Research Article

Assessment of degree of awareness about diet, physical exercise, and lifestyle modifications among diabetic patients

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ABSTRACT

Background: Increased prevalence of diabetes in India is due to modern lifestyle changes combined with urbanization. Knowledge about the diabetic diet and the importance of physical exercise in relation to reduce the complications of diabetes is very important and which, in turn, decrease the mortality and morbidity rate. **Objectives:** The objectives of this study were to assess the degree of awareness of diet, physical exercise, and lifestyle modifications among Type 2 diabetic patients among the rural population at tertiary care teaching hospital, Trichy. **Materials and Methods:** This cross-sectional study was conducted using questionnaire among 100 Type 2 diabetic patients attending the medicine outpatient department at tertiary care teaching hospital. Baseline characteristics of the study participants were elucidated and their awareness and practice regarding the lifestyle modifications were assessed. **Results:** The mean age of the study population was found to be 50 ± 9.64. 74% were well aware of foods to be avoided. 54% were familiar with the proportion of food in food plate. The awareness of lifestyle modifications was good among 29% and practice was followed by 15% of diabetics' patients. **Conclusion:** Despite the clear attitudes of Type 2 diabetes participants toward dietary pattern and healthy lifestyle modifications, the awareness and the practice were poor among the study group.

KEY WORDS: Awareness; Diabetes; Dietary Habits; Lifestyle Modifications; Physical Activity; Urbanization

INTRODUCTION

In India, diabetes is rapidly reaching the place of potential epidemic with more than 62 million diabetic persons,[1,2] and it is expected to rise up to 79.4 million individuals in the year 2030.[1] The study conducted by the Indian Council of Medical research revealed that a limited population is affected in states of Northern India (Chandigarh 0.12 million, Jharkhand 0.96 million) as compared to Maharashtra (9.2 million) and Tamil Nadu (4.8 million).[1,3] Diabetes is a metabolic disease defined by hyperglycemia due to defects in insulin secretion, insulin action, or both.[4] The chronic hyperglycemia of diabetes affects many of the body systems which include eyes, kidneys, nerves, heart, and blood vessels. It is increasing prevalence and associated health complications pressurize to crunch the financial gains in developing countries. Increased prevalence in India is due to modern lifestyle changes combined with urbanization.[5] Urbanization promotes the sedentary lifestyle, with a lack of participation in physical activities and unhealthy dietary practices.[6] According to the World Health Organization, urbanization with endorsement of alleged "western lifestyles" has been attributed in the abandonment of the healthier "traditional lifestyles" by the people in developing countries. Westernization of lifestyles in rural areas has made the people to have excessive dependence on vehicle for transport and consumption of unhealthy diets which is rich in carbohydrates, fats, sugars, salts, fast foods, and carbonated drinks.[6] Changes in dietary

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patterns and physical activity levels coupled with the genetic predisposition are probably the main reasons driving the current diabetes epidemic in the South Asian region.[7] In Tamil Nadu, people in rural areas mainly consume rice as staple diet.[6] Due to numerous sociocultural issues, protein consumption pattern varies among population between vegetarians and non-vegetarians. The conventional lifestyle constitutes vigorous physical activity followed by food rich in high fiber, whole grain-based diet, vegetables, and fruits. Physical inactivity is known to be associated with obesity, diabetes, hypertension, and metabolic syndrome. The American Diabetes Association recommends 30 min of moderate-to-vigorous intensity aerobic exercise at least 5 days a week or a total of 150 min/week, and some type of strength training at least 2 times/week in addition to aerobic activity.[8,9] Transformation toward a service sector economy and growing use of more advanced technologies have led to a rapid decline in physical activity.

Some studies have concluded that decreased physical activity was observed amongst South Asians when compared to other ethnic groups.[10,11] Diabetes is polygenic disease, so awareness of diabetes and its risk factors and lifestyle modifications will help in the control of disease. However, the awareness is still inadequate about the true scenario of the problem among the diabetics. Although the plenty of literature were done on the prevalence of diabetes, only few studies focused about the awareness and practices of dietary habits. Even though the studies have focused on the diabetic awareness on the urban level, few studies have focused about the dietary practices, food perceptions, and physical activity on the rural population, especially among the south part of Tamil Nadu. Most of the rural population in India has poor access to healthcare and is not familiar to pursue healthcare until the illness gets aggravated.

Diabetes mellitus (DM) is an incurable but controllable disease. Self-knowledge about the physical exercise is very important to enhance the insulin sensitivity. Basic knowledge about the caloric requirements, dietary pattern, and physical exercise might be needed to fight against DM and to achieve the glycemic control. Hence, this study provides the valuable data on food practices, dietary perceptions, and lifestyle modifications. Based on this background, the objectives were designed to assess the degree of awareness of diet, physical exercise, and lifestyle modifications among Type 2 diabetic patients from tertiary care teaching hospital of rural population.

