



Preliminary studies on the prevalence of Diabetes mellitus among student community in Kanyakumari District, India

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Abstract

Diabetes mellitus is emerging as a foremost health problem and the most common endocrine disorder. It is a persistent metabolic disease relating to carbohydrate metabolism characterised by glucose underutilization and hyperglycemia. The increase in occurrence of obesity and sedentary life style are the key factors for the rising prevalence of diabetes in India and throughout the world. It is important to consider the various factors contributing to the prevention and control of this pandemic disease. Hence, the present study was undertaken to assess the prevalence of Diabetes mellitus in Nagercoil, Kanyakumari District, Tamilnadu, India. In a population-based cohort study initiated in 2016, a sample of 200 students > 20 years of age from Kanyakumari district was selected by random sampling. The data on incidence of diabetes and the risk factor exposure were collected using questionnaire, anthropometric tests and urine sugar assessment. The gross examination of urine of the sample population revealed that the overall prevalence of diabetes is 3.5% only. Among the diabetic subjects 14.2% inherited diabetes from their parents. The findings of the present study also suggested that there is no association between the distribution of the ABO blood types and diabetes.

Keywords: Diabetes mellitus, Obesity, Body mass index, Anthropogenic test, Urine sugar.

Introduction

India is known as the diabetes capital of the world and a large percentage of diabetes cases are reported from the rural areas of India¹. Though the urban population has ways and means of regular check up of hypertension and diabetes, rural population have hardly any access to facilities for regular medical check up. If diabetes could be early detected and awareness created among the rural population about its implication, then a sustained dent can be made to the disease. Marginal cases can be tackled through yoga, naturopathy, light exercise and eating habits, which could help in reducing the burden of health care costs.

India is facing a massive diabetes epidemic and its prevalence is rising in every society including developing countries². New statistics indicate that diabetes, already known to be wide in India, is now becoming far more widespread amongst children and women in gestation. A study carried out by the Delhi Diabetes Research Centre reported that 17% of Indian children are overweight or obese. The number of diabetes cases will be almost doubled in developing world compared to a 41% increase in developed countries by 2025.

Diabetes is a disease characterised by the excretion of enormous volume of urine excreted by people suffering from this disease. This disease is caused by the deficiency of the hormone called insulin secreted by the β -cells of Islets of Langerhans of the pancreas which reduces the glucose level in the blood³. If the

insulin is not secreted adequately the liver and the muscles are unable to convert the glucose into glycogen. As a result more glucose enters into the blood increasing the blood sugar level called hyperglycemia and the excess of glucose is eliminated along with the urine resulting in a disease called diabetes mellitus⁴.

The symptoms of diabetes include polyurea, polydipsia and polyphagia⁵. When the level of insulin are low, lipid catabolism is increased and lipids are converted into glucose. This further increases blood glucose levels and results in ketosis. Persistent hyperglycemia may cause degenerative changes in organs and organ systems leading to malfunctioning of the organs. Increased blood sugar level of 400 mg/dl or more, causes dehydration leading to coma and death⁶.

Recent research studies from different regions of India have shown that prevalence of diabetes is increasing in rural areas⁵. Though 72% of Indians reside in rural areas, the information about diabetes incidence and its risk factors among rural inhabitants is scarce. Hence an attempt was made to study the prevalence of diabetes in Kanyakumari District, especially in rural areas, and as a step to create awareness about this killer disease in the society.

In the present study, a survey was conducted among the students hailing mostly from rural parts of Kanyakumari District which gives a cross section of the district rural population. Nowadays screening test for diabetes is considered as a preventive care

function or logical extensions of health care so as to bring the screening within the reach of large masses of people with minimal expenditure of time and money.

Materials and methods

Selection of the subjects: The present study was conducted after getting the acceptance from the group selected for study. The period of study was for 3 consecutive months-January, February and March. About 200 students were selected randomly from the first, second and third year respectively within an age group 18-20. They were met individually and their ages, family details such as annual income of the parents, occupation, educational status etc were collected and recorded.

Sampling: The data of the participating subjects were collected through interviews using a prepared questionnaire. The necessary demographic and socioeconomic factors included gender, age, educational level and economic status. Each subject was undergone physical and medical examinations, and answered health-related questionnaires. Body weight was measured using a digital scale. Height was measured without shoes using the same instrument.

