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Research Article
Identification of Type 2 Diabetes Risk and the Impact of Nutrition Education Among College Lecturers

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Abstract

Background and Objective: Type 2 diabetes is a preventable disease. Earlier detection of its risk and subsequent follow-up can delay the incidence, improve glycaemic control and complications associated with it. The objective of the study is to assess the risk of type 2 diabetes among college lecturers, impart and find the impact of diet counselling on lecturers at high risk of diabetes. **Materials and Methods:** Before and after study design was used to assess the risk of diabetes using the Indian Diabetes Risk Score among college teachers. The high-risk individuals were evaluated for knowledge attitude and practice about diabetes and diabetes diet. Nutrition education was given to them and then the impact of nutrition education was assessed. **Results:** Out of one hundred college lecturers, 50% were under the high-risk category. The majority of 24% were in the age group of 40-44 years and 39% of them were overweight. Association between BMI and risk score was significant at 1% level. The mean score of knowledge attitude and practice was 44% before diet counselling and after counselling the mean score was 100%. The results were significant at the 5% level. **Conclusion:** Low awareness about diabetes affects the ability of self-management and therefore hurt the outcome of diabetes. This recommends the necessity for an awareness program, patient counselling and education on self-care management of diabetic patients to improve their knowledge regarding diabetes with the emphasis on lifestyle modifications.

Key words: Type 2 diabetes, Indian diabetes risk score, lecturers, risk factors, knowledge, complications, nutrition education

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Competing Interest: The authors have declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Diabetes is a complex, chronic illness requiring continuous medical care. On-going diabetes self-management education is critical in preventing acute complications and reducing the risk of long-term complications[1]. Diabetes is an important public health problem, one of four priority non-communicable diseases targeted for action by world leaders. More than 400 million people live with diabetes. The prevalence of diabetes has been steadily increasing over the past few decades. Raised blood glucose, a common effect of uncontrolled diabetes, may, over time, lead to serious damage to the heart, blood vessels, eyes, kidneys and nerves[2].

Studies have documented that patients with diabetes had already developed subclinical atherosclerosis before the diagnosis of diabetes is confirmed. Diabetes and its complications bring about substantial economic loss to people with diabetes, their families, health systems and national economies through direct medical costs and loss of work and wages[3]. Preventive strategies cannot be planned unless the population "under the risk of diabetes" is correctly identified. Due to the lack of a clear etiological agent in diabetes, it's imperative to identify the high-risk individuals to tackle effectively the ongoing diabetes epidemic. Many health professional organizations in the world have prepared risk assessing tools for predicting the risk of diabetes[4].

It is necessary to detect a large pool of participants with undiagnosed diabetes in India and offer them early therapy. The Indian Diabetes Risk Score, developed by the Madras Diabetes Research Foundation, is a cost-effective method for the detection of undiagnosed diabetes in the community[5].

Identifying individuals at risk of type 2 diabetes using the Indian Diabetes Risk Score tool and educating them to modify their dietary and lifestyle practices will help individuals, a step forward in diagnosing and treating diabetes at an earlier stage. The present study focuses on the assessment of the risk of developing diabetes and its prevalence among college teachers using the Indian diabetes risk score and giving diet counselling to the high high-risk group of teachers.

The objectives of the present study, "Assessment of risk of type 2 diabetes using Indian Diabetes Risk Score and the impact of diet counselling among college teachers" has been framed as 1. To identify individuals, at risk of diabetes using the Indian diabetes risk score 2. To estimate the proportion of individuals at high risk, moderate risk and low risk for developing type 2 diabetes among the study population 3. To impart and find the impact of nutrition education about diabetes diet to high high-risk individuals.

MATERIALS AND METHODS

Study area: This study has been approved by the Independent Human Ethics Committee (IHEC) dated: 04/09/2019 (Protocol No. SDNBVC/HSC/IHEC/2019/25), conducted by the Department of Home Science, SDNB Vaishnav College for Women, Chromepet, Chennai-44. The study was carried out from October, 2019 to March, 2020, one phase after the other phase.

