

Original Research Article

## **Risk of Diabetes in Today's Asymptomatic Healthy Youth: A Cross - Sectional Study Using Comprehensive Diabetes Questionnaire**

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### **ABSTRACT**

To understand the risk of diabetes in today's healthy youth population, the study was conducted in varied age groups between 16-35 years. This was a quantitative, cross sectional study with 1200 respondents both males and females. The subjects were assessed using the Comprehensive Diabetes questionnaire having 37 questions & scored accordingly. Descriptive analysis was done.

The risk for diabetes was found to be on an all time high. In the age group of 16-20 years 69.3% of population was at mild risk and 30.7% were at high risk of diabetes. Similarly, in the age group 21-25 years 47.0% of population was at mild risk and 53.0% were at high risk. Similarly, in the age group of 26-30 years 37.0% of population was at mild risk and 63.0% were at high risk. Similarly, in the age group of 31-35 years 21.3% was at mild risk and 78.7% were at high risk. Hence, as the age advances risk of diabetes increases.

The prevalence of diabetes is almost 100% as assessed by the Comprehensive diabetes questionnaire indicating a huge health risk to the Indian Population in the very near future. The younger population is at a moderate risk while as age advances, the risk exponentially increases.

**Keywords:** Risk, Diabetes, Indians, Healthy, Youth.

### **INTRODUCTION**

Diabetes, a metabolic dysfunction ranges from mild blood sugar imbalance to full-fledged type 2 diabetes.<sup>[1]</sup>

Dr. Francine Kaufman coined the term *Diabetes* (diabetes + obesity), to refer to a form of diabetes which typically develops in later life and is associated with being obese.

**Diabetes is the leading cause of modern, chronic disease.**<sup>[2]</sup>

The "diabetics" have increased risk of heart disease, stroke, dementia, cancer, kidney failure and blindness - to name only a few. Type 2 Diabetes was earlier a disease of the middle-aged and elderly but no longer. Each year 7 million people develop Diabetes and the most dramatic increases in

type 2 Diabetes have occurred in populations where there have been rapid and major changes in lifestyle.<sup>[2]</sup> India is one such country, strongly being influenced by the western continents.

According to recent studies, obesity is a cause of Type 2 Diabetes. Adipose tissue functions as a metabolically active endocrine organ, secreting inflammatory cytokines and hormones, both of which have effect on body's physiology.<sup>[1,2]</sup>

A recent Yale study indicated that nearly one in four kids between the ages of 4 and 18 have pre-diabetes (glucose intolerance). Some regional studies show Type 2 Diabetes in kids has jumped from less than 5% before 1994 to 50% in 2004.<sup>[3]</sup>

Each year, kids are getting fatter. From 1993 to 2008, the number of people in the world with diabetes increased seven-fold from 35 million to 240 million, and is expected to rise to 380 million by 2030. This is ten times the number of people affected by HIV/AIDS worldwide. [3]

According to Dr. Kaufman, “Our ancient genes and our modern environment have collided. Our bodies store excess calories as fat. In ancient times calories were hard to come by. Today, fast food and junk food are everywhere. Coupled with our increasingly inactive lifestyle, the result being obesity”. [1,3]

It has long been known that Type 2 Diabetes Mellitus is a disease of impaired glucose metabolism. But what is less commonly known is that T2DM is also characterized by impaired fat metabolism. And recent research suggests that this is one way that obesity contributes to type 2 diabetes. [3]

The first step in this process is an abnormal gain of fat mass, usually caused by overconsumption of wheat, fructose, industrial seed oils or other dietary toxins. As fat mass increases, more leptin is secreted. (Leptin is the hormone that tells the brain to decrease appetite, increase metabolic rate and increase physical activity.) Chronically high levels of circulating leptin cause leptin resistance. [3]

Also, obesity causes excessive growth of fat tissue in two ways: it makes the fat cells larger (hypertrophy) and increases their number (hyperplasia). These overgrown fat cells become unstable and eventually rupture; releasing their fat content and causing further inflammation as the body attempts to clean up the dead or dying fat cells. The end result of this “lipotoxicity” and inflammation is insulin resistance, which as you know is the defining feature of type 2 diabetes and the metabolic syndrome. [3]

**Diabesity is a constellation of signs that includes:**

- Abdominal obesity (i.e. “spare tire” syndrome);

- Dyslipidemia (low HDL, high LDL and high triglycerides);
- High blood pressure;
- High blood sugar (fasting above 100 mg/dL, Hb1Ac above 5.5);
- Systemic inflammation and tendency to form blood clots. [1]

**Aim:** To understand the percentage risk to diabesity & its magnitude of severity in healthy asymptomatic youth population.

**Objectives:**

- 1) To assess severity of diabesity.
- 2) To assess factors contributing to diabesity.

