Assessment of the level of knowledge of diabetes mellitus patients about sweeteners

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Abstract

Nutritional therapy is essential for metabolic control among diabetic people. The use of sweeteners instead of sugar is common, as they bring sweetness to foods without increasing glycemia. This study aimed to evaluate the level of knowledge of diabetes mellitus individuals attending the Outpatient Center of Reference the Carapina, Serra/ES, regarding the consumption of sweeteners. Data were collected between August and October 2010 in a sample of 100 diabetic volunteers through a questionnaire on the consumption of this product. The use of sweeteners is frequent in the population, specially the liquid product, compared to other diet products and it was also possible to identify that 91.2% of the interviewed reported that they only began using sweeteners after the diagnostic. Regarding the choice of a sweetener, it was observed that is mainly influenced by the taste (52.75%) and that they control the quantity used. Among other diet products mentioned, the most consumed were soda. Moreover, it was found that 59% did not know the difference between diet and light, and that 63% did not have that habit of reading food labels. Therefore, it was concluded that health professionals should provide further clarification to diabetic people about the adequate use of artificial sweeteners and diet products, and include more complete nutritional information and understandable labels on these products.

Key words: Diabetes Mellitus. Health Education. Sweeteners.

Introduction

Diabetes mellitus (DM) is a metabolic disease characterized by a total or partial insulin deficiency, associated with the diagnosis of chronic hyperglycemia.[1,2] This condition can be subdivided into type 1, type 2, gestational diabetes and other specific types, according to the Brazilian Diabetes Society (2010).[3]

DM constitutes a public health problem due to its high frequency in the population, mortality, complications, treatment with high financial and social costs, and significant deterioration in quality of life.[4,5]

It is one of the most prevalent chronic degenerative diseases plaguing the world's population: in 2000 there were 150 million diabetics, estimated at 300 million by the year of 2025.[6] The prevalence in the State of Espírito Santo, Brazil, was 11.88%.[7] This is explained by the continuing increase in obesity, sedentary lifestyle and longevity.

This disease requires a treatment that focuses on metabolic control, prevention of acute complications and reduction in the risk of long-term complications, so as to obtain a balance between medication, diet and exercise.[8] Treatment adherence is considered one of the most challenging aspects in the care of diabetic patients.[9] The new guidelines do not place restrictions on the consumption of any type of carbohydrates and, according to the criteria adopted by the Recommended Dietary Allowances (RDAs) of the American Diabetes Association (ADA), the minimum carbohydrate intake should be of 130 g/day. [10]

Although the use of sucrose does not worsen glycemic control, it is important to note that the consumption of high-sugar foods can be harmful, since they are also, for the most part, rich in fat, which increases the risk of cardiovascular disease and obesity, other than being low in fiber, vitamins and minerals.[10]

Patients with DM who restrict the consumption of white sugar (sucrose) start making use of sweeteners and diet products, which add sweetness to foods with little or no calories. Although these products are not necessary for the metabolic control of DM, they play a significant role in the social relations and the psychological well-being of these patients, providing the palatability and pleasure of the sweet taste.[11]

According to Decree No. 29, of January 13, 1998, issued by the Brazilian Health Surveillance Agency (ANVISA),[12] dietetic sweeteners are targeted at individuals on diets with restriction of sucrose, fructose and / or glucose, in order to meet the needs of people subjected to restrictions on the intake of these carbohydrates. On the other hand, tabletop sweeteners, according to Decree No. 38, of 13 January 1998,[13] are products created with the aim of giving a sweet taste to foods and drinks. The raw materials sucrose, fructose and glucose cannot be used in the formulation of these food products.

