

Assessing Awareness on Nutrition Therapy and Physical Activity in Type 2 Diabetes Mellitus Patients of Bhavnagar, Gujarat: A Cross-Sectional Observational Study

Nisha Lalwani¹, Ravi Dharamdasani²

¹Assistant Professor, Department of Medicine, Government Medical College, Bhavnagar

²Consultant Vitreo- Retina Surgeon, Radheshyam Retina Hospital, Bhavnagar

Received: 25-05-2024 / Revised: 23-06-2024 / Accepted: 26-07-2024

Corresponding Author: Dr. Nisha Lalwani

Conflict of interest: Nil

Abstract:

Background: Medical nutrition therapy and exercise play an integral role in overall diabetes management as per American Diabetes Association. This study was conducted to have an insight on dietary and exercise practices in diabetic patients thereby to provide comprehensive diabetes care.

Aims and Objectives: To assess the awareness of nutrition therapy and exercise in Type 2 diabetes mellitus patients. To assess food perceptions, dietary practices and level of exercise in diabetic patients. To determine the association of diet and exercise awareness with socio-demographic factors like education, gender, occupation and economic status and glycemic control.

Methods: This study is a Hospital based, Cross-sectional, Observational Study. 100 T2DM patients coming to Sir T. General Hospital, Bhavnagar fulfilling the eligibility criteria were enrolled. They were interviewed with standard questionnaire that included questions on socio-demographic characteristics, disease details, diet and physical activity. A level of $p < 0.05$ was considered significant.

Results: 71% participants were aware regarding importance of dietary modification and 42% about exercise importance in diabetes management. 13% participants were aware about glycemic index and proportion of food in food plate. Nutrition therapy was limited to avoiding certain food items like sugar, sweets, potatoes and rice. 44% participants did exercise and 29% among these did it regularly. Walking was the most preferred form of exercise. There was significant association of awareness regarding diet and exercise importance with gender, education and socio-economic status.

Conclusion: Although participants had awareness regarding role of diet and exercise in diabetes management, their knowledge about its practical implementation was poor. There is need to implement hospital based strategies to improve education on life style modification in diabetic patients.

Keywords: Type 2 Diabetes Mellitus, Medical Nutrition Therapy, Exercise.

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

The burden of diabetes is increasing globally and India which is often referred as 'Diabetes Capital of the World' had around 77 million individuals with diabetes in 2019, which is expected to rise over 134 million by 2045 [1]. Type 2 Diabetes Mellitus (T2DM) is primarily a lifestyle condition and its rise is mainly fuelled by the increasing prevalence of overweight/obesity, unhealthy lifestyle and physical inactivity.

Medical nutrition therapy (MNT) and exercise play important role in diabetes management. MNT given by registered dietician nutritionist is associated with HbA1C absolute decreases of 0.3-2% for people with T2DM [2]. Exercise has been shown to improve blood glucose control, reduce cardiovascular risk factors, contribute to weight

loss and improve wellbeing [2]. American Diabetes Association (ADA) recommends engaging in 150 minutes or more of moderate to vigorous intensity activity per week spread over at least 3 days per week, with no more than 2 consecutive days without activity if not contraindicated [2].

Although most diabetes guidelines recommend starting pharmacotherapy only after first making nutritional and physical activity lifestyle changes, this is not always followed in practice globally [3]. There is more focus on pharmacotherapy for achieving glycemic targets amongst patients as well as practicing physicians due to various barriers on either side. Indian as well as international studies on Knowledge Attitude and Practices of diabetics have highlighted need of promoting education on

life style modification, dietary and physical activity practices in view of unsatisfactory practices and inadequate knowledge [4 5 6]. Having this in background, there was a need to have an insight on food perceptions, dietary intake and exercise practices in diabetic patients.

Materials and Methods:

Study was started after taking permission from Institutional Review Board (Human Ethics Committee), Government Medical College, Bhavnagar from January 2023 to March 2023.

Study Design: Cross-Sectional Observational study.

Study Setting: Department of Medicine, Sir Takhatsinhji General Hospital, Bhavnagar.

Sample Size: 100 T2DM patients fulfilling the following mentioned criteria were selected randomly from Medicine OPD and Diabetes clinic. T2DM patients with age >30 years were included. T2DM patients with Pregnancy, uncontrolled serious cardiac disease and physical disability that can impede physical activity were excluded from the study.

