ABSTRACT

Objective: To evaluate the knowledge of diabetes diet and identify factors that may interfere with the adherence to nutritional therapy and food choices of participants in a Community Center for the Elderly in Sairé, PE. **Methods:** A quantitative, descriptive and cross-sectional study, which evaluated 39 attendees of that center, from July to August 2014, with or without diabetes mellitus. Two questionnaires were applied to assess socioeconomic data, nutrition knowledge and cultural factors, and check the consumption of food with high and low glycemic index. Data was analyzed using the Assistat Program 7.0 Beta version. **Results:** The majority of the respondents have knowledge about types of foods that may influence the treatment of diabetes mellitus, as 51.2% (n=20) reported knowing some food that can reduce the risk for diabetes onset or assist in its treatment. Most of the participants reported having acquired such knowledge through the television 35% (n=7) and conversation with peers 35% (n=7). Evaluation of the food intake evidenced higher consumption of foods with high glycemic index. However, among diabetic patients, foods with low glycemic index are consumed more times per week. **Conclusion:** The knowledge about nutrition and diabetes mellitus was considered adequate, but socioeconomic and cultural factors may interfere in the adherence to diet therapy for diabetes or in the food choices made by the individuals. However, food consumption was considered appropriate among diabetics.

Descriptors: Food Consumption; Diabetes Mellitus; Aged.

RESUMO

Objetivo: *Avaliar o conhecimento sobre alimentação relacionada ao diabetes e identificar fatores que possam interferir na adesão à terapia nutricional e nas escolhas alimentares de participantes de um Centro de Convivência de Idosos em Sairé-PE.* ***Métodos:*** *Estudo quantitativo, transversal e descritivo com 39 frequentadores do referido centro, de julho a agosto de 2014, portadores ou não de diabetes mellitus. Aplicaram-se dois questionários para avaliar dados socioeconômicos, conhecimento alimentar e fatores culturais, e verificar o consumo de alimentos de alto e baixo índice glicêmico. Os dados foram analisados através do Programa Assistat versão 7.0 beta.* ***Resultados:*** *Observou-se que a maioria possui conhecimentos sobre tipos de alimentos que podem influenciar no tratamento de diabetes mellitus, pois 51,2% (n=20) disseram conhecer algum alimento que pode reduzir os riscos de acometimento ou auxiliar no tratamento do diabetes. A maioria disse ter adquirido esse conhecimento por meio de televisão (35%; n=7) e conversa com conhecidos (35%; n=7). Verificando o consumo alimentar, constatou-se maior consumo de alimentos com alto índice glicêmico. Porém, entre os diabéticos, viu-se que os alimentos de baixo índice glicêmico são consumidos mais vezes por semana.* ***Conclusão:*** *Considerou-se adequado o nível de conhecimento em relação à alimentação e diabetes, mas viu-se que fatores socioeconômicos e culturais podem interferir na adesão à dietoterapia ou nas escolhas alimentares dos indivíduos. Contudo, o consumo alimentar se mostrou mais adequado entre os diabéticos.*

Descritores*: Consumo Alimentar; Diabetes Mellitus; Idoso.*

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RESUMEN

Objetivo: *Evaluar el conocimiento sobre la alimentación relacionada a la diabetes e identificar los factores que puedan contribuir para la adhesión de la terapia nutricional y las elecciones alimentarias de los participantes de un Centro de Convivencia para Mayores de Sairé-PE.* ***Métodos:*** *Estudio cuantitativo, transversal y descriptivo con 39 mayores del referido centro entre Julio y Agosto de 2014, portadores o no de diabetes mellitus. Se aplicó dos cuestionarios para evaluar los datos socioeconómicos, el conocimiento alimentario y factores culturales y verificar el consumo de alimentos de bajo y alto índice glicémico. Los datos fueron analizados a través del Programa Assistat versión 7.0 beta.* ***Resultados:*** *Se observó que la mayoría tiene conocimientos de los tipos de alimentos que pueden influir en el tratamiento de la diabetes mellitus pues el 51,2% (n=20) afirmaron conocer algún alimento que puede reducir los riesgos de tener la diabetes o auxiliar en su tratamiento. La mayoría afirmó haber adquirido este conocimiento a través de la televisión (35%; n=7) y charla con conocidos (35%; n=7). Al verificar el consumo de alimentos, se constató mayor consumo de alimentos con alto índice glicémico. Sin embargo, entre los diabéticos, los alimentos de bajo índice glicémico son consumidos más veces a la semana.* ***Conclusión:*** *Se consideró el nivel de conocimiento sobre la alimentación y la diabetes adecuado pero se observó que factores socioeconómicos y culturales pueden influir en la adhesión de la dietoterapia o en la elección de los alimentos de los individuos. Sin embargo, el consumo de alimentos se mostró más adecuado entre los diabéticos.*