Torloni[14] states that sweeteners are sugar substitutes (substances other than sugar that sweeten in small amounts) and are responsible for the good appearance, durability and final texture of a product. When used according to the recommendations, they are not harmful to health, and people should take heed of the recommendations against its consumption in excess.[15]

Sweeteners are classified into two categories, caloric and non-caloric.[11] Caloric sweeteners include fructose, sorbitol, mannitol, xylitol, lactose, maltodextrin, and sucrose; and cyclamate, saccharin, acesulfame-K, stevioside, sucralose and aspartame (a combination of phenylalanine and aspartic acid) are some of the non-caloric sweeteners.[16]

There are few studies reporting on the knowledge and consumption of sweeteners by individuals with DM. Thus, considering the importance of these products in the treatment of the disease, the specific characteristics of each sweetener, and the fact there are no specific recommendations for their use in the nutritional therapy of the condition, this study aims to assess the level of knowledge of individuals with diabetes mellitus treated at the Outpatient Care Center (OCC) located in Carapina, a municipality of Serra, ES, Brazil, about the consumption of sweeteners, in order to learn their dietary habits regarding sweeteners and educate them about the proper consumption of these products.

Materials and methods

This is a cross-sectional, exploratory, descriptive study, conducted at the Outpatient Care Center (OCC) of Carapina, which is located beside the Central Basic Health Unit of Carapina, in the municipality of Serra, ES, where the Diabetes Education and Control Program is run.

The minimum sample size set for this study was 5% of the total amount of individuals with DM who were registered in the program and attended the OCC of Carapina for routine visits taking place in the morning hours, between August and October 2010. In all, we selected 100 volunteers.

Data collection began after the approval of the research project by the Research Ethics Committee of the Faculdade Católica Salesiana do Espírito Santo, in accordance with Resolution No. 196/96 of the National Health Council (Protocol No. 44/2010, Official Letter No. 146/2010/CEP).

The instrument used for data collection was a semi-structured questionnaire, with closed- and open-ended questions, consisting of three parts: the first being the sociodemographic data; the second, data related to the disease; and, finally, data on the knowledge and consumption of sweeteners and dietetic products, totaling 39 questions that were adapted from Sousa's[17] and Oliveira's[16] studies, excluding some questions, in order to achieve the purpose of this study.

Qualitative data were described using absolute and relative frequency distributions, and quantitative variables using mean and standard deviation values. The data were analyzed with SPSS software, v. 17 (2010).

Results

The average age of the sample was 54.64 ± 13.88 years old and the time taken to diagnose DM ranged from one month to 41 years, with a mean of 10.58 ± 8.55 years.

It was observed that most of the respondents were female (61%) and classified, as for marital status, as married (66%). Moreover, we noticed that 34% of patients had a family income of one minimum wage and 50% have not completed primary education. (Table 1)

Table 1. Characterization of patients attending the OCC of Carapina – ES, 2010, according to sex, marital status, family income, education, type of diabetes (n = 10)

Characteristics	Absolute Frequency (n)	Relative Frequency (%)
Sex		
Male	39	39
Female	61	61
Marital Status		
Single	11	11
Married	66	66
Separated	9	9
Widowed	14	14
Family Income		
No income	10	10
≤ 1 MW	34	34
≤ 2 MW	26	26
≤ 3 MW	30	30
Education		
No schooling	16	16
Incomplete Primary Education	50	50
Complete Primary Education	11	11
Incomplete Secondary Education	5	5
Complete Secondary Education	15	15
Incomplete Higher Education	0	0
Complete Higher Education	3	3
Types of Diabetes		
Type 1	22	22
Type 2	46	46
Unknown	32	32

Regarding the type of diabetes, 46% reported having type 2 DM, and 41% of these still do not know what the disease is. When associating family predecessors with the condition, 70% of respondents reported the existence of one or more cases in the family.

As for the type of treatment received, we found the combination therapy with insulin and oral antidiabetic agents to be the most frequent (53%) (Table 2). With respect to physical activity, 88% of respondents reported not exercising.

Table 2. Type of treatment received by individuals with DM attending the OCC of Carapina – ES, 2010. (n = 100)

Type of drug treatment	Absolute Frequency (n)	Relative Frequency (%)
Insulin	10	10
Oral antidiabetic	35	35
Insulin + oral antidiabetic	53	53
None	2	2

Of the 100 respondents, 98% believe proper nutrition is important for the treatment of DM. As for the importance of using sweeteners for the treatment, 52% reported that they help live better with the disease and 31% considered them to be indispensable.

It was also found that 92% of respondents were educated about food consumption, and that, in this orientation, 97% of patients were also instructed to replace sugar with sweeteners.