MATERIALS AND METHODS

This cross-sectional study was conducted in the tertiary care teaching hospital located in the rural area, Irungalur. This study was conducted to assess the degree of attitude, awareness about diet, physical exercise, and health education among Type 2 DM patients. This study includes totally 100 diabetics attended in medicine outpatient department during the period of 3 months from December 2015 to February 2016. Diabetes patients were chosen based on the medical records. Table 1 summarizes the age group distribution of the participants. A standard pretested questionnaire was prepared which includes age, gender, occupation and monthly income, history of smoking and alcohol intake, and comorbid illness. The duration of diabetes was also included in the questionnaire. The questions were mainly focused on the diet and physical activity. The dietary questionnaire which includes type of food, amount of sugar consumed, intake of fruits, type of oil used for cooking, foods and fruits to be avoided, proportion of food in their food plate, consumption of beverages with

Table 1: Sociodemographic characteristics of the study population

Variable	*n*
Age (years)	
40–49	22
50–59	48
60 or above	30
Sex	
Male	52
Female	48
Occupation	
Heavy	4
Moderate	42
Sedentary	54
Education	
Literacy	77
Illiterate	23
Residence	
Rural	89
Urban	11
Income (rupees)	
>5571	2
2786–5570	3
1671–2785	23
836–1670	48
<835	24
Duration of diabetes	
1–5 years	47
5–10 years	40
10–15 years	9
15–20 years	4
Associated comorbidity	
Chronic kidney disease	10
Hypertension	47
No comorbidity	43

or without sugar, and awareness of diet chart was included in the questionnaire. The questions regarding the type, duration and frequency of physical exercise and awareness regarding the brisk walking were asked. The awareness regarding the health education and its programs had been asked. Educated patients respond by themselves while uneducated participants were interviewed by the researcher. The questionnaire was also explained in regional language, Tamil. Identifying information such as names of participants was omitted from the questionnaires. Informed written consent was obtained from the study participants. Ethical committee clearance was obtained. The results of the analysis were presented in frequency distribution tables using SPSS 21. All statistical tests were performed using $P = 0.05$ as statistically significant.

RESULTS

The mean age of the study population was found to be 50 ± 9.64. Among 100 patients, 52 and 48 were male and female patients, respectively. 89% belongs to rural residents and remaining population occupied in urban areas. Of the 100 study participants, 47% and 40% had the duration of diabetes of <5 years and 5–10 years, respectively. 48% and 24% had per capita income of less than Rs. 1670 and Rs. 834, respectively. The socioeconomic status was compiled by An Updated Prasad's Socioeconomic Status Classification for 2013.[12] This scale uses per capita income and total number of family members. The sociodemographic and clinical characteristics are shown in Table 1. Anganwadi workers, stenographers, and clerks were included as sedentary jobs. Sales representatives, hand packagers, sales workers, food preparation, and service come under moderate workers. Farmers, construction workers, and weightlifters were categorized as heavy workers. Among the males study participants, 29% were alcoholic and 25% were smokers. No history of smoking and alcoholism were elicited in female study group. 12.39% and 1% of study group had hypertension and chronic kidney disease, respectively. 74% were well aware of foods to be avoided. 54% were familiar with the proportion of food in food plate. Awareness of diet, exercise, and other practices among the DM patients are depicted in Table 2. Type of cooking oil used by the diabetic patients is given in Figure 1. Physical exercise was regularly done by 57% of the study population. The details of the types of exercises done by the study participants are shown in Figure 2. Scoring was done for awareness and practice regarding the diet, exercise, and health education programs. The median for the awareness's score was about 6.5 and the median for practice score was 6. Awareness score was classified as poor, fair, and good: A score of 0–3 = poor, 4–7 = fair, and 8–10 = good [Figure 3]. 29% had good awareness score, among these, 46% are females and 54% are males. Overall, practice score was categorized as poor, fair, and good: A score of 0–2 = poor, 3–5 = fair, and 6–9 = good. Only 15% had good practice score [Figure 4].