Determination of Body mass index (BMI): The height and weight of the subjects were calculated for every subject and body mass index (BMI) was estimated by Quetex index.

$$\text{Quetex index} = \frac{\text{Weight (Kg)}}{\text{Height}^2(\text{m})}$$

Determination of blood group: Standard serological procedures were performed using the anti-A, anti-B and anti-D antisera for the determination of ABO blood group of the subjects.

Urine analysis: The urine sample of the population was collected at 9 O'clock in the morning one hour after breakfast. The urine samples were collected in a clean dry container and urine analysis were conducted. Since for ordinary qualitative test random sample is enough. Gross examination of urine was done. This procedure was repeated three times at an interval of one month from January to March.

Results and discussion

The results are presented in the Figures 1-4. From the survey it was understood that out of 200 study subjects, 49 % was within ideal weight group and 47.5 % came within underweight category. Only 1% of the total population is obese while 2.5% is having overweight. While analysing the income status of the family of the observed population 97.5% are hailing from families having annual income below Rs. 20,000/- and only 2.5% is under the category with income above Rs. 20,000/- per annum. Obesity is observed mostly among students coming under income group above Rs. 20,000/- per annum. It is found that majority of underweight students are having poor financial and educational background. From the gross examination of urine of the sample population the overall prevalence of diabetes is 3.5% only. Of the 7 diabetic subjects 4 belongs to underweight category and the remaining possess ideal weight. Among the diabetic subjects 14.2% had inherited from their parents through genes.

The blood group analysis indicated 23% of the students has "A" group blood, 30% has "B" group blood, 4% has "AB" group blood and 43% has "O" group blood. The precipitation of diabetes indication was observed in 3 students having "B" group blood, 2 having "AB" group blood and 2 students having A group blood. No "O" group student showed the symptoms of diabetes. All students are having normal vision.

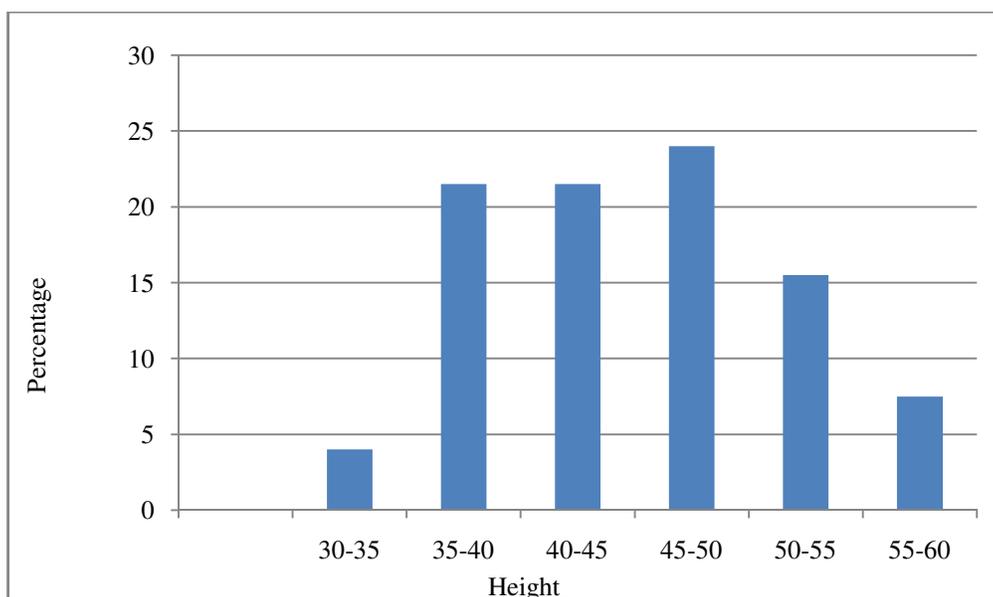


Figure-1: Percentage distribution of height in the sample population.