By analyzing which professional has given the respondents orientation regarding the dietary treatment for DM (Figure 1), we can observe that the doctor is the most cited one, followed by the nutritionist and the nurse. And in the option 'Others', the only professional mentioned was the social worker.
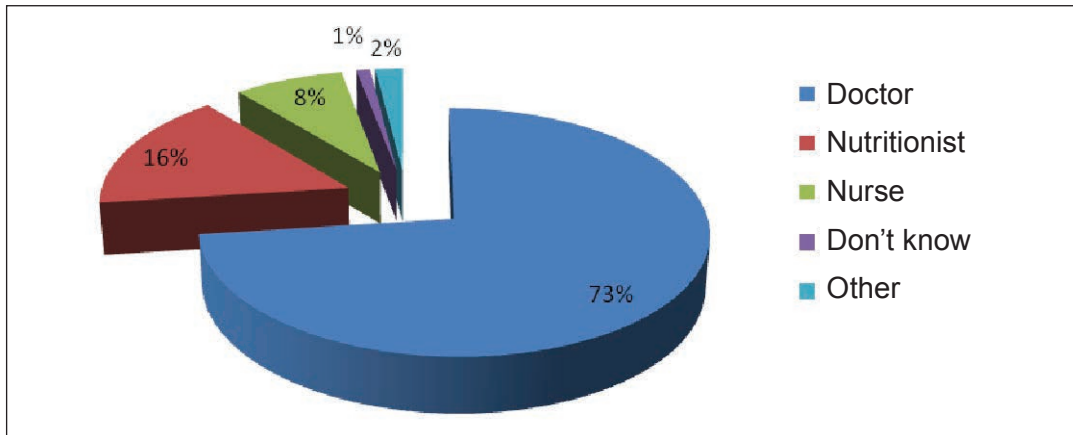
Figure 1. Percentage distribution of professionals participating in the nutritional education of individuals with DM attending the OCC of Carapina – ES, 2010. (n=92)

The habit of not reading food labels was detected in 63% of the subjects and, while the reasons for this differ, overarching all is the lack of interest (40%). Overall, most people make use of sweeteners (91%), which they started to consume only after the diagnosis of DM. Table 3 shows that, for most respondents, the reason for using this product is the presence of DM (51.65%), and the nonuse was mostly justified in terms of being harmful (55.56%) and unnecessary.

Table 3. Reasons for use and non-use of sweeteners by individuals with DM attending the OCC of Carapina – ES, 2010.

	Absolute Frequency (n)	Relative Frequency (%)
Reason for use (n=91)		
Recommendation by the provider	40	43,96
Due to DM	47	51.65
Liking to the taste	1	1.1
Liking to sweets	1	1.1
Other	2	2.19
Reason for nonuse (n=9)		
It is harmful	5	55.56
Unpleasant taste	4	44.44

The most used type of sweetener is the liquid form, mentioned by 94% of the sample of sweetener users. Regarding the way of using the product, respondents said to count the drops to be consumed (78.02%), with a considerable percentage of subjects who do not do so (21.98%). Of the 91 interviewees who use sweeteners, 56% reported being concerned about the amount ingested, and 57.14% would replace the sweetener with sugar, if they could.

Individuals reported higher consumption of the ZeroCal® sweetener (65%) and 80% of respondents do not know the composition of their sweetener of choice. As regards the selection of the sweetener, the taste was the key criterion for purchase decisions (53%), followed by suggestions of friends and family (11%), price (10%) and brand (10%). Just over half of the sample has changed their sweetener before (63%) and the main justification was the unpleasant taste of the product (46%).

Cited by 53% of respondents, soda ranks first among the products in which sugar has been replaced with sweeteners that are consumed the most. Juice is the second most consumed (47%), and, in the option 'Others', the most frequently mentioned were: gelatin, yogurt, ice cream, cereal bar and some sweets, such as coconut candy and guava paste. The less frequently cited ones include jam, pudding, chocolate and cake.

As for the frequency of consumption, soda (58.49%) and juice (53.19%) are consumed weekly, and pudding (71.43%), chocolate (70%) and cake (81.82%), monthly.

