



## KNOWLEDGE, ATTITUDE AND AWARENESS OF DIABETES NUTRITION IN PHYSICIANS: A DIETARY SURVEY

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### Abstract:

**Background and objective:** Diet management is the integral part of diabetes. A regular and balanced diet helps in a better glycemic control in type 1 and Type 2 diabetes. The objective of this survey was to examine the current dietary practices and to get a view of the current practice of doctors towards advising diet to their diabetic patients.

**Methods:** A survey form consisting of 21 questions, was specifically designed to understand doctor's view on recommended or discouraged diet for diabetic patients. The survey form was circulated to the doctors across various geographical locations of India. The obtained response was analyzed and the results were expressed in terms of percentages based on the number of responses obtained.

**Results:** The survey included 644 consulting physicians who responded to the distributed survey questionnaire. Majority of the doctors selected 1800 – 2200 calorie and 1800 calorie diet for healthy men and women respectively, and also opined that restricting the calorie intake can help in weight reduction as well as a better control of glycemia in diabetic patients. The rice intake should be discouraged in diabetic patients as per 46.7 % of doctors and 48.6% of doctors believed that potato, sweet potato, and carrots should be avoided by patients with diabetes. 61.3% of doctors opined about avoiding mangoes, banana and grapes for diabetic patients. Surprisingly instead of ripe fruits, 26.4% of doctor's recommended all unripe fruits. Seasonal fruits such as apple, guava, carrots were suggested only upto 200 gm by 46.2% of doctors and up to 400 gm by 30.3% of doctors. Most doctors preferred that dietary fats should only contribute to about 10% -20% of calories, and preferred it to be from olive oil. Egg should be consumed without egg yolk as per 60.3% of doctors' opinion. Artificial sweeteners can be taken as they are considered safe in moderate amount as preferred by 51.6% doctors. In this survey, majority of the doctors agreed on avoiding sweet items and food item with high glycemic index.

**Conclusion:** A good proportion of qualified physicians lack sufficient knowledge of important aspects in nutrition: ideal calorie intake for men and women; glycemic index of fruits and vegetable; recommendation of ripe/unripe fruits or fruit juices; intake of sweets, artificial sweetener and cane sugar. This highlights the need of better training for first-line health-care providers and we recommend dietary management to be included in medical education at all speciality ladders.

**Keywords:** Diet, Fruit Juice, Artificial sweetener, Calories, and Unripe Fruits.

### Introduction:

Diabetes mellitus is a global public health problem with increasing prevalence, and puts a significant financial burden on patient and health-care system. According to IDF 2017, India is home to the second largest number of adults living with diabetes worldwide. One of the goals of diabetes management is to improve fat and carbohydrate metabolism in the tissues and maintain whole-body glucose homeostasis with regular exercise, healthy diet and medicines. Medical nutrition therapy is an integral part of effective diabetes management which advocates the consumption of fruits, cereals, vegetables, milk and milk products.<sup>[1]</sup> An appropriate diet and exercise in diabetic patient improves glycemic control and insulin sensitivity

and decreases the need for oral anti-diabetic drugs or insulin. The optimal diet for diabetes still remains a debatable issue; however dietary guidelines recommend increasing the consumption of fruits and vegetables, and decreasing the daily consumption of saturated fats.<sup>[2]</sup>

The study by Ahmadi et al suggested that physicians have inadequate knowledge related to nutrition, which revealed that 13.1% doctors had mediocre and 86.9% doctor had poor nutrition knowledge.<sup>[3]</sup> While, another study showed that 25% doctors found it difficult to identify patient in need of nutritional therapy, 39% lacked techniques for identifying malnourished patients, and 53% found it difficult to calculate the patients' energy requirement and 66% lacked knowledge of national

guidelines for clinical nutrition.<sup>[4]</sup> Similarly, a questionnaire based survey by Hu SP et al showed that physicians did consider nutrition to be important in their personal and clinical practice and 78% agreed with the statement that nutrition consultation should be a part of health care delivery.<sup>[5]</sup> This dietary survey was conducted to analyze knowledge and understanding of the dietary regimes being advised to type 2 diabetes patients in Indian settings.

