ORIGINAL ARTICLE

Prevalence of Pre-Diabetes Mellitus in the Young Individuals of a Medical College in Karachi

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ABSTRACT

Objective: To assess the prevalence of Pre-Diabetes Mellitus in the United Medical & Dental College Students at Karachi.

Methods: This cross-sectional study conducted at United Medical & Dental College Karachi from July to December 2016. 113 medical students from all the classes were enrolled. Brief history especially regarding risk factors is taken and fasting blood sugar levels measured. All the data entered in SPSS version 20 and analyzed.

Results: 5(4.42%) out of 113 students were identified as pre diabetes,3 are male and 2 females. Regarding BMI 36 (31.85%) students were underweight, 65 (57.52%) normal, 11 (9.73%) overweight, and 1 (0.88) obese. 39 (34.51%) students had a positive family history of D.M and 2 of them were pre diabetic (5.12%) while 74 (65.48%) had no family history and 3(4.05%) were pre diabetic. Only 24 (21.23%) students perform exercise. 21 (18.58%) students were very fond of junk food and 2of them were pre diabetic. 6 (5.309) students are regular smokers.

Conclusion: The incidence rate of pre-diabetes mellitus is lower in medical students as compared to general population, due to health awareness, and physically active routine, needs the awareness programs in general population.

Keywords: Pre-diabetes Mellitus, Diabetes Mellitus, Medical Students, General Population.

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INTRODUCTION:

Diabetes mellitus is one of the oldest diseases which is traced to 400 BC, mentioned in the ancient manuscripts of Egyptians, Romans and Indian physicians and it still remains a major cause of morbidity and mortality throughout the world.[1,2]

It is actually a group of metabolic disorders resulting in the high serum glucose levels.

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This gives rise to the characteristic symptoms of polydipsia, polyuria and polyphagia and if untreated, then DKA and Hyperosmolar hyperglycemic state which may lead to coma and death. The long term complication of diabetes are multiple and effect almost every system in the human body i.e. cerebrovascular stroke, atherosclerosis, MI, Retinopathy, nephropathy, diabetic foot (gangrene), neuropathies. Diabetes Mellitus occurs throughout the world having the highest incidence in the developed countries. In the recent decades its incidence has a remarkable rise globally, including many of the developing countries.[3]

In 1980 there were 108 million people suffering from diabetes worldwide which has risen to 422 million in 2016.[4]

Diabetes Mellitus has resulted in 1.5 million deaths in 2012 according to W.H.O data

estimation placing diabetes in the top 10 leading causes of death globally[4,5]. While 2.2 million deaths worldwide occurred due to the associated complication of diabetes e.g.: stroke, MI, Renal failure due to prolonged diabetes mellitus[4,6]. In 2014, the international diabetes federation (IDF) estimated 4.9 million deaths due to Diabetes Mellitus worldwide[7].

The incidence rate of diabetes mellitus in Pakistan is 11.5 percent which is the highest incidence rate in Asia, and this is expected to even rise up to 15% in the coming decade[8], and with that Pakistan is expected to rank in the top 5 countries with diabetes mellitus[9].

Diabetes Mellitus is a disorder which has underlying genetic etiology combined with environmental factors, such as high calorie fatty diets combined with sedentary life style and lack of exercise resulting in obesity and dyslipidemia. This condition will eventually end up at insulin deficiency but before absolute deficiency there comes a period of relative deficiency /impairment, during this time although, the fasting blood sugar level of the individuals are below 120mg/dl but they are not with in normal (70-99mg/dl) limits. These individuals are identified as pre-diabetic and are expected to develop diabetes with in coming years. With industrialization and changing life style the incidence of pre-diabetes is increasing day by day and alarmingly it is occurring at a very young age.[10] We conduct this study to assess the prevalence of Pre-Diabetes Mellitus in the medical students of United Medical & Dental College Karachi.

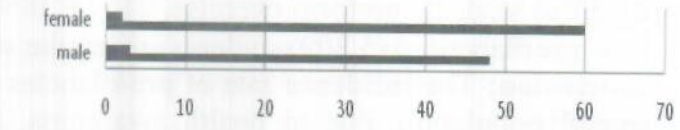
METHOD:

A total of 113 students are included in the study during July to December 2016. The study design was approved by the ethical committee of the college. The students from five different classes of both genders were randomly selected. The selected students were explained about the purpose of the study. All the known cases of Diabetes Mellitus were excluded from the study. The fasting blood sugar testing was done in all cases and then the detailed history was taken. History of diabetes in parent or siblings or any 2nd degree relatives and the height, weight and BMI were documented all the data collected was recorded on a proforma. The results were compiled and analyzed statistically.

RESULT:

Collectively around 150 students were approached for this study but only 113 students proceeded for investigations. So the response rate was 75.3% in the medical students.

Out of these 113 students, 62 were females, their age ranging between 18-25 years. Mean age of all students was 22.54 years.



	male	female
prediabetic	3	2
normal	48	60

Chart I: Gender Wise Distribution of Normal & Pre Diabetic Students

108 (95.57%) students had their fasting blood sugar levels within the normal range ie. below 100mg/dl, ranging between 70-96mg/dl, only 5 students (4.42%) had blood sugar level above 100mg/dl (The highest being 107mg/dl).

The BMI calculation revealed 36(31.85%) underweight youngsters, despite consumption of junk food and no proper physical exercise they had normal fasting blood sugar levels. 65 students had normal BMI (57.52%) interestingly 4 individuals with normal BMI had deranged blood sugar levels. 11 students were overweight and 1 of them was found to have pre-diabetes BSL, only one female student had obese BMI.