**Purpose of the Study**

The purpose of the study is to assess risk of type 2 diabetes and obesity in normal healthy asymptomatic youth population in varied age groups between 16-35 years.

## **MATERIALS AND METHODS**

A cross-sectional study design was approved by the Institutional Ethical committee. The study was conducted in Pune city. 1200 asymptomatic healthy respondents of both genders in the age group of 16-35 years were divided in 4 age groups (16-20, 21-25, 26-30 & 31-35). 300 respondents in each age group with minimum education of 12<sup>th</sup> grade, fulfilling PAR Q & YOU questionnaire 2014 were included in the study after explaining them the study design & need for study in the language they understood best. Stratified Sampling technique was used in the study. Informed written consent was taken from all the subjects. Those with diagnosed Diabetes Mellitus were excluded from the study.

Comprehensive Diabesity Questionnaire was used to assess the risk of diabesity. This questionnaire had 37 questions. Subject scores 1 point for each yes. Final score was calculated. Scores between 1-7 indicated Mild diabesity and scores more than or equal 8 indicated Moderate to severe risk of diabesity.

**Statistical analysis**

The scores obtained from the questionnaire were utilized for descriptive analysis using Microsoft office 2010.

**RESULT**

The study had a sample size of 1200 subject with 300 in each age group. The age groups were:

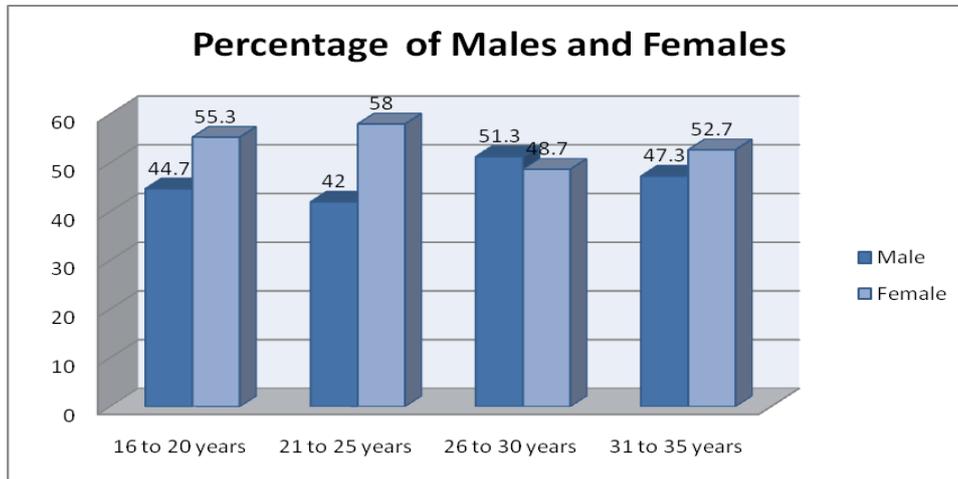
**In the study:**

**Group A :** 16-20 years with a mean age of 17.33±1.8

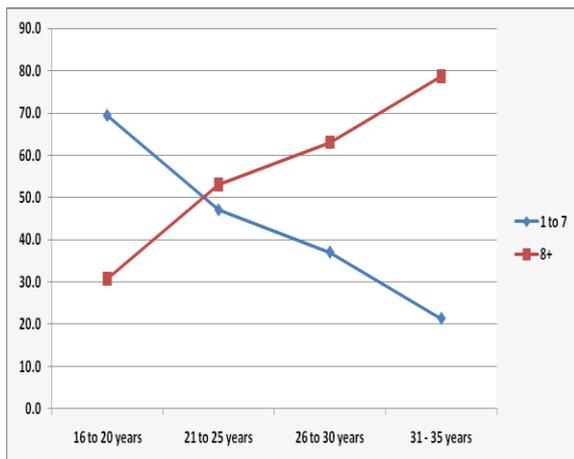
**Group B :** 21- 25 years with mean age of 22.4 ± 1.6

**Group C :** 26 - 30 years with mean age of 27.3± .2.1

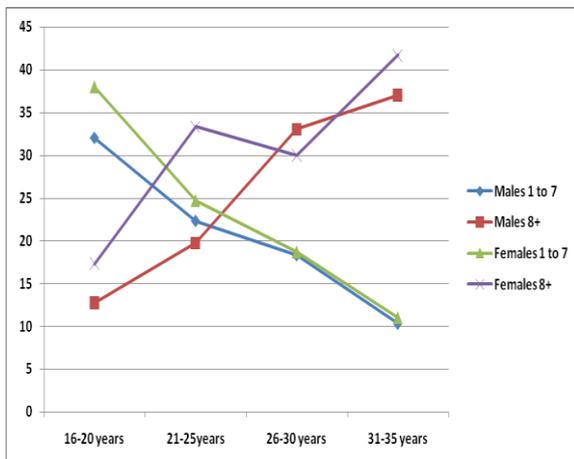
**Group D :** 31-35 years with mean age of 32.2 ± 2.3



Graph 1



Graph 2: shows a trend of the risk of severity increasing as the age progresses.