### Materials and Methods

An anonymous survey questionnaire was designed to assess the physicians' self-reported behavior on specific food items that needs to be included or excluded from the diet of the diabetic persons. The survey questionnaire consisted of 21 multiple-choice questions. The first three questions collected information on the average calorie intake in men and women, and importance of calorie reduction in diabetic patients. The next two questions focused on vegetables and cereals to be avoided in diabetic patients. Further, six questions focused on consumption of fruits, fruit juices, ripe, seasonal and dry fruits and cane sugar in diabetic patient. The next three questions consisted of amount of dietary fat recommended, preferable source of dietary fat. Finally, last six questions were based on consumption of milk/tea/coffee, sweet substances, eggs and cholesterol content of diet.

The survey questionnaire was given to doctors across various geographical locations of India and duration of 20 min was allocated for completing the questionnaire. Most of the questions needed single response, while particular questions needed multiple responses. The completed forms were collected and further descriptive analysis was performed. The results were expressed in percentages based on the responses for each question. There was voluntary participation of all the doctors in the survey and no incentives were provided for their participation.

### Results

#### Population Characteristic

The study included 644 consulting physicians which participated in the diet survey consisting of 21 survey questionnaires.

#### Calorie intake

The results revealed that most doctors (84.1%) believe that the average calories required per day

by an index healthy man is 1800 - 2200 calorie per day, while for a woman, the average calories required per day reported is 1800, by 43.8% of doctors (Table 2). The ideal calorie requirement however, as recommended by NIN for an index man and woman is 2400 calorie and 2100 calorie respectively.<sup>[6]</sup> This gap in the knowledge often leads to erroneous dietary recommendation. Similarly, 77.5% of doctors believed that calorie reduction helps in decreasing weight, cholesterol and triglycerides in the management of diabetic patient, which is true for overweight diabetic patients, but will not be helpful in a normal weight patient<sup>[6]</sup>, this was opinion of about 77% of physicians.

#### Cereals and Vegetables

Rice and maize should be discouraged in diabetic patients as per 46.7% and 11.0% of doctors respectively. 25.6% of doctors opined that total intake of the cereals should be reduced. Similarly, 48.6% of doctors think that potato, sweet potatoes and carrots should be avoided by diabetic patients. While 22.2% and 19.1% doctors suggest that potato and sweet potato respectively, need to be avoided. However, guidelines only recommend daily calories intake for diabetes patient and lacks restriction about the individual food items such as rice or maize.<sup>[7]</sup>

#### Fruit intake

Whole fruits such as mangoes, banana and grapes should be avoided in diabetic patients, was suggested by 61.3% of doctors. Instead of ripe fruits, 73.6% of doctors recommend all unripe fruits to diabetic patients. Seasonal fruits such as apple, guava, carrots are recommended only upto 200 gm/day, by 46.3% of doctors and upto 400 gm/day by 30.3% of doctors. Dry fruits are recommended by 52.2% of doctors only. (Table 3). Fresh fruit intake should be encouraged in all diabetic patients, as their relatively low glycemic index does not add to a significant surge in glycemia. Around 47.7% of doctors felt that fruit juice such as orange, pomegranate or mango juice should be avoided, while 8.5% felt that there is no need to avoid the same and 22.8% specified avoidance of mango juice.

Fruit juices are a rich source of calories without fiber and with relatively high glycemic index. Hence, it is better to avoid fruit juices in diabetic patients. It is also suggested that a diabetic patient should

consume the whole fruit with skin, instead of fruit pulp /juices. Ideally, minimum of four or five servings per day of fruits and vegetables is recommended (i.e., approximately 400–500 g/day including three vegetable and two fruit portions [e.g., 100 g of (one katori) raw vegetables (e.g., cauliflower, brinjal, etc.) = 20–30 Kcal; 100 g of fruit e.g., one apple=59 Kcal]).<sup>[8]</sup> Dry fruits, also should be made a part of daily diet wherever possible, as these encourage a rise of HDL, are a very rich source of high quality protein and do have a very low glycemic index and therefore do not add to rising glycemia.