As far as the knowledge about diet and light products is concerned, it was found that only 41% of the subjects reported being able to distinguish between the two. The answers given by the respondents for the definition of a diet product were: reduced-sugar (34.15%), sugar-free (34.15%) and suitable for diabetic patients (31.7%); and for the definition of a light product: reduced-fat (48.78%), recommended for weight loss (19.51%), reduced-sugar (12.2%), fat-free (9.76%) and suitable for diabetics (9.76%). There is confusion about the matter, as shown by the answers given by the 41 individuals who claimed to know the difference.

Discussion

Gender stratification analysis in patients treated at the OCC of Carapina who sought the Diabetes Education and Control Program showed results similar to those reported by Castro & Franco,[11] who found a prevalence in women, which may be related to a greater concern and interest of this group in the care and treatment of the pathology.

We also found a higher incidence of type 2 diabetes, and a prevalence in the elderly was observed among those affected, which can be explained by Sousa[17], who states that this type of diabetes is more related to this age group.

Regarding educational level, more than half of the population (66%) in this study has 'no schooling' or 'incomplete primary education', which hinders the provision of nutritional information to diabetic individuals, since understanding becomes more difficult. This resembles a finding reported by Sousa[17] that respondents have low family income, which is related to educational level and the difficulty in following the treatment instructions.

With respect to medication, the use of insulin in combination with oral antidiabetic agents was the most frequently reported treatment (53%), which, according to Oliveira,[16] may stem from the difficulty in controlling the disease and to an advanced stage thereof. It was also reported that the use of sweeteners only began after the diagnosis of DM, and that it is done out of obligation, which is proven by the fact that 52 subjects stated that they would start consuming sugar again if they could.

The importance of sweeteners in the treatment of DM was cited by the respondents, who, despite not always being able to make use of these products, regarded them as 'indispensable' and as 'helpful in coping with the disease'. However, sweeteners are not essential in the lives of these individuals; these artificial sugar substitutes only help satisfy the desire for sweetness and sustain glycemic control.[18]

Each sweetener has its own particularity, such as the limited use of aspartame at high temperatures and the prohibited use of sodium cyclamate by hypertensive individuals because it contains sodium. These examples testify to the importance of identifying the composition of the product.[16,19] In this study, the sweetener most consumed by the population evaluated was identified by its brand name, since most respondents did not know about its composition. The brands most frequently cited in the study are linked to an article from a nationwide magazine, which, according to Weinberg,[20] lists the best-selling brands in the Brazilian market, proving that sweeteners are best known by their trade name rather than by their composition.

Thus, ZeroCal® was reported as the most consumed sweetener, and aspartame, cyclamate and saccharin were found to be the most used sugar substitutes, though it was not possible to determine their exact amounts, since the form of the sweetener used was not informed.

According to Castro & Franco,[11] cyclamate is combined with saccharin in order to reduce the bitter taste of the latter. Duarte & Oliveira[19] highlighted sucralose and stevioside as the most suitable products, because they have considerable sweetness and less bitterness, but they are the most expensive options.

The study by Castro & Franco[11] also found that the majority (79.2%) of diabetic respondents regard liquid sweeteners as the preferred and most adequate form of consumption. Also, the studies by Castro & Franco[11] and Sousa[17], respectively, show that 61.3% and 87.8% of diabetic respondents do count the drops of the sweetener as they use it. According to Duarte & Oliveira,[19] just over half

of them are concerned about how much sweetener they add and control its use, even not knowing what the recommended amount would be.

The findings regarding the buying criterion for a particular sweetener were in agreement with the results obtained by Castro & Franco[11] that flavor is given priority in the purchase decision-making process, followed by the suggestion of friends and relatives, price, and brand, which shows that the individuals look for food products that match their taste. The influence of the media, through advertising, was not as present in this group, and, according to Oliveira[16] and Castro & Franco,[11] this impact can be associated with younger people who seek a better quality of life, healthy living and obesity control. Contrary to a finding by Oliveira,[16] over half of diabetics have changed sweeteners before, which is an important attitude involving both brands and the artificial sugar substitute used.

It was found that there are misconceptions regarding the actual meaning of the terms diet and light, since most of the 41% who answered the question did not define them properly, similarly to what was observed by Duarte & Oliveira,[19] which only aggravates the state of the disease, for this confusion leads to an inadequate consumption of these products. The low educational profile of the survey population may be related to this reality, because the lack of and/or reduction in calories in the products may be neglected by those with a low educational level.[16] Therefore, there is a need for improvement in the provision of information about the use and composition of these products, considering that their supply and acquisition by diabetic subjects have increased.

