INCREASING PREVALENCE OF TYPE 2 DM WITH ADVANCING AGE: AWAKENING ALARM FOR YOUTH OF NORTH INDIAN POPULATION

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ABSTRACT

This study was planned to evaluate if incidence and prevalence of diabetes rises with increasing age in North Indian population. A total of 150 diabetic patients and 150 normal controls were taken for study. The fasting glucose and glycosylated haemoglobin (HbA1c) were recorded with standard procedure. The statistical analysis was done by using SPSS software. Mean fasting blood sugar of diabetic patients was 150.68 ± 37.02 and that of healthy control was 88.43 ± 8.17 ($p < 0.0001$). The mean % of glycosylated hemoglobin in diabetic patients was 7.6 ± 1.06 and 5.30 ± 0.16 in healthy control. A statistically significant difference was found with $p < 0.0001$. The mean age of the subjects was 55.64 ± 11.34 and 33 ± 37.24 yrs. For the diabetic and control group respectively, $P < 0.0001$. Results of the study concluded that there is a sharp increase in incidence of diabetes mellitus type 2 with increasing age in North Indian population.

KEYWORDS: Diabetes mellitus type 2, Aging, lifestyle, Insulin resistance.

INTRODUCTION

According to a study conducted by World Health Organization (WHO), World Bank and Harvard University in 1990, there is a changing pattern of diseases attributed to unhealthy life style, that may eventually lead to metabolic syndrome, type 2 diabetes mellitus, depression, coronary arterial diseases and traffic accidents.[1]

Diabetes mellitus (DM) is a frequently occurring, multifactorial disorder. It has been estimated that approx 10% of the population in Japan and Western countries are victim of this disease.[2] The pandemic frequency of diabetes mellitus is continuously cropping up. Increased prevalence of D M has been observed in Asian countries especially India.[3] However DM has not only affected the Asian population but people living in China and Australia are also affected by this major health problem.[2,4] This increased occurrence in Asian population can be attributed to high incidence of increased body weight, sedentary lifestyle or other environmental factors.

Diabetes mellitus is a group of metabolic disease characterized by hyperglycemia resulting from defects in insulin action or both. There are two main form of diabetes mellitus type 1 and type 2 diabetes.[5,6] Type 1 diabetes is due to an autoimmune mediated destruction of pancreatic ß- cells resulting in insulin deficiency. Type 2 diabetes is a term used for individuals who have insulin resistance and usually some degree of insulin deficiency.[7]

Diabetes mellitus influences the life of individual by starting from organic dysfunction leading to organ failure. Hyperglycemia produces the classical symptoms of polyuria, polydypsia and polyphagia.[8] Metabolic disorder like type 2 DM is closely related with the aging process. Central obesity and insulin resistance which are the key factors related with metabolic diseases and cardiovascular diseases are frequently found among the elderly. The prevalence of impaired fasting glycemia (IFG) and T2DM increases with advancing age. In the US, in 2005-2008 the percentage of people aged 20 years or more having diagnosed or undiagnosed diabetes was estimated to increase with age. In the age group of 20-44 yrs, about 3.7% people was found to be diabetic, while in

the age group 45-64 yrs, the number rises to 13.7%; the percentage increased to about 26.9% in the age group of > 65 years.[9] According to American diabetic Association (ADA), approximately 18.3% (8.6 millions) of Americans age 60 and above are suffering from diabetes.[10] Early detection, treatment and prevention are significant challenges faced by this century. The present study was aimed to find the prevalence of T2DM increases with advancing age in North India region.

MATERIAL AND METHOD
Present study was retrospective, analytical case control study. The study protocol was approved by the institutional ethical committee of Subharti Medical College, Meerut U.P. India. Prior to sample collection,

written informed consent was obtained from all the subjects, included in the study, explaining the nature of the project. Peripheral blood was collected from 150 unrelated T2DM patients attending to out patient and admitted in inpatient department of medicine C.S.S.H. Meerut India for diabetes & 150 healthy controls. Both patients and controls were of same ethnic origin. Fasting blood sugar and HbA1c were assayed of both the control and study group.

Statistical Analysis
Statistics was applied to age and biochemical parameters using SPSS software. Mean ± SD (Standard deviation) of parameters was calculated. P – Values were obtained.

Table 1: Comparison of Age, FBS & HbA1c in control group & Type 2 D M patients.