### **Cane Sugar**

Around 46.0% of doctors believed that cane sugar should be stopped completely in diabetic person. While the glycemic index of cane sugar is only 40% as compared to wheat (70%), but its contribution in blood glucose rise after its consumption is insignificant. Hence it is suggested to diabetic patient to avoid sugars in totality.<sup>[7]</sup>

### **Dietary Fats**

Responding to the requirement of dietary fats in diabetic patients, whether it should contribute 10%, 20% or 30% of calories, the response was 30.7%, 23% and 10.1% of doctors respectively. A healthy and well balanced diet which is recommended for all, as well as to all diabetic patients, should include fats and oils in such a way that they contribute 30 % of their daily calories.<sup>[9]</sup> Unfortunately however only 10 % of doctors believe and recommend this to their diabetic patients. The physician fraternity should introspect therefore that by recommending a very low fat diet, are they actually not recommending an unhealthy and harmful diet to their patients. Around 30.3% of doctors suggested that the source of dietary fat should be olive oil rather than ghee, canola/safflower/ground nut oil, while 29% of doctors selected that source should be a combined use of all the above oils in almost equal proportion. The best dietary fat would be olive oil, as preferred by 40.7% of doctors. Olive oil is rich in monounsaturated fatty acids and is definitely a healthy choice but it doesn't go well with Indian culture and traditional dietary choices, besides being expensive.<sup>[10]</sup> Further use of Olive oil alone as a dietary fat is also not recommended, probably it will not be able to provide all the essential amino acids in the proportion needed by body.

The general recommendation as per various guidelines is that every one, except for few who have a raised LDL, including a diabetic person. should consume a combination of Saturated, Mono unsaturated and Polyunsaturated oils in almost equal proportion, in their diets .For individuals, having low-density lipoprotein cholesterol of >100 mg/dL, saturated fatty acids should be <7% of total energy intake/day.<sup>[11]</sup> There should therefore be no reason why fats like butter, sunflower oil or mustard oil be not recommended to our diabetic patients in the permissible quantities, besides olive oil, if acceptable to the person.

### **Milk/tea/coffee/beverages**

Around 53.7% of doctors preferred to avoid tea/coffee with sugar, carbonated soft drink and lassi (sugar sweetened yoghurt) in the diabetic patient. Similarly, 43.6% of doctors advised diabetic patient to eat curd but avoid extra sugar while, 23.4% of doctors suggested curd with artificial sweetener. Milk administered to the diabetic patient should be fat free as advised by 42.5% of doctors. Further, studies is data to convince that increased intake of dairy products was found to be associated with lower measures of body fat, including waist-to-hip ratio. A similar relationship was observed for total milk consumption, and for yogurt.<sup>[12]</sup> These results are supported by a recent review, where authors concluded that increased consumption of dairy products has a modest, positive effect with respect to body weight and body fatness.<sup>[13]</sup>

### **Sweet intake**

Sweet food items such as cake, jalebi, and sweet biscuits should be avoided as per the belief of 79.7% of doctors. The intake of sweets as long as their calorie content is within the recommended quota are absolutely harmless and therefore there seems absolutely no reason to restrict these items from the daily diet of all diabetic persons. This absolutely unjustified restriction generates a lot of anxiety and guilt feeling, amongst the patients and their families, and may be a significant contributor, of often associated depression in diabetic patients. Around 60.8% of doctors opinioned that artificial sweeteners can be taken as they are considered safe in moderation. (Figure 1). While these agents so far are being considered in “generally regarded as safe (GRAS)” category, and therefore can be allowed in moderation.

### Egg and Cholesterol content

As one egg contains 300 mg of cholesterol, which is equivalent to the maximum dietary limit of cholesterol per day, one egg with yolk, per day can be considered to be reasonably safe for most non obese diabetic patients.