DISCUSSION:

Diabetes Mellitus has turned to become a global issue in the recent years, along with a rise in the pre-diabetic population as well. A large scale study carried out by Daniel G et al, shows that

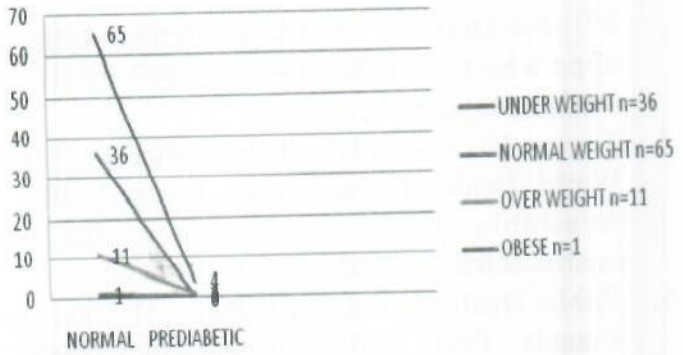


Chart II: Ratio of Pre Diabetes with Body Mass Index

Table I. Modifiable Risk Factors & Prediabetes

Factors	Status	Normal	Pre-Diabetic
Smoking	No	86	3
	Occasional	17	1
	Regular	05	1
Junk Food	No	24	1
	Occasional	65	2
	Regular	19	2
Physical Exercise	No	85	4
	Occasional	15	1
	Regular	08	0

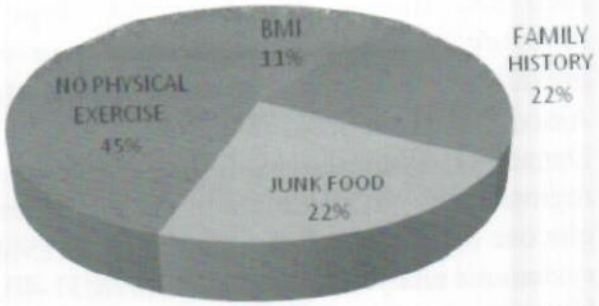


Chart III: Percentage of Risk Factors Related to Pre-Diabetes.

throughout the world, the mean fasting blood sugar levels have shown an overall rise of 1 mmol during 1980-2008[11].

The same time period when mechanical equipment, dietary choices (high protein, fat, carbohydrate with low fiber content) and sedentary life style was gradually changing the day to day routine in almost every part of the world. Pakistan is also having a rise in the incidence of Diabetes. In fact it has the highest incidence rate (11% - 12%) of Diabetes Mellitus than any other Asian country.[8,12]

Before the development of full blown type 2 Diabetes, there is a considerable time of deranged blood sugar levels in almost every case which usually goes unidentified. This critically important time period needs to be identified and emphasized in order to prevent or at least delay the development of Diabetes Mellitus because pre-diabetes is the time period which denotes that the insulin secreting beta cells of islets of Langerhans of pancreas are under stress and need to be relaxed by proper diet, physical activity and weight reduction.

These modifications help the beta cells to function properly in lowering the blood sugar levels for a longer duration, hence delay the development of Diabetes Mellitus and further its lifelong complications will be delayed as well. So in the communities with higher incidence rates for Diabetes Mellitus, Like Pakistan, India, China, the pre-diabetic cases need to be identified individually at General physician (GP) level and worked upon in order to delay the development of DM in these cases. This will substantially reduce the Diabetes Mellitus related morbidity and mortality in the high risk communities. In this study 5 student were found to have impaired fasting blood sugar levels i.e. 4.42% prediabetes (3 were males and 2 female indicating a sight difference in the prevalence of pre diabetes in both sexes) while multiple researchers, in their study have noted 11-12% prevalence of pre diabetes in Pakistan[8,12,13].

A recent study by Anjana RM et al, which was conducted in 15 states of India showed 10.3% prevalence of pre diabetes[14], Ramachandran et al, denote a prevalence rate of 11.90% in a survey on urban population of India[15]. while Mustafa et al calculated 11.89% prevalence of pre diabetes in Malaysia[16]. According to a Saudi official national population survey carried out by the Saudi central department of statistic and information in 2010, the prevalence of pre diabetes is 9% in the Saudi population[17].

The possibility of low prevalence in a related population depends upon the particular features related to that group of population. Like in case of medical students, the health awareness has a substantial effect over both eating habits and life style. Furthermore, factors such as young

age (18-24 year) combined with a physically active daily routine (getting up early , running for classes in the campus and hospital from morning till evening, etc) are itself a type of physical exercise, and thus help maintaining the proper functioning of all body systems. The most advancing risk factors for Diabetes Mellitus are obesity, positive family history and age. In fact, aging process is always associated with gradual accumulation of body fat and thinning of muscle mass due to gradual loss of physical activity with aging[18]. An age related study conducted in china by Xu Y et al showed the low prevalence 6.9% of D.M in people aged 18-59 and 12% prevalence in people above 60 year age[19]. A positive family history of Diabetes Mellitus is the next important risk factor, although it is a non-modifiable risk factor but it is seen in different studies that if person with positive family history are diagnosed at pre-diabetic stage they can benefit from life style intervention[20], especially avoiding their sedentary life styles which is associated with increased risk of Diabetes Mellitus[21,22]. This study results revealed 39 (34.51%) students had a positive family history of D.M and 2 of them are pre diabetic (5.12%)

CONCLUSION:

The incidence rate of Pre-Diabetes is lower in medical students as compared to general population possibly due to health awareness, young age and physically active daily routine. Diabetes Mellitus related awareness programs are needed of the general population to reduced the risk.

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