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Research Paper

Impaired Glucose Tolerance Among Young Adults in Coimbatore.

Community Nutrition

KEYWORDS : Impaired Glucose Tolerance, Anthropometric, Lifestyle.

Premagowri.B — Assistant Professor, Dept. of N&D, Dr. NGP ASC, Coimbatore.

Dr. Jemima Beryl Mohankumar — Associate Professor, Dept. of Nutrition & Dietetics, PSG CAS, Coimbatore

ABSTRACT

Impaired Glucose Tolerance (IGT) and Impaired Fasting Glucose (IFG) collectively called as pre-diabetic states, have a high risk of conversion to diabetes. The study was undertaken with objectives as to know the prevalence of IGT among the selected subjects. Almost 180 young adults of age 25 years to 45 years were selected for the study. Selected anthropometric, biochemical and clinical profile was analyzed. It was found that 29 male subjects (28.4%) and 14 female subjects (13.7%) were with Impaired Glucose Tolerance. The study was statistically significant (p- value < 0.0001). The mean BMI of IGT subjects were 26.9 Kg/M2 were as for Normal Glucose Tolerance subjects was 25.95Kg/M2. Lifestyle modification is an effective tool for the primary prevention of diabetes in Asian Indians. Screening for glucose intolerance is a preventive measure; the primary prevention of diabetes is urgently needed in India to curb the rising burden of diabetes.

Introduction

Globally the number of people with diabetes is expected to rise from the current estimate of 150 million to 220 million in 2010 and 300 million in 2025. Type 2 Diabetes is the predominant form of diabetes worldwide accounting for 90% cases globally. Evidence has accumulated from observational studies and randomized controlled trials on the beneficial effects of good blood glucose control in the prevention of micro vascular and macro vascular damage in people with diabetes[1]

The increased number of diabetics in India is likely to be due to a significant increase in the incidence of type-2 diabetes, caused by unprecedented rates of urbanization, which results in environmental and lifestyle changes.[2]

India is a country experiencing rapid socioeconomic progress and urbanization. The prevalence of pre diabetes is also high. Recent studies have shown a rapid conversion of impaired glucose tolerance to diabetes in the southern states of India, where the prevalence of diabetes among adults has reached approximately 20% in urban populations and approximately 10% in rural populations.[3]

Another study from southern India in subjects 26–32 years of age that used WHO criteria (WHO report 1999) showed that diabetes was prevalent in 3.7% of the urban population and in 2.1% of the rural population. The prevalence of IGT was higher: 18.9% and 14.3% in urban and rural populations, respectively.[4]

There was a large pool of subjects with Impaired Glucose Tolerance (IGT), 14 per cent with a high risk of conversion to diabetes. A series of epidemiological studies performed in Chennai, southern India, showed an increasing prevalence of diabetes and impaired glucose tolerance (IGT).[5]

The highest prevalence of diabetes and or IGT was reported for the southern state of Kerala, which had undergone widespread and rapid urbanization. The lowest prevalence rates for diabetes and IGT were found in Kashmir (north India), with crude prevalence rates (based on WHO criteria) of 6.1% and 8.1%, respectively.[6]

Hence the study was undertaken with following objectives as to

- Investigate the nutritional and health status of the selected subjects
- Know the prevalence of IGT among the subjects.
- Provide guidelines for lifestyle modification.

Methodology

The study was conducted in Coimbatore city, 180 young adults of age 25years to 30 years who visited the Diabetic Care Clinic for general check-up were selected for the study on the inclusion criteria - Healthy young adults of age 25 years to 30 years. Those with known hyperlipidaemia, hypertension, and complicated cases of any acute and chronic diseases, other characteristics (psychological or physical disabilities) and on steroids, diuretics were excluded from the study.

The data collection was carried out through a structured questionnaire which included family history of diabetes, physical activity, lifestyle, anthropometric measurements and clinical parameters. WHO Global Physical Activity Questionnaire, Analysis Guidelines 7 was used. The total physical activity of the respondents was classified under three categories low, medium and high on the basis of duration for which they performed physical activities of varying intensity. The percentage of respondents according to three categories of physical activity by sex was classified. The biochemical investigations carried out were OGTT (Oral Glucose Tolerance Test) and HbA1c (Glycosylated Haemoglobin). All the parameters were run using Roche, Germany - Cobas B 101 POC systems and diagnostic kit.

Guidelines were given to all the selected 180 subjects to be aware on diabetes - its risk and symptoms.