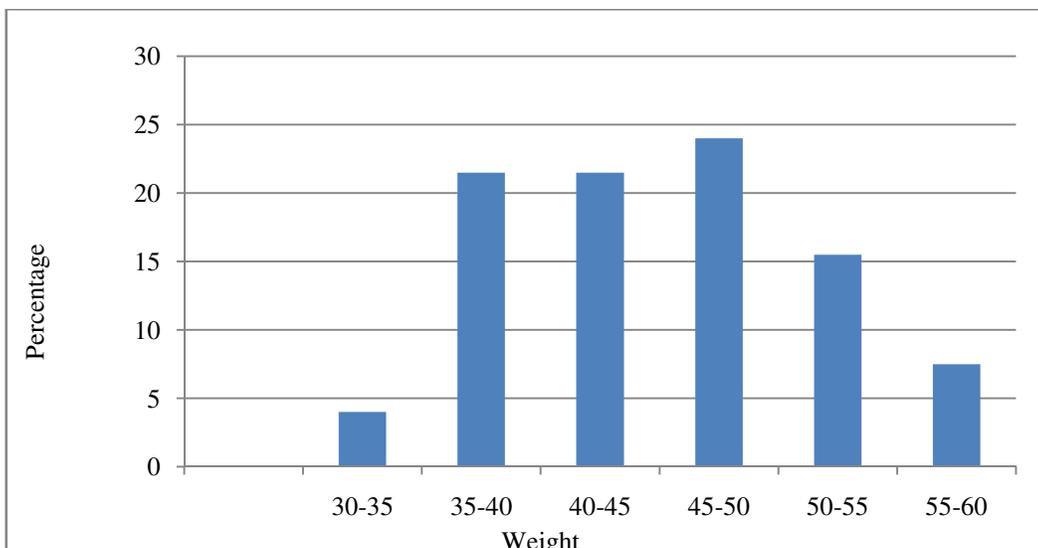


Figure-2: Percentage distribution of weight in the sample population.

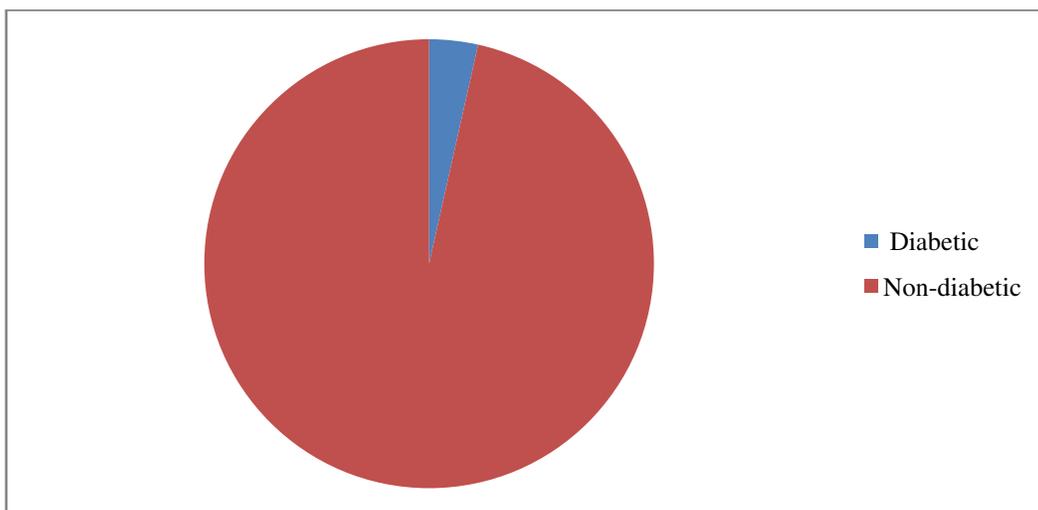


Figure-3: Percentage occurrence of diabetes in the sample population.