Subjects and methods: A cross-sectional study was undertaken to assess the risk of diabetes using the Indian Diabetes Risk Score among college teachers. The high-risk individuals were evaluated for knowledge attitude and practice about diabetes and diabetes diet. Nutrition education was given to them and then the impact of nutrition education was assessed. The present study was conducted among 100 college lecturers at SDNB Vaishnav College for women, Chromepet, Chennai, India. The Indian Diabetes Risk Score (IDRS) takes into account family history, BMI, waist circumference, age and physical activity of the individual. Individuals with a high risk of developing diabetes mellitus in near future can be identified and systematic counselling and further interventions could be applied to reduce diabetes-related complications. The outcomes are expressed in percentages based on low, medium and high risk of developing diabetes using the IDRS risk score. The minimum score is 0 and the maximum score is 100. This includes four parameters: Age, body mass index and waist circumference, physical activity and family history. Each parameter has an assigned score ranging from 0-60 and accordingly the subject was graded as having no risk, high risk or moderate risk. A validated interview schedule was used to collect the demographic profile and dietary pattern of the participants. A validated checklist was used to check the pre and post knowledge attitude and practice scores of the individuals. Diet counselling and self-monitoring practices were taught using PowerPoint presentations and flashcards.

Informed written consent was taken from each subject. The confidentiality of the subjects is also well-maintained.

Statistical analysis: The data obtained was coded and entered in a Microsoft Excel sheet and analyzed using SSPS version-23.

RESULTS AND DISCUSSION

Socio socio-demographic profile of the participants: The participants were between the age of 25-60 years and all the participants were female as the study was conducted in a

Table 1: Percent distribution of subjects based on BMI

Classifications	Asian range	Numbers	Percentage
Underweight	>17.50	4	4
Normal weight	17.50-22.99	13	13
Over weight	23.00-27.99	39	39
Obese	28.00<	44	44

Table 2: Family history of diabetes type 2 patients

Family history of type 2 diabetes	N = 100	Percentage
No family history	46	46
Either parent	38	38
Both parents	16	16

Table 3: Distribution of participants based on Indian diabetes risk Scores

Categories	Risk Score	Numbers	Percentage
High risk category	(IDRS $\geq$60)	50	50
Moderate-risk category	(IDRS 30-50)	36	36
Low risk for diabetes	(IDRS <30)	14	14

Table 4: Association between age and knowledge about risk factors

	Sum of squares	Df	Mean square	F	Sig.
Between groups	14157.564	3	4719.188	15.667	0.000*
Within groups	28917.436	96	301.223		
Total	43075.000	99			

*Denotes highly significant

Table 5: Correlation between body mass index and total score

		Total score	BMI
Total score	Pearson correlation	1	0.564**
	Sig. (2-tailed)		0.000
	N	100	100
BMI	Pearson Correlation	0.564**	1
	Sig. (2-tailed)	0.000	
	N	100	100

**Correlation is significant at the 0.01 level (2-tailed)

women's college. As the participants were college Professors, they have all finished at least their master's degree. The percent distribution of subjects based on BMI is presented in Table 1.

Family history of diabetes: Among the participants, 46% did not have any family history of diabetes, while 38% had one parent as diabetic and 16% of participants had both the parents as diabetes Table 2.

The distribution of participants based on Indian diabetes risk scores is given in Table 3. Based on IDRS, 50% of the participants were at high risk of diabetes, 36% were under the moderate category and only 14% were at low risk of diabetes.

Table 4 represents the association between age and knowledge about risk factors. In this ANOVA, between groups in age was statistically significant at 1% level. Ho is rejected. As the age of the participant increases, knowledge about risk factors of diabetes also increases. The correlation between BMI and total risk score was highly significant. The values were highly significant at <0.01 level (Table 5).

Table 6: T-test for pre-test and post-test score

Mean score	N = 50
Before (X_i)	9.8
After (Y_i)	22.34
($D_i = X_i - Y_i$)	12.17
D^2_i	158.23
t-value	12.703
	0.05

8X_i: Before, Y_i: After, D_i: Difference D^2i: Sum

To impart and find the impact of diet counselling: A before and after study design was followed to evaluate knowledge, attitude and practices regarding diabetes among the participants. A validated checklist was used to evaluate the Knowledge, attitude and practice. Scores were assigned to each question in the checklist. One point was given to the correct answer and the wrong answers were marked zero. It was found that before diet counselling, participants had insufficient knowledge regarding the symptoms, complications, prevention and control of their disease condition. After diet counselling, all the participants managed to answer all the questions appropriately.

Throughout knowledge assessment (Fig. 1) we recognized that most patients didn't know about the cause of diabetes and its consequences (nearly 86%). Only a few of the patients knew that one of the common complications of diabetes is kidney disease (6%).