Methods

After taking informed consent, patients were interviewed with standard questionnaire that included questions on socio-demographic characteristics, disease details, diet and physical activity. Questionnaire had been formulated keeping in mind the Standards of Medical Care in Diabetes by ADA [2].

The first section depicted the socio-demographic profile including age, gender, education, location, occupation and socioeconomic status. The socioeconomic status was assessed by Modified BG Prasad Socioeconomic Status Scale 2022 [7].

The second section included medical history-duration of diabetes, presence of co-morbid illness and any addictions. FBS, PP2BS and HbA1C values from recent available reports were collected. Patients were grouped on basis of glycemic control as recommended by ADA [2].

The third section comprised questions on dietary practices and perceptions. These included number of meals, predominant type of diet, healthiest drink to quench the thirst, staple diet, type of oil used for cooking, foods items to be avoided, free food, proportion of food in food plate, glycemic index, diet charts, artificial sweeteners, etc.

The fourth section was regarding questions on type, duration and frequency of physical activity.

Statistical Analysis: Statistical Methods such as mean and standard deviations were used for age, FBS, PP2BS, and HbA1C. Chi square test was used for determining association between awareness of diet and exercise with various socio-demographic parameters and glycemic control. All statistical tests were performed using a p value of <0.05 as level of significance.

Result

Among 100 T2DM participants, 45 were male and 55 were female patients. The mean age of the participants was found to be 58.72 ± 7.09 years. 34 belonged to the rural area and 66 occupied in the urban area.

The mean duration of diabetes among study participants was 6.83 ± 4.67 years. 39 participants had diabetes duration of < 5 years, 46 for 5-10 years and 15 for > 10 years. 73 participants were only on oral anti-diabetes (OADs) drugs, 3 only on insulin and 24 participants were both on insulin and OADs for treatment.

Mean FBS (mg/dl) was 156.82 ± 60.15 and mean PP2BS (mg/dl) was 225.75 ± 74.80 . HbA1C results were available with 45 study participants only. Mean HbA1C was 7.88 gm% for these 45 participants.

Number of participants who achieved glycemic targets as recommended by ADA were as follows: FBS- 46 participants out of 100; PP2BS- 36 participants out of 100; HbA1c- 16 out of 45 participants (35.56%). Amongst 45 participants who had all of the above reports, 13 participants (28.89%) fulfilled all three targets for glycemic control.

71 participants were aware regarding importance of dietary modification in diabetes management. Table 1 shows food perceptions and practices of our patients. 18% were given diet charts and not all followed them regularly. For majority, wheat was the staple diet. Cotton seed oil and ground nut oil were commonly used oils.

Rice, potatoes and sugar were the common food to be avoided. Vegetables and lentils were the common free foods. 71% considered water as the healthiest drink to quench the thirst. 76 % of the participants were aware about restricting salt intake in their diet. 10 % of the participants limited salt intake to not more than 1 tsp/day.

19% of the participants used artificial sweeteners as a substitute to sugar in their tea. All of them used "Sugar free" tablets which contained sucralose.

Table 1: Dietary practices and Food perceptions

	Variable	N=100(%)
Major Meal	Breakfast	23
	Lunch	58
	Dinner	19
Pre- dominant type of diet	Vegetarian	80
	Mixed	20
Awareness on importance of dietary modification	Yes	71
	No	02
	May be	27
Eating restrictions are no longer required once diabetes is controlled	Yes	06
	No	53
	May be	41
“One size fits all” is true for diet pattern	Yes	04
	No	33
	May be	63
Awareness on proportion of food in food plate	Yes	13
	No	82
	May be	05
Awareness about glycemic index	Yes	13
	No	87
Eating bitter food can cure diabetes	Yes	32
	No	20
	May be	48
Awareness about high fiber diet	Yes	33
	No	02
	May be	65
Eating rice is advisable	Yes	27
	No	71
	Don't know	02
Use of artificial sweeteners advisable	Yes	13
	No	22
	May be	65
Artificial Sweeteners used	Yes	19
	No	81

Table 2 shows exercise parameters of patients. 42% were aware about importance of exercise in managing their diabetes. 44 participants did exercise and 29 among these did it regularly. Out of these, 25 walked for 150mins/week. Walking was most preferred form of exercise. Most of the females considered their routine household work as a form of exercise. The average duration of exercise was 32 minutes/day.

