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Prevalence of Pre-Diabetic State among Medical Students of Muhammad Medical College

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Abstract

Introduction: Diabetes is one of the most prevalent disease in Pakistan. Pre-Diabetes is the predisposition to diabetes. This study was conducted to identify the high-risk pre-diabetes individuals and the associated risk factors.

Methodology: A cross section al, descriptive study was conducted among medical students of Muhammad Medical College, Mirpurkhas. Total 100 were identified by using convenience sampling technique, after taking informed consent. WHO recommended procedure Oral Glucose tolerance test were performed and a face to face interview was conducted to collect information to identify associated risk factor by using closed ended pre- tested questionnaire. Data was entered and analyzed by using SPSS version 16.

Result: In total study sample of 100 patients; common age group was 20-22 years (n=49, 49%) and majority were male (n=56, 56%). Family history was present in 64% of study sample. Although all participants were disease free, results of oral glucose tolerance test showed that12% were at pre-diabetic state (FBS>110 &RBS>140). Among these 12 participants, 5(41.7%) were overweight, 4(33.3%) were obese, while 3(25%) were having normal BMI. Among this cohort of prediabetic, 75% have positive family history of diabetes, 50% spend 2-5 hour free with no physical activities, 90.9% take junk food, 91.7% take stress about their family/study and 50% have family history of obesity.

Conclusion: Results of current study showed 12% prevalence of pre-diabetic among medical students. The family history of diabetes, obesity, sedentary lifestyle, stress and use of junk foods are associated risk factors. As a preventive measure, health education should be given to all medical students particularly high-risk group.

Key Words: Pre-diabetic state, Oral glucose tolerance test, Overt Diabetes.

Introduction:

Prediabetes is the “pre-diagnosis” of diabetes—mean blood glucose level or blood sugar level is higher than the normal level but it’s not enough to be considered as diabetes mellitus type 2. It is a warning sign to develop diabetes mellitus type 2 in future. Prediabetes is an indication of the risk of developing type 2 diabetes if appropriate lifestyle changes[1]are not brought about. This stage is known as the "grey stage’. Prediabetes as the name indicates is the predisposing to diabetes and increased risk of cardiovascular events and thus mortality[2]. According American Diabetes Association “Prediabetes should not be viewed as a clinical entity but rather as having an increased risk for diabetes and cardiovascular disease (CVD). It is associated with obesity (especially abdominal or visceral obesity), dyslipidemia with high triglycerides and or low HDL cholesterol, peripheral neuropathies, fatigue ability, retinopathy, hypertension and renal diseases.[3]Prediabetic state is a metabolic syndrome and a subclinical condition and therefore must be viewed as ice berg phenomena; where there are no symptoms, but the highs blood sugar is the only sign. Impaired fasting blood sugar (IFG) and impaired glucose tolerance (IGT) are two forms of prediabetes that are similar in clinical definition (glucose levels too high for their context) but are physiologically distinct. IFG is due to increased gluconeogenesis by liver while IGT is due to insulin resistance or decrease glucose uptake by muscles.[4]

Term “border line diabetes” for those having impaired glucose tolerance was used up to 1965, while in 1979 WHO and National diabetes council replaced this old term as “asymptomatic DM w.[5]If fasting blood glucose level is impaired or random blood glucose level is impaired it will predispose to type 2 diabetes mellitus. Many newly identified IFG patients develop overt diabetes in less than three years. IFG is also a risk factor for mortality[6]. Multiple research papers have been published to assess the prevalence and risk factor of type 2 diabetes mellitus in different cities of Pakistan.[7]According to WHO estimate, Pakistan has 9.4 million diabetes, while another 3.5 million are undiagnosed giving an overall figure of 12.9 million. By the end of 2030 Pakistan is expected to be at number 7 among top ten countries in type 2 diabetes mellitus.[8,9]

ADA criteria; fasting blood sugar > (100 mg/dl) to < (126mg/dl)

WHO criteria: fasting blood glucose level from > (110 mg/Dl) to < (125 mg/Dl)[10/11]

Prediabetes have a 50% risk of developing frank diabetes over 10 years.

Methodology:

For this descriptive cross-sectional study, during May-August 2014, 100medical students were selected through random sampling technique from five different classes of MBBS. Student of either gender willing to participate were enrolled after taking informed written consent. The variables studied includes Body Mass Index (BMI), random blood sugar, family history, stress, cigarette smoking and physical activity. Cigarette smoking was defined as having smoked 20 cigarettes/day is equal to one pack

per year. Regular physical activity during leisure time was defined as participation in moderate or vigorous activity for 30 minutes or more per day at least 3 days a week. The criteria of WHO was used to identifying participants as normal, prediabetic or diabetic. Blood sugar level below 110 was considered normal; between >110 and <126mg/dl was considered as indicative of diabetes mellitus. Body weight was estimated, using a weighing machine, with a least count of 0.5 kg. The subject was made to stand on the weighing scale, feet around 15 cm apart, and weight equally distributed on both legs. Height was measured by the help of a rod attached to the weighing machine. Zero setting was done before each measurement. The fasting blood sugar was measured in the morning after advising protocol to students 1 day before sampling. After taking fasting sugar level, students were advised to take 75gm glucose orally and then 2 hours later their random blood sugar levels were taken. The blood sample was taken using aseptic measures at hospital laboratory by same expert technician for all students. The data were initially entered on a pre-formed Performa and then were entered at SPSS 17.0 version. Descriptive statistics were measured as mean ±S.D.