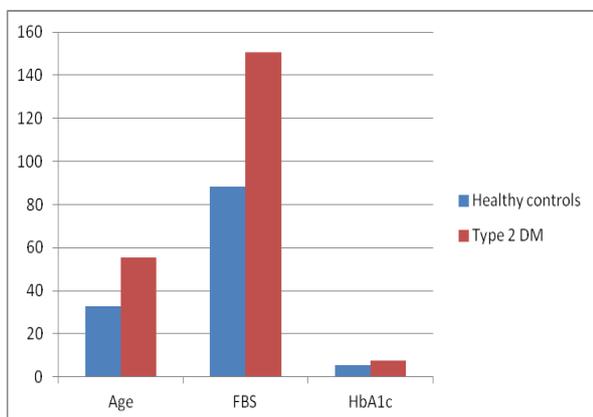| N	VARIABLES	Healthy Controls (n=150)	Type 2 DM	P Value
1	Age (years)	33 ± 37.24	55.64 ± 11.34	P < 0.0001
2	Fasting Blood Sugar (mg/dl)	88.43 ± 8.17	150.68 ± 37.02	P < 0.0001
3	HbA1C (in %)	5.30 ± 0.16	7.6 ± 1.06	P < 0.0001

Fig.1: Graph showing mean Age, FBS & HbA1c of healthy controls & type 2 DM patients.

RESULT AND DISCUSSION
150 patients of type 2 diabetes mellitus and 150 normal healthy subjects were selected for study. Mean fasting blood sugar of diabetic patients was 150.68 ± 37.02 and that of healthy control was 88.43 ± 8.17 (p < 0.0001). The mean % of glycosylated hemoglobin in diabetic patients was 7.6 ± 1.06 and 5.30 ± 0.16 in healthy control. A statistically significant difference was found with p < 0.0001. The mean age of the subjects was 55.64 ± 11.34 and 33 ± 37.24 yrs. For the diabetic and control group respectively, P < 0.0001. Hence according to our study middle aged persons are suffering from T2DM in North India. This shows prevalence & incidence of type 2 diabetes increases with age in North Indian Population.

Insulin & glucagon interact with each other to maintain normal blood glucose level. Deficiency of insulin leads

to elevation of blood glucose. Persistence of insulin deficiency for a long time leads to the development of diabetes mellitus.

The present study documented marked hyperglycemia in the type 2 D M patients. The increased concentration of plasma glucose (hyperglycemia), due to increased production and decreased peripheral utilization of glucose, is the specific sign of diabetes mellitus.[11] Plasma HbA1c concentration was also measured to evaluate diabetic control for the 4-6 week period before the measurement. Significantly high plasma HbA1c level indicates the poor status of glycemic control in the subjects over the previous months. Elevated level of HbA1c is due to persistent high fasting and prandial blood glucose.[12,13]

Our study favors the previous studies on diabetes related with age. With advancing age the prevalence of glucose intolerance (pre- diabetic and T2DM) increases. Decrease insulin sensitivity and insufficient compensation of ß- cells in response to increasing insulin resistance are the main factors induced by aging.[14] According to a study conducted by Szoke et. al. (2008), the first and second phase of insulin secretion normally decreases at the rate of approximately 0.7% per year with ageing and this rate is further accelerated about two fold in people with impaired glucose tolerance.[15] There is a reduction in mitochondrial oxidation and phosphorylation to about 40% which is associated with increased intramyocellular and intrahepatocellular lipid content resulting in decrease uptake of glucose.[16] A study was conducted by Minamino et, al. (2009) on mice proposed a model in which aging and inflammation was initiated in adipose tissue which subsequently leads to insulin resistance in adipose tissue, liver and muscle.[17]

CONCLUSION

There is a sharp increase in the number of elderly population worldwide, especially in the developing countries. The increase prevalence of metabolic diseases like T2DM in middle and old age may related directly with aging process or indirectly with other age related factors of T2DM like central obesity, mitochondrial dysfunction, FFA and lipid metabolism disorders, inflammation & ß- cell dysfunction, insulin resistance, metabolic syndrome etc. The development of type 2 D M is caused by a combination of lifestyle and genetic factors**.** Some of these factors are under our personal control such as diet and obesity while others are not like increasing age, gender and genetics. Preventive measures should be taken at an early age so as to not allow the diabetes to influence the quality & longevity of life.

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