From statistical analysis (Table 6) it is evident that diet counselling had an effective impact on knowledge, attitude and practice. The mean total score was 10 upon 25 before counselling while after counselling, the mean score improved to 22.3. The results were statistically significant at a 5% level. This study used the IDRS to identify individuals at risk for diabetes and determine the association of various risk factors with their risk status.

The percentage of high-risk individuals in the present study is 50%. In a study conducted by Kaur *et al.*[4] the prevalence of high-risk individuals is 42%. The prevalence of people at high risk of diabetes was 36.55% in a study conducted by Sharma *et al.*[5]. However, a study conducted by Oruganti *et al.*[6] in the city of Chennai, found 43% of the population was in the high-risk category. The difference in risk prevalence between the current study and the others may be due to lifestyle, age group, socio-economic status and the type of physical activity performed.

The current study noted that as age increases, the risk for diabetes also increases. Several other studies have noted similar findings[7-9]. Two further studies found a positive association between higher age and undiagnosed diabetes[10]. A high incidence of diabetes is seen among first-degree relatives where one has diabetes and the risk of a child with a

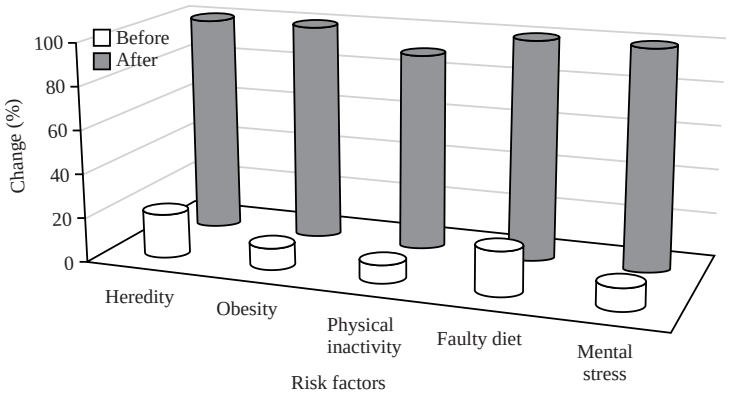

Fig. 1: Knowledge about risk factors before and after counselling

parental history of diabetes developing diabetes themself is more than 50%[11]. Two other studies have shown that increased risk for diabetes was associated with a family history of diabetes[12,13]. Thus, family history of diabetes is one of the major contributors to diabetes.

About 38% of the subjects had the habit of exerting strenuously for 30-40 min in our current study. Physical activity is one of the important modifiable risk factors for diabetes. Globally, physical inactivity accounts for 14% of diabetes[14] and it also acts as a major risk factor for obesity, which again has a significant relationship with diabetes.

At the commencement of the study, the mean average score was 9.8 for knowledge attitude and practice. The participants were enlightened about the disease nature of diabetes, its symptoms and its complications. They were made clear that diabetes can be controlled by weight management, physical activity and dietary management. They were taught about fibre rich foods, antioxidant-rich foods, food exchange lists, foods to eat in moderation, foods to be excluded and included. After diet counselling, the mean score increased to an average of 22.34. The results were statistically significant at a 5% level.

As prevention of diabetes is primarily dependent on altering lifestyle and increasing levels of physical activity, changing societal perceptions of health and improving knowledge about the risk factors of diabetes and steps to promote physical activity must receive urgent attention from policymakers and health care planners[15-17].

With the help of Indian diabetes risk scores, lecturers at low risk, medium risk and high risk of type 2 diabetes were screened effortlessly. Lecturers were made aware of their health status, their risk of diabetes, foods to include, foods to exclude and foods to be taken in moderation. Imparting knowledge about a healthy lifestyle will go a long way in preventing or delaying the onset in a country that is hailed as the diabetes capital of the world.

CONCLUSION

To effectively manage their condition, persons with diabetes have to learn and practice self-monitoring techniques like blood sugar monitoring, taking medications (self-injecting), keeping track of mealtimes, diet and exercise, besides dealing with their routine work, social and family life. Adherence to a regimented and monitored way of living for long periods is difficult and requires resolve, encouragement and continuous reinforcement.

SIGNIFICANCE STATEMENT

The study discovers the prevalence of type 2 diabetes risk among college lecturers. Educating the lecturers about the risk per cent will help them to follow a healthy lifestyle that will delay or prevent the onset of incidence.

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