Results and Discussions

Baseline information

The number of subjects studied was 180 young adults among them 102 of were males and 78 were females of mean age 27.9 years. In a study 54.3% of the study subjects were below the age of 35years and the overall prevalence of undiagnosed diabetes was 11.1%. This shows the gravity of the problem of T2DM All the selected individuals were degree holders and were employed. Around 17.7% of the selected individuals had positive family histories of both the parents diabetic and 27.2% of them had their either parent diabetic.[7]

Physical activity

All the selected subjects were on sedentary life style. Though there is no doubt that physical activity will reduce the risk of many disorders, only 11.7% of males and 6.4% of females were on regular physical activity. Association between Physical Activity and Diabetes was reported as 73.5 % of subjects had diabetes among no exercise or sedentary work group. Only 4.58%subjects were found to diabetic (n=20/436) among regular exercise or

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strenuous group. The relation between the physical activity and undiagnosed diabetes was statistically significant. (p- value < 0.0001)[7]

Anthropometric Data

Physical body measurements are key indicators for the prevalence of non-communicable diseases.

The following table gives the mean anthropometric data.

Table-1
Mean Anthropometric profile of the selected young adults (n = 180)

Parameter	Mean observed values		Standard values (as per WHO)	t-value
	Normal	IGT		
Height (Cm)	159	158.8	NA	0.07
Weight (Kg)	65.4	67.8	58.16 (Ideal Body Weight)	0.035
BMI Kg/M^2	25.95	26.90	23.0	0.79

Prevalence of IGT

Impaired glucose tolerance is an intermediary category between normal glucose tolerance and overt diabetes and it can be identified by an oral glucose tolerance test. Subjects with impaired glucose tolerance have an increased risk of type 2 diabetes.

The cumulative incidence of diabetes from IGT after four years was 11 % in the intervention group and 23% in the control group. During the trial the risk of diabetes was reduced by 58 % (p<0.001) in the intervention group. The reduction in the incidence of diabetes was directly associated with changes in lifestyle.[8]

The following table gives the mean biochemical data.
Table-1I
Mean Clinical Profile of the selected young adults (n = 180)

Parameter (OGTT)	Observed values (Mean)		Standard values (American Diabetic Association)	t-value
	Normal	IGT		
FBS (mg/dl)	92.4	99.6	80 - 100	16.8
1st hour (mg/dl)	158.8	189.4	≤180	34.14
2nd hour (mg/dl)	127.6	156.2	≤140	28.89
HbA1c (%)	5.4	6.1	≤7	18.39

The risk factors peculiar for developing diabetes among Indians include high familial aggregation, central obesity, insulin resistance and life style changes due to urbanization. Study had shown that the prevalence of diabetes in the year 2009 & 2010 is (12.4% & 12.11%) and of pre-diabetic in year 2009 & 2010 is (13.5 & 14.3%) respectively which is quiet correspondent with urban prevalence of diabetes in India.[9]

Impaired Glucose Tolerance (IGT) and Impaired Fasting Glucose (IFG) collectively called as pre-diabetic states, have a high risk of conversion to diabetes.[10]

The Data on IGT and IFG are also urgently needed as they are indicators of future diabetes prevalence and burden on the nation. The National Urban Diabetes Survey (NUDS) results indicate that the prevalence of IGT was higher than that of type 2 diabetes in four out of six cities studied was 16.8 per cent in Chennai, 14.9 per cent in Bengaluru, 29.8 per cent in Hyderabad, 10 per cent in Kolkatta, 10.8 per cent in Mumbai and 8.6 per cent in New Delhi. The Diabetes and Endocrine Population Survey done in Kerala showed that 11.2 per cent of the subjects had either IFG or IGT. The prevalence of diabetes in India study (PODIS) reported that the prevalence of IGT was significantly high in both rural and urban populations.[11]

From the present study it was found that 29 male subjects (28.4%) and 14 female subjects (13.7%) were with Impaired Glucose Tolerance. The study was statistically significant (p- value < 0.0001).

Lifestyle modification is an effective tool for the primary prevention of diabetes in Asian Indians. The primary prevention of diabetes is urgently needed in India to curb the rising burden of diabetes.[12]

Hence all the selected young adults were provided guidelines to educate them about diabetes. The subjects with IGT were individually counselled on lifestyle modification to postpone diabetes.

Conclusion

It is concluded from the study that there is rapid rise in prevalence of diabetes, especially in the urban areas. Hence, the early identification of at risk individuals and appropriate intervention in the form of weight reduction, changes in dietary habits and increased physical activity could greatly help to prevent, or at least delay the onset of diabetes and thus reduce the burden due to non-communicable diseases.

The most pressing need is the primary prevention of diabetes. Screening for glucose intolerance as a preventive measure, even in those younger than 30 years of age, is a requisite in Asian Indians because they develop hyperglycemia at a younger age.

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