Descriptores*: Consumo de Alimentos; Diabetes Mellitus; Anciano.*

INTRODUCTION

Diabetes mellitus is a group of metabolic diseases characterized by a hyperglycemic condition resulting from defects in the insulin action, secretion, or both. When the individual is affected by the disease for a long time, it results in reduction of the activity of various organs, such as kidneys, eyes, heart, blood vessels and nerves[1].

The incidence of diabetes mellitus in the world grows alarmingly. In 1985, the number of diabetic adults reached 30 millions worldwide, reaching 135 millions in 1995. In 2002, 173 million people were already affected, and the forecast for 2030 is that these numbers can reach into the 300 millions[2].

In Brazil, in the late 1980s, it was reported that 8.0% of the population between 30 and 69 years old, residing in metropolitan areas, had diabetes. In 2005, it was estimated that 11.0% of those aged 40 and over were affected by the disease, which corresponded to about five and a half million people, according to the population estimated by the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística - IBGE*) in the respective year[3].

By the time they receive the diagnosis of type 2 diabetes, many people already present chronic complications of the disease. This situation interferes with their quality of life and causes increased spending on the healthcare service[4], which varies according to the local prevalence and complexity of the available treatment. Such complications can also lead to premature death, loss of productivity at work and early retirement, thus representing further burden to the society, in addition to lower quality of life, not only to the individual, but also to his family[3].

In the case of diabetes, the difficulties faced by the individuals to adhere to the disease treatment are known, likewise the influence of factors such as low levels of education, beliefs, and non-acceptance of the disease, among others, which can prevent the individual to adopt necessary changes to take care of their health[5]. It is possible that the information levels received by the public about the risk factors for developing chronic diseases are related to regional, socioeconomic and cultural differences[6].

Considering the relevance of food and adherence to nutritional therapy for the improvement of the population's quality of life and the success of diabetes management, it is important to study the knowledge of nutrition in diabetes, aiming to contribute to the literature and providing data for reflection and conduction of new researches and strategies on social nutrition area that focus on the prevention of diseases and disorders.

Given the above, the objective of this study was to evaluate the knowledge about diabetes mellitus-related nutrition, identify factors that might interfere with the adherence to nutritional therapy and food choices, and observe the actual food intake of participants in a Community Center for the Elderly in the municipality of Sairé, PE.

METHODS

A quantitative, descriptive and cross-sectional study, conducted with attendees of the said Community Center for the Elderly (CCE) in the city of Sairé-PE, between the months of July and August 2014. The sample was composed of 39 subjects, representing 65% of the individuals registered in total at the CCE. The participants were individuals of both sexes, with or without diabetes mellitus, who were duly registered and participated regularly in the activities offered by the community center, being present on the days of data collection.

Data collection was performed by applying an adapted questionnaire[7], which addressed socioeconomic information (gender, age, marital status, education level,

household monthly income, number of family members, and whether the individual is affected by diabetes or not). In addition to outlining the profile of the studied population, the questionnaire included questions aimed at assessing their knowledge of foods liable to increase the risk of developing or worsening a diabetes mellitus condition, containing nine phrases related to food and diabetes, to which the interviewees should answer "true" or "false".

The identification of cultural factors that might interfere with adherence to nutritional therapy and food choices of participants was assessed through five questions inserted in the questionnaire: if the individual is aware of some food/preparation that can reduce the risks or assist in the treatment of diabetes; an example of that food; if the individual has already made use of it; where did they hear indications or who told them about that food; if they have ever been to a consultation with a health professional for guidance on healthy eating and diabetes; and if they have ever seen a nutritionist.