**Table 1: Doctors’ opinion about egg consumption for diabetics**

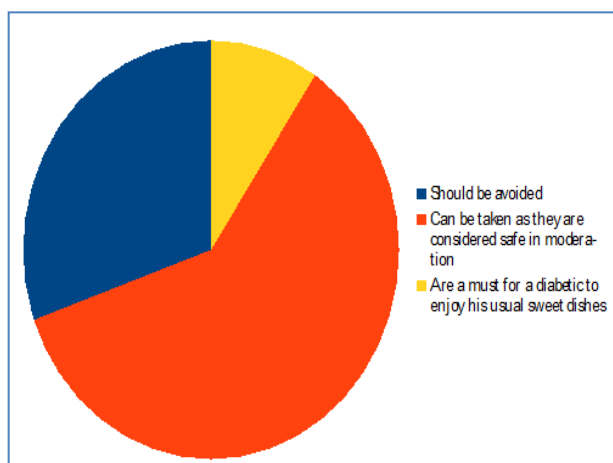
Assessment	Doctors N (%)
Eggs should be avoided	45 (7.5)
As all diabetics are on statins so this much of cholesterol does not matter	81 (12.6)
Cholesterol of eggs is generally found to be harmless	94 (14.6)
Egg yolk containing cholesterol should not be consumed	311 (48.3)

**Table 2: Average calorie requirement per day (kcal) by healthy Indian men and female**

Calories	Female		Male	
	No.	%	No.	%
1800	170	26.4	211	32.8
2000	282	43.8	133	20.7
2200	148	23.0	197	30.6
2400	29	4.5	93	14.4
Not Answered	15	2.3	10	1.5

**Table 3: Profile of dry fruits in diabetic person**

Assessment	Doctors	
	No.	%
Should be avoided	144	22.4
Can be taken	336	52.2
Very beneficial	83	12.9
Not Answered	85	13.2



**Figure 1: Artificial sweetener for diabetic person**

### Discussion

Self discipline and dietary management is a key step, according to American Diabetes Association in the management of diabetes. Skilled management needs knowledge about nutritional aspects, medications and possible diabetes related complications. The study results indicates that physicians are generally aware of information which has been publicized in the medical and lay press, but have a poor knowledge of other important topics in nutrition which have been given less importance. Overall, the results of this study indicate that there is serious lack of knowledge in physician as far as dietary recommendations to a diabetic patient are considered. Many physicians do not have the expertise to properly advise their patients on important aspects of the role of nutrition in prevention, and treatment of disease, which reflects the low priority given to the subject in medical schools and in continuing medical education sessions. The patients are also often ill advised about consumption of dairy products also. An unnecessary restriction about it’s consumption often becomes counter productive and adds to malnutrition.

Nutrition is important in managing diabetes, hence, the dietary practice of doctor’s should match the standard guideline recommendations. In this survey, majority of the doctors agreed on avoiding sweet items, food items with high glycemic index and egg yolk, which was not quite true as per the standard guidelines. Let us propagate the belief that a healthy, well balanced and nutritious diet which is good for everybody is good for all diabetic persons as well. However an obese diabetic person should reduce his calories like any other non diabetic obese person.

What is more important to be stressed, however in view of possible hypoglycemia, all diabetic persons, especially who are on insulin or sulphonylurea, should be careful about taking their carbohydrate containing meals at regular time intervals every day,<sup>[14]</sup>

### Conclusion

The current survey presents that the practicing physicians generally believe in the importance of dietary regime and recommend a strict and similar diet to almost every diabetic patient in India. By contrast, a sizable proportion of physicians lack sufficient knowledge of important aspects of

nutrition: ideal calorie intake for men and women; glycemic index of various food items including fruits and vegetables; intake of sweets, artificial sweetener and cane sugar. The study clearly indicates that physicians need more training in nutrition. Accordingly, nutrition needs to be properly integrated into the medical school curriculum. Hence, we recommend dietary management to be included in medical education at all specialty ladders. There is a need for interventions which includes nutrition education programs or awareness programs to promote health and prevent diabetes complications in the future.

### Limitation

The limitation of the study includes that the non-responding doctors may have a knowledge, practice patterns and perceptions different from the respondents. There is diversity in dietary pattern across India. The wide regional distribution of the sample size may help mitigate some of these concerns. The current survey forced the respondent to choose a right answer and not allowed multiple selections.

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