Results:

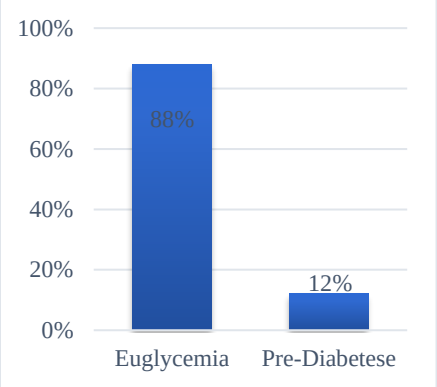
For this study 100 medical students participated. In the total sample the most common age group was 20-22 years (n=49, 49%) and majority were male (n=56, 56%). All students were disease free at the time of study.

TABLE: Demographic and life style characteristics of prediabetic. (Case wise Report)

Cases	Year of MBBS	BMI	F. Diabetes	F. Obesity	FBS
Case1	Final	33	Yes	Yes	117
Case2	Final	27	No	Yes	112
Case3	Final	27	Yes	No	110
Case4	4th	31	No	Yes	115
Case5	4th	30	No	Yes	115
Case6	4th	30	Yes	Yes	117
Case7	4th	28	Yes	No	112
Case8	3rd	24	Yes	No	114
Case9	3rd	24	Yes	No	111
Case10	2nd	24	Yes	No	114
Case11	1st	27	Yes	Yes	119
Case12	1st	27	Yes	No	118

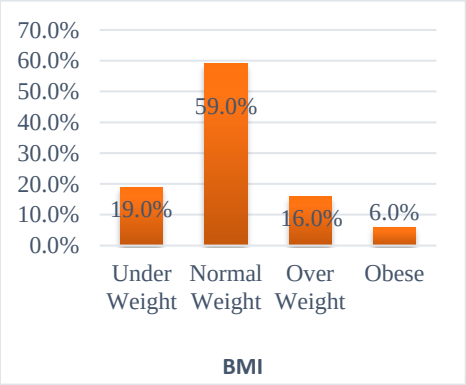
	RBS	Stress	Physical Activity	Smoking	Junk Food
Case1	156	Yes	No	Yes	Yes
Case2	142	Yes	Yes	No	No
Case3	142	Yes	Yes	No	Yes
Case4	152	Yes	No	Yes	Yes
Case5	169	Yes	Yes	No	Yes
Case6	150	No	No	No	No
Case7	143	Yes	Yes	No	Yes
Case8	144	Yes	Yes	No	Yes
Case9	141	Yes	Yes	No	Yes
Case10	143	Yes	No	No	Yes
Case11	154	Yes	No	No	Yes
Case12	150	Yes	No	No	Yes

Figure 1: Random Blood Sugar level.



The family history of diabetes was found in 63% participants. Among this cohort of students with positive family history of diabetes, 60.3% (n=38) have type 2 diabetes and 39.7% (n=25) have type 1 diabetes. Among this venerable cohort of students n=12(12%) were at pre-diabetic state (FBS>110 &RBS>140) detected on oral glucose tolerance test. Among these prediabetic 5(41.7%) were overweight, 4(33.3%) were obese, while 3(25%) were having normal BMI. Among this cohort of prediabetic, 75% have positive family history of diabetes, 50% spend 2-5 hour free with no physical activities, 90.9% take junk food, 91.7% take stress about their family/study and 50% have family history of obesity. Among them n=2(16.7%) are cigarette smokers smoke 3-5 cigarettes in a day.

Figure 2: Body Mass Index (BMI) of the participants



Discussion:

Overall prevalence of prediabetes (type 2 diabetes) is 12% in medical students of Muhammad Medical College. Factors identified associated with prediabetes includes sedentary lifestyle and lack of physical activity, stress due to excessive burden of study. The trend of junk food and smoking is increasing day by day to relieve the stress posed by medical studies. Blood glucose level is rapidly deranging in developed countries as well. In a survey of 2.7 million adults, in 2008, the estimated level of fasting plasma glucose was 95 mg/dl in men and 90mg/dl in women, a rise of 5mg/dl is noted since 1980.In United States of America prediabetic conditions had been increasing like other developed counteries[12].Due to lack of knowledge regarding sign and symptoms, prediabetes has become a silent killer. Those patients which have positive family history of diabetes or other risk factor should have a regular checkup about their blood glucose level. Most of the patients have complaints like weight loss, easy fatigability, increase appetite other like symptoms like fever, headache due to decrease immunity, blurred vision, neuropathy, optic neuropathy, slow healing of cuts and bruises, numbness in hands and feet[13,14]. There are multiple causes of this condition like family history, sleep disturbance, high level of triglycerides, and low level of good cholesterol. In our study only 12 students were prediabetics and mostly males were affected. In other studies males were more affected as compared to female. Study conducted at Kuwait and China, reported the prevalence of prediabetes as 6.8% and 3.8% respectively, obese were mostly affected[15]. Obesity is not only a significant risk factor. Smoking is another risk factor. The study in India found that smoking, obesity, family history and sedentary life style are important risk factors for pre diabetes[16]. In future Pakistan, India and china will be the largest contributors to the world's diabetic load.

Those students in our study in Muhammad medical college are at high risk of pre-diabetes that have risk factors like obesity, family history, fast food consumption and physical inactivity. Further studies over general population are needed to give more valuable results about the prevalence of prediabetes. Health education should be given to all medical students including high risk group as a preventive measure to minimize the risk of diabetes in future.

Conclusion:

Results of current study showed 12% prevalence of prediabetes among the medical students particularly those having family history y of diabetes, obesity, sedentary lifestyle, stress, and use of junk foods. Health education should be given to all medical students including high risk group as a preventive so that the risk of diabetes can be minimized.

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