The actual eating practices were assessed through a food frequency questionnaire (FFQ), which was applied on a different day from the interview on food knowledge and grouped the foods into two groups: high-glycemic index foods (cassava, cream crackers, *farofa* - a seasoned toasted flour mixture, watermelon, cantaloupe, French bread and toasts) and low-glycemic index foods (banana, orange, brown rice, skim milk, whole milk, beans, yogurt, diet yogurt, and diet soda). The determination of the glycemic index of foods, likewise the classification into high or low, was made in accordance with previous studies[8-10]. The frequency of consumption was evaluated according to the weekly consumption, considering the consumption categories of less than three times, from three to five times, and on a daily basis.

Statistical analysis was performed with use of Assistat Program version 7.0 beta. An analysis of variance was conducted to assess whether the values found for intake of foods with high and low glycemic index showed statistically significant difference. The research followed the Resolution 466/12 of the National Health Council and was approved on 2014 June 5 by the Research Ethics Committee of the Vale do Ipojuca University Center, under protocol no. 0010/2014. All the study participants signed the Free and Informed Consent Form (FICF).

RESULTS

The survey found that 39 elderly attended the Community Center for the Elderly on a weekly basis, and the majority were women (92.3%). These individuals had average age of 67.2 years, with the youngest aged 48 years old and the oldest, 84. According to the socioeconomic profile, it was observed that 43.5% (n=17) of them were married and 33.3% (n=13), widowers.

Regarding the education level, it was observed that a significant part of the sample was illiterate (23.0%; n=9), the majority (74.3%; n=29) had not completed up to the 9th grade, and only one had completed high school. With regard to monthly income, a little more than half of the respondents (56.4%; n=22) reported receiving between 1 and 2 minimum wages, while 28.2% (n=11) reported earning 1 minimum wage or less per month. Most respondents (30.7%) lived with 1 and 2 persons (30.7%), 8 subjects reported living alone (20.5%), and only 2 reported living with 5 persons.

Of the 39 subjects, 35.9% (n=14) had diagnosed diabetes, and one of them was not able to say whether he was diabetic. Therefore, 61.5% (n=24) of the elderly monitored at the Community Center for the Elderly were not affected by this disease.

By analyzing the individuals' knowledge of food, most showed adequate knowledge about the types of foods liable to influence the treatment of diabetes mellitus, as shown in Table I.

Table I - Knowledge of foods related to diabetes mellitus by attendees of a Community Center for the Elderly in the city of Sairé. Pernambuco, 2014.

Questions	Correct answer		Wrong answer	
	n	%	n	%
Bread, crackers and toasts interfere with blood sugar	27	69.2	12	30.7
The diabetic cannot eat cantaloupe and watermelon freely	30	76.9	9	23.0
The diabetic cannot eat orange and banana freely	37	94.8	2	5.1
The diabetic cannot consume milk and yogurt freely	34	87.1	5	12.8
Sources of fiber contribute to sugar and cholesterol control	35	89.7	4	10.2
Any diet food and sweeteners may be consumed freely by the diabetic	29	74.3	10	25.6
The diabetic can eat verduras e leguminosas freely	23	58.9	16	41.0
The diabetic can eat manioc flour freely	37	94.8	2	5.1
The diabetic can eat cassava freely	37	94.8	2	5.1

Among the evaluated subjects, 51.2% (n=20) said they knew some food/preparation that can reduce the risk of diabetes onset or aid in the treatment. In the group of patients with diabetes, this percentage was found to be even higher (64.2%; n=9).

The most cited food item was the eggplant, recalled by 35% (n=7) of the twenty participants who reported such knowledge. Respondents also cited foods such as soy, carqueja (*Baccharis trimera*) tea, passion fruit, string beans, onions, green bananas, okra, lettuce, orange, toasted common orange seed, plantains cooking water, and lemon juice with garlic and onion.

