Section: Biochemistry

Prevalence of Prediabetes in Young Adults with Family History of Diabetes Mellitus at a Tertiary Health Centre in Uttarakhand

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ABSTRACT

Introduction: Prediabetes is the precursor stage before diabetes mellitus in which not all of the symptoms required to diagnose diabetes are present, but blood sugar level is abnormally high Study aimed to find the number of young adults (18-30 years) with impaired blood glucose tolerance at Himalayan Institute of Medical sciences.

Material and Methods: The study was conducted at the Himalayan Institute of Medical sciences, at Dehradun in Uttarakhand. Fifty medical students of the institute, within age group of 18-30 years with family history of diabetes mellitus were chosen as subjects. Fasting and postprandial plasma glucose levels were estimated by Glucose oxidase- peroxidase method.

Results: Prevalence of prediabetes was found nil among all the subjects in the study group.

Conclusion: Finding in the study indicates that occurrence of prediabetes is age related, may be present in advanced adult age, and also a multifactorial process.

Keywords: Prediabetes, Family History of Diabetes Mellitus

INTRODUCTION

Diabetes mellitus [DM] refers to a group of common metabolic disorders that share the phenotype of hyperglycemia.[1] It results in various health problems like heart diseases, kidney failure, stroke, blindness and premature deaths.[2] WHO estimates that diabetes resulted in 1.5 million deaths in 2012, making it the 8th leading cause of death.[3] Prediabetes is the precursor stage before diabetes mellitus in which not all of the symptoms required to diagnose diabetes are present, but blood sugar level is abnormally high.[4] The glucose levels are higher than normal but not enough higher to be called diabetes.[5] Diabetes is fast becoming the epidemic of the 21st century.[6] Over the past 30 years, the status of diabetes has changed from being considered as a mild disorder of the elderly to one of the major causes of morbidity and mortality affecting the youth and middle-aged people.[7]

The International Diabetes Federation (IDF) estimates the total number of diabetic subjects to be around 40.9 million in India and this is further set to rise to 69.9 million by the year 2025.[8] According to the National Urban Diabetes Survey, the prevalence of diabetes and pre-diabetes were 12.1% and 14%, respectively.[9]

Study was done with objectives to find the number of young subjects (18-30 years) with impaired plasma glucose, to estimate the plasma glucose levels by GOD –POD method and screening the subjects for glucosuria.

MATERIAL AND METHODS

The study was conducted from 24-4-2017 to 16-10-2017 at the Himalayan Institute of Medical sciences, at tertiary health care centre in Uttarakhand after getting approval from Institutional Ethical Committee. Fifty Medical students of the institute, within age group of 18-30years with family history of diabetes mellitus were chosen as subjects from the center. Informed consent was taken from all subjects. Blood samples from these subjects were analyzed for fasting and postprandial plasma glucose levels.

Estimation of Glucose

Glucose was estimated by Glucose oxidase-peroxidase method. Glucose oxidase is an enzyme which catalyze the oxidation of beta D-glucose present in the plasma to D-glucono-1, 5-lactone with the formation of hydrogen peroxide; the lactone is then slowly hydrolysed to D-gluconic acid. The hydrogen peroxide produced is then broken down to oxygen and water by peroxidase enzyme. Oxygen then reacts with an oxygen acceptor such as phenol aminophenazone which oxidizes in a coloured compound, the amount of which can be measured calorimetrically.

Screening of Glucosuria

Glucosuria was screened by semi-quantitative Benedict's reagent method. When reducing sugars are heated in basic solution, they form powerful reducing compounds known as enediols. Enediol further react with cupric ions (present in Benedict's solution) into cuprous ions. Cuprous ions get precipitated as brick red precipitate of cuprous oxide.

Pre-diabetics was defined according to the ADA recommendation included those with Postprandial glocose between 140 and 199 mg/dL and fasting glucose between 100 and 125 mg/dL.[10]

Inclusion Criteria
- Subjects – Between age group of 18-30 years.
- Subjects with family history of diabetes.

Exclusion Criteria
- Known Diabetics.
- Pregnant Females.

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B4

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	Mean (mg/dl)	Standard Deviation
Fasting	85.6	1.844
Post-Prandial	94.4	2.055

Table-1: Mean and standard deviation of fasting and postprandial plasma glucose

	Males		Females	
	Mean	SD	Mean	SD
Fasting	82.4	2.69	86.15	1.682
Post prandial	90.08	2.12	95.12	2.044

Table-2: Mean and standard deviation of fasting and postprandial plasma glucose in males and females

- Subjects with any endocrinal disorder.

RESULTS

The total number of subjects included in the present study was 50. Out of which, 7 were males and 43 were females. Mean age of subjects was 20 years. Table 1 shows mean and standard deviation of fasting and postprandial plasma glucose in studied subjects. Both fasting and post prandial glucose were found to be within normal range in all studies subjects. Table 2 shows mean and standard deviation of fasting and postprandial plasma glucose in males and females.

Glucosuria was not observed in the study group. In the study group, fasting plasma glucose and postprandial plasma glucose levels were observed within the normal range.

DISCUSSION

The present study has not shown the prevalence of pre-diabetes in young adults. Similar study was done by National Health and Nutrition Examination Survey (NHANES) in the USA which showed the prevalence of 17.8% in a group of subjects aged 20-39 years.[11] Another similar study was done in Mexico, which includes 550 subjects aged 36-50 years and showed the prevalence of 43.3%.[12] In another study, the prevalence of prediabetes is 20.5% and 24.3% in men and women respectively between age group 20-30.[13] The present study was not in agreement with other studies, as the study group includes the subject with a family history of diabetes aged between 18-30 years. These subjects are medical graduates and most of them are from a medical background, so they are aware of causes and consequences of Diabetes Mellitus. Regular weekly yoga practices are included in their time table. The occurrence of prediabetes and diabetes is multifactorial disorders, which include hypertension, obesity, lifestyle modification and dyslipidemia. Important approaches to counteract the growing epidemic of DM2 include the improvement of health care for young people with pre-diabetes or with risk factors for its development, provision of an effective and timely diagnosis and treatment, and self-care. Although there is a lack of evidence about the potential benefits and harms of screening for pre-diabetes in primary care settings[14], results of several studies have demonstrated that intensive lifestyle and pharmaco -therapeutical interventions effectively reduce the progression from pre-diabetes to diabetes by 50% or more.[15]

CONCLUSION

Nil prevalence of prediabetes in the study indicates that occurrence of prediabetes is age-related, may be present in advanced adult age, and also a multifactorial process. To find out the prevalence of prediabetes, there should be a large sample size along with different adult age group and other factors such as obesity, hypertension, stress and lifestyle modification.

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B5