Table 2: Exercise parameters in study population

	Variable	N= 100 (%)
Activity Factor	Light work	65
	Moderate work	33
	Heavy work	2
Awareness regarding regular exercise in managing diabetes	Yes	42
	No	5
	May be	53
Exercise is fruitful	Yes	39
	No	10
	May be	51
Recommended to do 30 minutes of moderate to vigorous aerobic activity for 5 days a week	Yes	71
	No	29
Kind of exercise	Cycling	09
	Walking	42
	Swimming	00
	Yoga	11
	Household work	38

Discussion

In our study, 71% were aware about importance of diet and 42% about importance of exercise in diabetes management. In KAP study by Shah et al [8], dietary modifications (74.78%) were relied more than exercises (51.23%) among evaluated patients. In study by Nishchitha S et al [9], 72.4 % knew that diet and exercise are important in control of diabetes. In study by Mukhopadhyay et al [10], 71.9 % participants considered healthy diet and 65.6% considered regular exercise important for diabetes treatment. Although 71 % were aware about role of diet in diabetes management, patients were unaware how they should approach this issue. The only thing that mattered to most of the patients was “what to eat?” For them, nutrition therapy was limited to avoiding certain food items like sugar, sweets, potatoes and rice. Few were given diet charts and reasons for non-adherence to charts were dislike for food items mentioned in the chart, occupational barriers and lack of family support. Majority (71%) participants considered water as healthiest drink to quench their thirst. Low calorie or non-nutritive sweetened beverages may serve as short term replacement strategy; however people with diabetes should be encouraged to decrease both sweetened and non-nutritive sweetened beverages with an emphasis on water intake [2].

19% of the participants used artificial sweeteners as a substitute to sugar. One of the KAP study regarding use of artificial sweeteners in diabetics as substitute of sugar, 205 patients (38.25%) out of 536 patients used artificial sweeteners [11]. The U.S. FDA has approved many non-nutritive sweeteners and they may be an acceptable substitute for nutritive sweeteners such as sugar and honey when consumed in moderation [2]. Majority of the participants practiced salt restriction as avoiding papad, pickles, bakery items, extra salt on table and packaged foods like chips. These practices were relatable with Indian hypertension guidelines [12].

47% participants used cotton seed oil and 34% used ground nut oil. However in study by Sivakumar Karunanandham et al [4], 58% used sunflower oil and 15 % coconut oil which indicate regional differences in type of oils consumed. No single type of oil can be considered perfect and hence to ensure adequate supply of essential fatty acids a combination of oil is required. Various combinations like groundnut or sesame or rice bran + Mustard or canola etc are advised by National Institute of Nutrition [13].

44% did exercise and only 29% did exercise regularly. In PROGENS ARENA study 57.4% of patients declared any form of deliberate, leisure time physical activity [5]. Exercise was performed on a daily basis only by 22.3% [5]. In study done

by, Sivakumar Karunanandham et al [4], walking was done by 54%, Yoga by 1%, cycling by 2%, household work by 2% and 41% did other exercises.

This study also aimed to determine association between dietary and exercise awareness and practices with socio-demographic variables. Males were more aware than females regarding diet ($p=0.0017$) and exercise ($p=0.037$) importance. There were more males who performed exercise as compared to females ($p=0.0035$), however there was no significant difference in regularity of performing exercise ($p=0.89$). There was no influence of gender on awareness about glycemic index, proportion of food in food plates and use of diet charts. There was significant association between awareness about diet and exercise importance ($p=0.0023$), proportion of food in food plate ($p=0.0129$) with education. Percentage of participants having awareness increased with increase in level of education.

There was influence of socio-economic status on awareness about diet and exercise. Percentage of participants decreased with lower socio-economic class. There was no impact of socio-economic status on awareness on glycemic index, proportion of food plate, percentage of participants performing exercise and regularity of exercise. Lower literacy and socio-economic status can be the problem in diabetes education and management. There is a need to improve literacy rate of the society which may help patients to understand and acquire skills for DSMES in a better way.