Of the twenty participants who claimed to have knowledge of some food/preparation that can reduce the risk of diabetes onset or assist in the treatment, 35% (n=7) reported having acquired this knowledge through the television and conversation with acquaintances, but cited also the doctor (15%; n=3), radio programs (5%, n=1), books (5%, n=1), and health facilities (5%, n=1) as sources of information. The source of knowledge most cited by the diabetic subjects was the conversation with acquaintances (33.3%; n=3). Of those who cited the source "conversation with acquaintances", 66.6% (n=2) stated that they had made use of the recommended food, even without certainty about scientific confirmation of the therapeutic purpose of the cited food/preparation. Moreover, 60% (n=12) said they had made use of some of these foods with the intention to reduce or maintain blood glucose levels.

Still, it was possible to detect that the majority of respondents (56.4%; n=22), whether having diabetes or not, had never had a consultation with a health professional for guidance on healthy eating and diabetes, and 58.9% (n=23) had never had a nutritionist follow-up. Among the diabetics, it was found that most (71.4%, n=10) sought guidance of a health professional on nutrition and diabetes but, regarding the nutritional counseling, only 42.8% (n=6) reported having been monitored by a nutritionist.

Checking the food consumption of all respondents, it was found that the high-glycemic index foods were more consumed than the low-glycemic index foods, as shown in Table II.

Farofa and toasts are the high-glycemic index foods less consumed by the assessed population, as 89.7% (n=35) and 58.9% (n=23) of the subjects reported not eating them, respectively. Among the low-glycemic index foods, brown rice, skim milk, yogurt, diet yogurt and diet soda are consumed by less than half of the study participants, as shown in Table III.

Table II - Types of foods most frequently consumed by attendees of a Community Center for the Elderly in the city of Sairé. Pernambuco, 2014.

Foods	**Consumption by the population**	
	n	**%**
High-glycemic index foods		
Cassava	31	79.4
Watermelon	31	79.4
Cantaloupe	30	76.9
French bread	27	69.2
Cream crackers	25	64.1
Low-glycemic index foods		
Beans	39	100
Banana	38	97.4
Orange	34	87.1
Whole milk	21	53.8

Table III - Types of foods less frequently consumed by attendees of a Community Center for the Elderly in the city of Sairé. Pernambuco, 2014.

Foods	Do not consume	
	n	%
High-glycemic index foods		
Farofa	35	89.7
Toast	23	58.9
Low-glycemic index foods		
Brown rice	30	76.9
Diet yogurt	34	87.1
Diet soda	29	74.3
Yogurt	26	66.6
Skim milk	25	64.1

As for the weekly frequency of consumption of these foods, it was observed that cassava, watermelon and melon are consumed less than 3 times a week, represented by 83.8% (n=26), 61.2% (n=19) and 63.3% (n=19) of the subjects, respectively. As for the beans, most (69.2%, n=27) consumed them on a daily basis. Bananas are consumed 3 to 5 times a week by 42.1% (n=16) of the subjects.

In the group of diabetics, as well as in the general population, it was observed the consumption of more high-glycemic index than low-glycemic index foods. However, regarding the frequency of consumption, high-glycemic foods are eaten less often, while low-glycemic index foods are consumed more times a week in comparison to the non-diabetic individuals, as seen in Table IV.

After analysis of variance to assess the values found for intake of foods with high and low glycemic index, there was no statistically significant difference.

Table IV - Weekly frequency of food consumption of diabetic and non-diabetic attendees of a Community Center for the Elderly in the city of Sairé. Pernambuco, 2014.

High-glycemic index foods	Diabetics		Non-diabetics	
	Weekly frequency	n (%)	Weekly frequency	n (%)
Cassava	< 3	11 (100)	< 3	15 (78.9)
Watermelon	< 3	10 (90.9)	3 to 5	10 (52.6)
Cantaloupe	< 3	9 (75)	< 3	9 (52.9)
French bread	2 to 3	5 (60)	Daily	6 (42.2)
Cream crackers	< 3	4 (44.4)	3 to 5	7 (46.6)
Low-glycemic index foods				
Beans	Daily	12 (85.7)	Daily	14 (58.3)
Banana	< 3	7 (50)	3 to 5	12 (52.1)
Orange	3 to 5	7 (58.3)	< 3	10 (47.6)
Whole milk	3 to 5	4 (40)	< 3	7 (70)