The finding regarding the lack of reading of food labels was similar to that obtained by Duarte & Oliveira[19] that several factors relate to the lack of interest in the labels, such as the use of small print, as reported by many respondents, as well as the lack of knowledge and understanding of the information contained therein. This finding was expected, since this is a population with low family income and little education, which hinders understanding and the process of learning about diabetes and changing one's lifestyle.[17] Thus, the purpose of the labeling – that is, to help in the selection and consumption of food products – is not achieved.

The consumption of products in which sugar has been replaced with sweeteners is not common for many respondents, because they do not believe in the effectiveness of their use and their ingestion makes them feel sick. However, the individuals reported that they did not stop consuming foods rich in simple carbohydrates due to being diabetic, which contributes to their glycemic crises and increased blood glucose levels, aggravating the state of the DM.[17] As regards the consumption of sweeteners in places outside the home, just over half of the respondents reported using them, because many eating places still do not offer sweeteners as an option, which shows a lack of interest, information and awareness, by most of the population, of the needs of diabetics, since these products are not only used by individuals seeking to lose weight.

The importance of the diet in the treatment of DM was recognized by almost all respondents (98%), but this does not necessarily result in following the instructions received, given that many respondents fail to conform to the diet. This non-compliance with the nutritional therapy makes the metabolic control, and, consequently, the treatment, more difficult, since DM is an asymptomatic disease, which causes patients to believe they are fine because no symptoms are showing. In addition, health professionals must bear in mind that eating is not only a biological phenomenon; more so, it is influenced by social, cultural and emotional aspects.[16]

A study by Peres and colleagues[4] argues that several factors may influence this matter, such as psychological aspects, socioeconomic status, educational level, and disease symptoms. Nutritionists, despite the growth of the profession, did not have a significant role in the choice of the sweetener and in giving the necessary dietary guidelines, which can be explained by their exclusion from the team providing care to diabetics at the OCC.

Regarding physical activity, respondents reported not having the habit of engaging in mild, moderate or vigorous exercise on a regular basis, and studies have shown that physical activity, along with a change in lifestyle and the promotion of healthy eating habits, is effective in the prevention and control of diabetes, especially type 2, acting on glycemic control.[21]

Aerobic exercise is commonly recommended for type 2 diabetics;[21] however, resistance training is also beneficial, especially for the elderly, since, according to Ciolac & Guimarães,[22] the decreases in strength and muscle mass resulting from aerobic exercise lead to a prejudicial modification of energy metabolism, whereas resistance training increases strength and muscle mass, thus contributing to glycemic control, with a reduction in glucose levels and an increase in muscle glycogen. It is important to emphasize, however, that prior medical evaluation is crucial, since the type of sport and the exercise intensity may be harmful to the diabetic patient.

The presence of friends and family in the lives of diabetic individuals helps them control the diet in the treatment, follow the guidelines and exercise, which contributes to the adherence to the necessary care in the treatment and the control of symptoms and aggravations, as the desire to eat and the obligation to monitor themselves are present at all times in the lives of this group.[4,19]

Conclusion

It was found that, despite participating in the Diabetes program offered by the OCC of Carapina, attending regular visits with a multidisciplinary team and orientation workshops, respondents have little knowledge about DM, as well as on the proper consumption of sweeteners and the types of sugar substitutes. Thus, it is necessary to provide them with information regarding the proper use and the composition of these products, since the level of education of the population is also low.

The difficulty in reading labels prevents consumers from increasing their own awareness and becoming more knowledgeable; therefore, it is necessary to encourage them to read the labels by enlarging the print and using simple language, so as to avoid misinformation that leads to an inappropriate use of these products.

The inclusion of a nutritionist in the multidisciplinary team to provide guidance on the importance of eating habits and proper nutrition for the treatment and the prevention of aggravations of diabetes has shown to be important and necessary in the battle to improve health and quality of life, as well as in contributing to raising awareness among individuals and promoting healthy eating habits.

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