Before conducting this study, it was considered that what is being done being as a primary care physician is enough for diabetic patients. Diabetic care was restricted more to pharmacotherapy and screening of its complications. Due to busy schedules and high patient load in OPDs, life style modification education was limited to advising patients to exercise for 30mins/day, at-least 5 days/week and briefing patients about what to eat and what not to eat. However, comprehensive diabetes care focuses on Diabetes Self-Management Education and support, MNT, Physical activity and Psychosocial issues apart from pharmacotherapy.

On conducting this study, it has been found that more patients rely on diet than exercise in diabetes management. Very few are given diet charts due to unavailability of dieticians, educators. Very few knew about glycemic index, proportion of food plates and fibre rich diet. There is influence of socio-demographic factors like gender, education and socio-economic status on awareness about diet and exercise. Facilities for necessary investigations should be made available in the hospital set up and

primary care physicians should recommend HbA1C testing at regular interval to the patients.

Conclusion

The findings in our study necessitate us to take more efforts to impart proper diabetes education about life style modification to diabetic patients. Every little step in educating and creating awareness will improve overall wellbeing and prolong life span of diabetic patients.

Limitations

This study was based on questionnaires, so answers could be biased by various factors. This study enrolled participants from one government run hospital, so the results cannot be generalized to diabetic population of entire region and there may be bias regarding socio economic status and rate of literacy.

References

1. Pradeepa R, Mohan V. Epidemiology of type 2 diabetes in India. *India J Ophthalmol* 2021; 69:2932-8
2. American Diabetes Association: Standards of Medical Care in Diabetes- 2022 Abridged for Primary Care Providers. *Clin Diabetes* 1 January 2022; 40 (1): 10–38.
3. Forouhi NG, Misra A, Mohan V, Taylor R, Yancy W. Dietary and nutritional approaches for prevention and management of type 2 diabetes. *BMJ* 2018;361: k2234
4. Rajappa T, Ponniraivan K, Kalyan H, Selvaraju K, Karunanandham S. Assessment of degree of awareness about diet, physical exercise, and lifestyle modifications among diabetic patients. *Int J Med Sci Public Health* 2018;7(6):481-486
5. Kaur G, Arora P, Pathak J, et al. Dietary and Lifestyle Modifications among Diabetic Patients at a Tertiary Care Hospital in Delhi: A Cross-sectional Study. *J Med Acad* 2019;2(1):20–24.
6. Kozzka-Paszko, Janina & Kubik, Magdalena & Masierek, Małgorzata & Czerwińska, Margerita & Malecki, Maciej. (2016). Diet-Related Knowledge and Physical Activity in a Large Cohort of Insulin-Treated Type 2 Diabetes Patients: PROGENS ARENA Study. *International Journal of Endocrinology*. 2016. 1-6. 10.1155/2016/2354956.
7. Kaur G, Arora P, Pathak J, et al. Dietary and Lifestyle Modifications among Diabetic Patients at a Tertiary Care Hospital in Delhi: A Cross-sectional Study. *J Med Acad* 2019;2(1):20–24
7. Bashar, m. A. Modified BG Prasad Socioeconomic Status Scale: Updated for the years 2022. *Indian Pediatr* 59. 816 (2022).
8. Viral N. Shah, P. K. Kamdar, and Nishit Shah. Assessing the knowledge, attitudes and practice of type 2 diabetes among patients of Saurashtra region, Gujarat. *Int J Diab Dev Ctries* July- August 2009;29(3):118-22.
9. Nishchitha S et al. *Int J Community Med Public Health*. 2021 Oct;8(10):4857-4861
10. Mukhopadhyay, et al: Perceptions and practices of patients with /diabetes Mellitus type II. *Int J Diab Dev Ctries* July-September 2010
11. Jain R, Nayaka M.R. Knowledge, Attitude and Practice of Diabetic Patients Regarding the Use of Artificial Sweeteners as Substitute To sugar. *Natl J Integr Res Med* 2018; 9(6):28-35
12. Indian Hypertension guidelines-II by The Association of Physician of India; Pg-16
13. National Institute of Nutrition, Dietary Guidelines for Indians, 2011; Pg. 49.