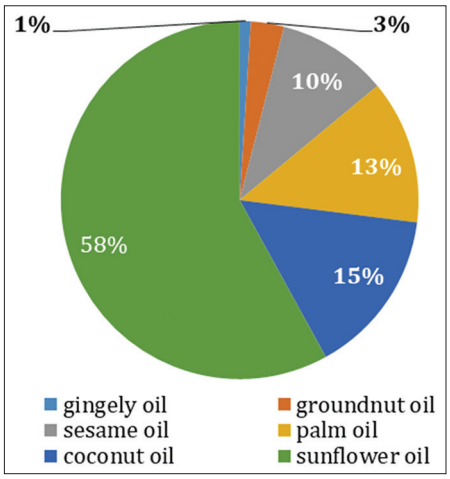

Figure 1: Type of cooking oil used by diabetes patients

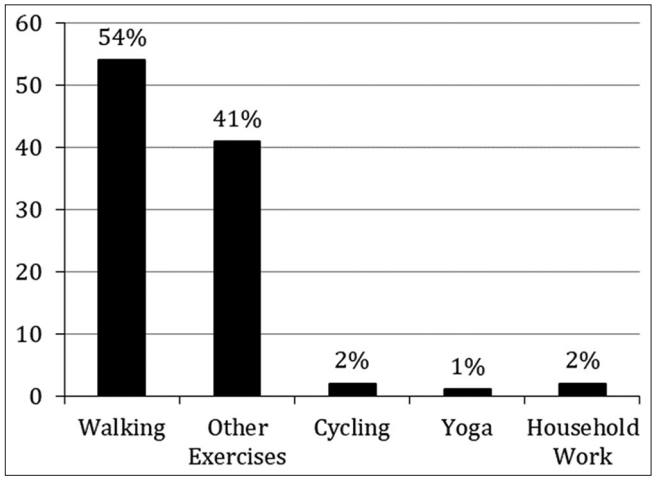

Figure 2: Types of exercises done by the study group

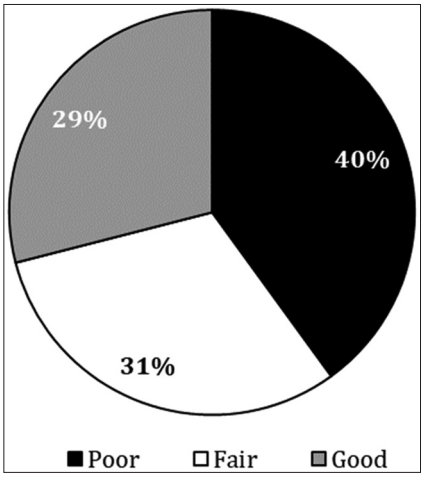

Figure 3: Overall awareness of diet, physical activity, and health education

DISCUSSION

This study was planned to evaluate the awareness and practice of the dietary habits and physical exercise among the Type 2 diabetic patients. 100 diabetic patients were included in the

Table 2: Awareness of diet, exercise, and other practices among the DM patients

Awareness items	Responses (%)
Diet	
Daily recommended fruits intake	Yes (7)
	No (93)
Fruits to be avoided	Yes (45)
	No (55)
Oil to be used	Yes (62)
	No (38)
Foods to be avoided	Yes (74)
	No (26)
Proportion of food in a food plate	Yes (54)
	No (46)
Diet chart awareness	Yes (58)
	No (42)
Exercise	
Aware of brisk walking	Yes (57)
	No (43)
Behavioral characteristics	
Smoking habit	Yes (25)
	No (75)
Number of cigarettes	One packet/day (36)
	Two packet/day (16)
	Twenty packets/day (48)
Alcohol consumption	Yes (29)
	No (71)

DM: Diabetes mellitus

Table 3: Correlation of awareness, attitude, and practices among Type 2 diabetics

Parameters	Pearson's correlation	*P* value
Awareness and attitude	0.14	0.01
Awareness and practice	−0.54	0.02
Attitude and practice	−0.85	0.01

study. Among these individuals, 78% were above the age of 50 years. 72% of study participants had per capita income of less than Rs. 1670. The awareness regarding dietary habits and physical activity was below average among 71% of study population.