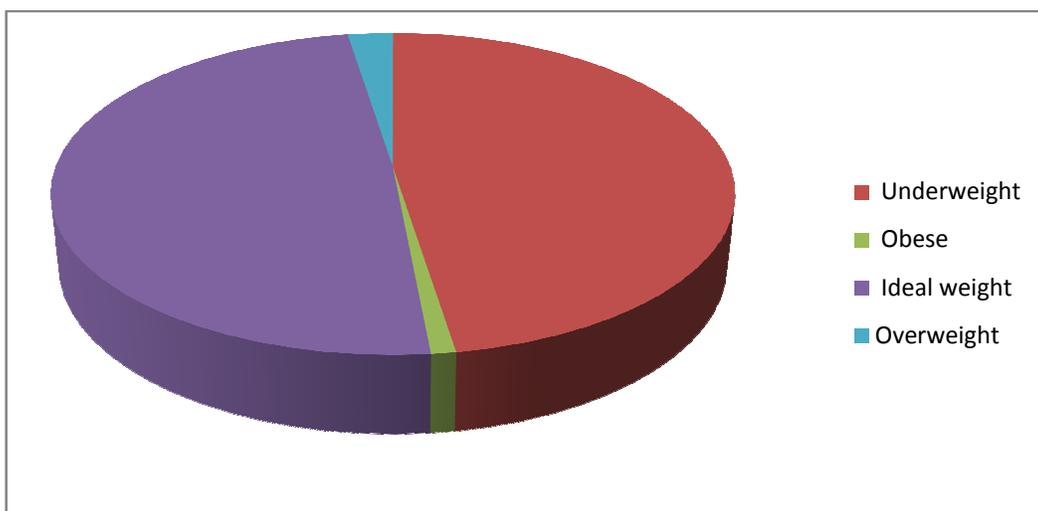


Figure-4: Percentage occurrence of body mass index in the sample population.

From this study it is understood that out of 200 students observed, 95 were having weight below the normal weight for the age, irrespective of income. The prevalence of underweight condition among the sample population belonging to poor families may be due to non availability of nutritious food^{7,8}. Though 1% of the sample population is obese, it is also a major public health problem of the people enjoying high economic status. Excessive weight is a crucial factor for cardiovascular disease, osteoarthritis, diabetes, gout, liver and gall bladder disease and hernia⁹.

There is an association between early puberty among fat girls, insulin resistance and their tendency to acquire diabetes. From the analysis of urine of sample population for the prevalence of diabetes we came to know that only 3.5% of subjects are positive. This disease is not one that affects only the well-off, though it is most likely to affect those with a sedentary life style and who consume unhealthy diets. Subjects with family history had 2 - 3 times higher risk of developing intolerance to glucose¹⁰. The role of heritability has long been well known in diabetes. It has been shown that subjects with family history of diabetes develop diabetes in advance when compared to subjects without family history. In the present study 14.2% of the diabetic subjects had inherited diabetes from their parents.

In the present study, an attempt has been made to investigate any association with the ABO blood types and diabetes mellitus. It is reported that the ABO blood group distribution varies in different geographical and racial groups, and socio-economic groups¹¹. In India, the ABO blood group frequency is not consistent. The frequency for group B ranges from 6% in negritos of Andamans to 48% in Birijias of Bihar while group A is 20-30% in Western and Eastern Himalayas¹². The blood group occurrence in North India is B > O > A > AB¹³. The findings of the present study suggest that there is no association between the distribution of the ABO blood types and diabetes.

A common problem of diabetes is diabetic eye disease^{14,15}. Diabetic eye disease refers to a group of sight-threatening eye problems that people with diabetes may develop. But no such difficulties could not be found in this study. All students of the sample population was having normal eye sight without any deformity. It is not a final decision because we are not physicians and also this survey was preliminary and should not be taken at its consideration. Further analysis and research are needed in this context to reach a final conclusion.

Conclusion

The population-based, cross sectional study indicated that incidence of diabetes was 3.5%. Among the diabetic subjects 14.2% had a positive family history of diabetes. Increasing age, obesity and positive family history of diabetes predicted the future development of diabetes. Identifying individuals with these risk factors may be the initial approach to prevent diabetes.

Thus the present investigation created awareness of diabetes and its complication in student community of this region. Prevention is always better than cure. Diet modifications, regular exercise and medicine are very much important to keep the blood glucose in control throughout the day. If obese person need to reduce weight through diet control and give up sedentary habits, insulin works better. Treatment should be started and supervised by an expert, who should review every 3-6 months to help to maintain the blood glucose in control. Treatment is intended at maintaining the blood glucose in the normal range by balancing food intake with oral medication or insulin and physical activity year after year, to prevent complications of diabetes¹⁶. Patient need to talk about the problem with the doctor for suitable modification in dosage of medication and stress control exercises. By keeping an excellent control of diabetes at all times, will be able to prevent the complications of diabetes affecting the nerves, eyes, kidneys, heart and blood vessels¹⁷. Diabetes can be controlled in an efficient way with better treatment facilities available today.

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