DISCUSSION

A majority (74.3%) of the individuals who attend the Community Center for the Elderly did not get to finish the 9th grade, characterizing a population with low level of education. It is important to highlight that it has been observed in the literature an association between education and knowledge providing better food choices[11]. Nevertheless, even with the low education level found, the level of knowledge related to nutrition and diabetes mellitus, in general, was considered satisfactory, given that most subjects answered correctly to the proposed questions related to this issue. In a research where the knowledge of primary health care users affected by diabetes mellitus was analyzed, it was found that they have satisfactory knowledge of its pathophysiology, self-care practices and complications of the disease, though this is not always enough to adhere to treatment, since they report the existence of aspects that interfere with this process[5].

With respect to income, the highest number of individuals earn between one and two minimum wages. In a study conducted in order to characterize the most common food consumption in the Brazilian population, it was evidenced that there are differences in food intake between individuals with high and low income status[12]. In a cross-sectional population-based study with 2,066 low-income elderly in the city of São Paulo, it was concluded that low income was associated with limited variety of fruits and vegetables consumed, even though the sample constituted a relatively homogeneous population group[13].

This factor may explain the low intake of diet, low-fat and whole foods identified in the group from the Community Center for the Elderly, since these foods have higher costs, compared to other items in the questionnaire. A national survey on the use of the family budget between 2008 and 2009 also noted that increased consumption of fruits, vegetables, milk and non-fat derivatives increased much with the income[14].

Overall, a large part of the sample reported knowledge of some food/preparation that reduces the risk of onset or interfere positively in diabetes. Such knowledge, for the majority, has been acquired through television programs. An observational and descriptive study that evaluated food advertisements of two television stations on Brazilian public-access channels showed that, through persuasive, attractive and remarkable messages, the television media has more enduring influence than the family impact on food choices, and this has not contributed to a healthy lifestyle among the Brazilian population[15].

When analyzed only the diabetic subjects, the knowledge of food was even higher, which can be explained by the fact that they are affected by the condition. The main means of sharing information was through informal conversations with acquaintances. The social interaction leads to a set of beliefs, among these, the primitive ones, which are those learned by the direct encounter with the object of belief and reinforced by social consensus, representing the basic truths of the individual. Such beliefs were identified among diabetic patients as indicators of poor adherence to nutritional therapy[16].

The present study identified that, among the total number of individuals who responded positively to this question about making use of the food that they already have knowledge of, most are subjects affected by diabetes mellitus (88.8%), who aim at obtaining the cure or improvement of symptoms. This data corroborates the study in Teresina-PI, which analyzed the difficulties encountered in changing eating practices among diabetics treated at a nutrition office of the Brazilian Unified Health System (*Sistema Único de Saúde*) in the city of Teresina. It was observed that tradition is strongly linked to the way individuals deal with diabetes, as all the assessed patients made reference to the practice of traditional medicine, which was presented with strong credibility and a somewhat indiscriminate use[17].

On the other hand, a study conducted in 2013 showed that 65% of diabetic patients hospitalized in a Clinical Hospital, who used functional foods for diabetes control received no indication to do so, and only 9% said the indication was given by an acquaintance[18].

The food most remembered by the group was the eggplant. In a literature review, which studied and analyzed articles published in databases, books and journals, and sought to justify the eggplant characteristics as a functional food, it was seen that many studies reveal that the components in the chemical composition of that food make it important in the prevention and treatment of some chronic diseases such as diabetes[19].

Among other foods, soy, onion, and lemon juice with onions and garlic were present. In a research emphasizing the properties of functional foods and their role in the prevention and control of hypertension and diabetes, the data points that soy fibers regulate glucose levels in the blood[20], while onion and garlic are considered important functional foods in diabetes control[18]. Thus, one sees that this is still a vague knowledge in the group. Therefore, it stands out the importance of educational activities able to expand the individuals' knowledge of functional foods, with proper scientific evidence, and to clarify how such knowledge should be used, so that it can actually contribute to diabetes mellitus prevention and/or treatment.