In our study, more than 61% of diabetic patients with low income had facing the difficulty in following the practice, although they were aware of dietary modifications and regular health checkup. This finding has been supported by studies of Kaiser and Baumann.[13] Poverty could limit the accessibility and affordability of a well-balanced diet and this could be the reason why the majority of participants had less lifestyle modification practice score despite having a good positive attitude. Low socioeconomic group of diabetics faced hard times when implementing these practices, especially under social circumstances. Due to the poverty, daily wagers consume rice as main food (mostly 3 servings/day) with limited proportion of protein and vegetables. The Shanghai Women's Health Study[6,14] postulated that the increased intake of foods with a high glycemic index, especially white rice is associated with increased risk of diabetes. As the income of the patient increases, the practice score also increases. It is positively correlated and it is statistically significant ($P = 0.01$) Table 3. In our study, 74% patients with Type 2 diabetes have to achieve the desirable weight by combination of lifestyle modifications and the reduction of calorie intake. It is advisable to consume carbohydrates from whole grains, vegetables, legumes, diet with high fiber, and low glycemic food. Diabetes individuals should avoid sugar-sweetened beverages and minimize the consumption of foods with added sugar that have the capacity to displace healthier, more nutrient-dense food choices.[15,16] Currently, the American Dietetic Association also highlights that foods if consumed in moderation with appropriate portion size in combination with regular physical activity are ideal to maintain the euglycemic status.[17] As suggested by Evert *et al*.,[18] nutrition therapy is endorsed for Type 2 diabetes patients as an imperative factor of the overall management plan. In this present study, 25% of the male diabetic patients were smokers and 29% had the habit of consuming alcohol. Smoking causes stimulation of sympathetic nervous system activity which, in turn, produce increased blood cortisol levels and the provokes visceral adiposity.[19] Some studies in animals have determined that nicotine exposure can cause β-cell dysfunction and increase β-cell apoptosis.[20] Diabetic patients who consume alcohol have reduced insulin resistance, and it is also associated with chronic pancreatitis that leads to alcohol-induced liver changes.[21] Smoking and alcohol cessation counseling should also be included as a routine component of diabetes care. Concurrent alcohol and smoking habit commonly have concreted effect on diabetes risk and are highly common in Indians. 54% of diabetes were doing the sedentary jobs in this study. Regarding occupation, sedentary workers have more chance of getting diabetes compared to moderate and heavy workers. Sedentary behavior is defined as sitting or lying down, with low energy expenditure, during waking hours.[22] Diabetes due to insulin resistance can be reversed by habitual physical exercise.[23] Perseghin *et al*. proved that a single bout of moderate intensity exercise could increase the uptake of glucose by 40%.[23,24] Diabetes is strongly associated with increased production of reactive oxygen species.[23,25] Research studies demonstrated that endurance training increases the levels of antioxidant enzymes and antioxidants in cardiac and skeletal muscles, thus protecting from oxidative stress.[26] The inflammatory markers of endothelial dysfunction such as soluble intracellular and vascular adhesion molecules and granulocyte-macrophage colony-stimulating factor are reduced by exercise.[23] Physical exercise also preserves nitric oxide availability, thus improving endothelial function.[27] In

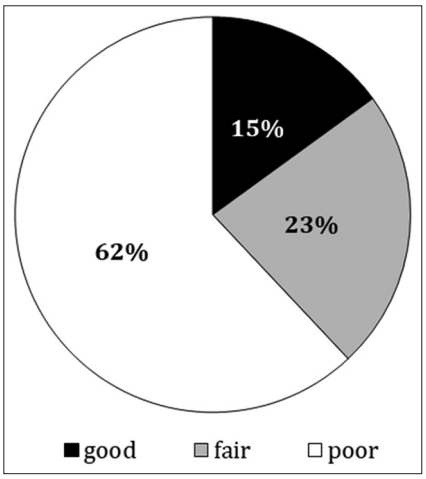

Figure 4: Practice score of lifestyle modifications

our study, yoga was practiced by 1% of the study population. Based on individual preferences, Yoga may be included as a part of physical activity. 29% had good awareness score, among these, 46% are females and 54% are males. Overall, awareness score was found to be high in males compared to females. This may be because of the differences in literacy level, training received, and availability of information on Type 2 diabetes. Among the 29, 15 persons got good practice score. As the age advances, the awareness score decreases. On the other side, the practice score increases with age and duration of the diabetes. When the duration of diabetes increases, the comorbidity also increases. In this study, when the duration of diabetes is more than 10 years, the risk of comorbidity is about 37%.

This study highlights the imperative for reformation of awareness of dietary practices among the diabetic persons to attain better control of diabetes. This emphasizes the need for increasing diabetes awareness activities in the form of mass campaigns and organized medical nutrition program in both urban and rural areas of India. The nutritionist could calculate the caloric needs of the individual based on the physical activity, occupation, and body mass index and to suggest healthy foods. Public health policies regarding alcohol consumption must be introduced to reduce the habit. In summary, the present study provides a snapshot of the current situation of knowledge and awareness of study regions in India. Psychosocial care should also be provided to all diabetes, with the goals of improving the quality of life. However, there was lack of consensus and clarity with regard to type, duration, timing, and frequency of physical activity. This study has its own limitations which includes, it is a single-centered study and this study did not include the knowledge of glycemic status.

CONCLUSION

The observations of our study reveal the awareness and practice of lifestyle modifications among Type 2 DM patients attending tertiary care hospital are considered to be poor and the practice of dietary pattern is found to be inadequate. In India, with the wealth of physicians and practicing dieticians, we believe that counseling programs if implemented in diabetes management programs could definitely have immense impact and providing an even greater place in the medical management of patients. A hospital-based lifestyle intervention program should be implemented to improve the knowledge and practice of patients regarding healthy lifestyle. This might be extended to the primary health center, rural health center where the majority of rural patients are resided.

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