Graph 3: The risk of diabetes in both the genders showed a similar trend.

As seen in the above graph in Group A, 44.7% males and 55.3% females. In Group B, 42% males and 58% females. In Group C, 51.3% males and 48.7% females. In Group D, 47.3% males and 52.7% females. There was discrepancy between the number of male and female in each group.

**DISCUSSION**

Type II Diabetes Mellitus (TIIDM) has proven itself to be a significant public health problem in American Indian communities for quite some time. [4] Although, TIIDM has traditionally been regarded as a disease of adults, although recently its prevalence among children and youth has emerged as a public health concern for communities in America and India. [5] Obesity and physical inactivity are of growing concern in developed & developing countries & is likely to continue and increase the risk of developing complications in those already suffering from TIIDM.

This poses a major public health challenge for the affected communities. Young diabetics will have to spend more years with the disease, facing a higher

probability of contracting various co-morbidities related to T1DM. [6] In the dearth of literature, prevalence of diabetes and obesity has substantially been grown and prevention of these co-morbidities have become an important aim for the community as studies estimate that 1 in 3 persons with diabetes had not received a diabetes diagnosis. [7] According to recent studies, conducted diabetes burden on the world's economy in the last decade had reached \$376 billion and now is expected to reach \$490 billion in 2030. [8]

Diabetes represents substantial economic burden on world economy. So therefore, the main focus is to take primordial prevention in younger asymptomatic population those who have positive family history of T2DM or pre-diabetics and primary and secondary prevention in those with diagnosed diabetes mellitus to prevent and or delay the development of associated complications. [8,9] These necessary actions need to be taken because the projections for 2030 show the prevalence to reach 439 million individuals comprising 7.7% of the world population. [9,8,7]

According to The International Obesity Task Force, which estimates almost about 155 million school going children world over in their childhood are either obese or overweight. And these Asymptomatic children and adolescents are associated with metabolic syndromes or may have clustering of cardiovascular diseases and risk factors such as dyslipidemia, hypertension, increase left ventricular mass and elevated fasting and post load insulin levels. [10,9]

The risk of developing T1DM is also associated with these modifiable risk i.e., obesity and inactivity. Over recent decades, the prevalence of overweight and obesity has increased among children and adolescent, mainly due to physical inactivity, exposure to various addictions and eating fads. [11]

The information being put forth by the present study supported by studies done

across the globe, suggest that the age at which people are now suffering from otherwise age related degenerative conditions like CAD, DM, HTN etc is now reducing. Due to mechanization of the modern world and westernization of Indian Culture our life styles and eating habits are also suffering; predisposing us towards diabetes. [11,10,8]

Basically, T2DM is known to be disease of mix aetiology and is both polygenetic and heterogeneous. The risk factors playing a major role in development of T2DM are; ageing, genetic make, previous gestational diabetes history; maternal and paternal family history of diabetes mellitus, hypertension, cardiovascular diseases, alcohol consumption, obesity, sedentary lifestyle, increased cholesterol level (dyslipidemia), metabolic syndrome, ethnicity, nutrition and poverty.

Environmental, lifestyle and nutritional factors play a major role in development of diabetes. Factors contributing are overweight, physical inactivity, diet, work related stress, tension, depression etc. Nutritional behavior include small snacks, fast food, carbonated drinks, canned food items are partly responsible for increasing prevalence of obesity in children, adolescents and youth population. [11,10] This condition is marked by high levels of glucose in the blood, caused by a reduced capacity or inability to produce insulin- a hormone generated in the pancreas that controls blood glucose levels (WHO 1999). Similarly, the idea of fatness has become one of the major risk factors and/ or prime cause of developing T2DM in the recent years. T2DM is the disease which often goes undetected for years and early symptoms include increased tiredness, thirst, urination, hunger, and weight gain. [12,13] Efforts are required to prevent diabetes as well as to delay the development of complications.

So as to decrease the rate of deaths every year from cardiovascular disease, for which diabetes and hypertension and obesity are major predisposing factors. [14-17]

The data from the present study showed similar predisposition of males & females to Diabetes; both genders had a mild risk of Diabetes till 25 years of age with a considerable decline till 35 years. At the same time, the severity increased as the age increased. The 26-35 years age group showed a moderate to risk of Diabetes.

If we had to follow a simple rule of "Prevention is better than cure"; than the present data does act an eye opener.

## CONCLUSION

Population belonging to age group of 6-35 years is at a significant risk of relatively old disease called diabetes. The risk of which is exponentially increasing as the age progresses, commonly seen in both the genders.

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