The search for health professionals to receive guidance on nutrition and diabetes is more common among diabetic individuals (71.4%), while the majority of the general

population has never had contact for this purpose. Such trend was also seen in a study that evaluated the resident population of Vila Gaúcha, Porto Alegre, where 37 individuals were identified with diabetes diagnosed by a doctor, 81.1% of whom had received guidance from a professional about diet, and 64.9% reported having had an appointment with the doctor because of illness in the previous year to the survey[21].

With regard to nutritional counseling, most individuals reported never having received it (58.9%). Among the diabetics, it was seen that, although 42.8% claimed the nutritionist had followed them up, this is still considered an unsatisfactory data, since the disease requires the person to have a proper and balanced diet so that it can be kept under control, in order to prevent or delay its complications.

Evidence indicates that, when associated with the dietary planning of diabetic patients, the glycemic index of foods helps to improve the individual's glycemic control and, if maintained permanently, it can prevent and/or delay the onset of diabetes complications[22]. With regard to food consumption among individuals of the Community Center, there is a tendency to consumption of more foods with high glycemic index than low glycemic index. It is known, however, that high-glycemic index foods have a greater impact on blood glucose, being quickly digested and absorbed, and that there are intrinsic and extrinsic factors to the food that can influence this index[23].

Cassava and watermelon, which are part of the high-glycemic index food group, are consumed by the majority of respondents, even though their consumption frequency (less than three times a week) is considered low. French bread and cream crackers, on the other hand, were found with high frequency of consumption, on a daily basis and 3 to 5 times per week, respectively.

In the group of low-glycemic index foods, we point out that beans are consumed daily by most respondents and, regardless of the frequency, all the subjects consume that item, which is part of Brazil's food culture. Data of individuals selected to participate in the National Food Survey (NFS) was submitted to an analysis stratified by region, which showed that beans and French bread are among the five foods with the highest prevalence rates in Brazil[12]. This study identified that banana and orange are also largely consumed by the group - 97.4% and 87.1%, respectively. A study shows that, among the twenty most prevalent food consumption in the population, banana is the main fruit in all age groups, and only the elderly added a second fruit to this group: the orange[12].

The consumption of whole milk was cited by most individuals (53.8%), but with low weekly frequency (less than three times). A survey conducted in all the Brazilian state capitals and the Federal District found that the frequency of full-fat milk consumption by adults (≥18 years) was high in all the cities studied (53.8%) and higher among men than in women, and that the consumption tended to decrease as age increased[24].

By analyzing the diabetic participants, it is evidenced that the high-glycemic index foods are eaten less times a week than the low-glycemic foods, in comparison to those who are not diabetic. This trend was seen in Bauru, SP, where individuals with diabetes reported consuming more fruits and vegetables, non-fat dairy, diet soft drinks, oleaginous seeds/fruits and olive oil, and less sweeties and sugary soft drinks, compared to non-diabetic subjects[25]. However, other study, also in the state of São Paulo, which evaluated the dietary intake of individuals with type 2 diabetes, found that the majority consume foods with high carbohydrate content, such as potatoes, cassava, white flour and polished rice[26]. Another study, conducted in a university hospital in Rio de Janeiro, showed that low-glycemic index diets are able to improve glycemic control in patients with type 1 diabetes[27].

The physiological aspect of aging represents a possible limitation of the current study, because memory loss could be present and influence the elderly's answers on food consumption.

Given the large increase in diabetes-related mortality in Brazil, one can state the need for these issues to be at the center of public policies, and it is suggested, therefore, the intensification of health promotion activities in the group, since the persistence and continuation of such activities can lead to changes in lifestyle and contribute to the prevention of diabetes.

CONCLUSION

The level of knowledge related to food and diabetes mellitus among the elderly was considered adequate, but it was observed that socioeconomic and cultural factors might interfere with the adherence to nutritional therapy of diabetes or even with the individuals' food choices. Nevertheless, food consumption appears more suitable among persons with diabetes, as these presented a lower frequency of consumption of high-glycemic index foods and higher frequency of consumption of low-glycemic index foods, compared to the non-diabetic population.

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