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DIABETICS IN A LOW SOCIOECONOMIC COHORT;
AN UPDATE INTO THE PATTERN OF PRESENTATION OF CARDIOMETABOLIC RISK FACTORS

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ABSTRACT… Objectives: To study the latest trend of cardiometabolic risk factors in diabetics in a low socioeconomic group. **Design:** Cross sectional observational. **Place and duration:** Three tertiary care hospitals of Karachi. June 2013 – Dec 2014. **Methods:** 824 type II adult diabetic patients of both genders were included. History was taken regarding diabetes, ischemic heart disease, hypertension, and cerebrovascular accidents. Blood pressure and BMI was recorded. Investigations were done for dyslipidemia. SPSS 16 was used for means, frequencies and proportions. **Results:** There were 276 males (33%) and 548 females (67%) with a mean age of 52 years (±9.67). Mean duration of diabetes was 9.36 years (± 6.39). Hypertension was present in 375 (45%) diabetics of which males were 124(33%) and females were 251(66.6%). Frequency of hypertension in total diabetic males is 45% (125) and in females 45.6 %(140). Ischemic heart disease was present in 105 patients (12.7%) in which males were 45(42.8%) and females were 60(57.1%). The male percentage of ischemic heart disease was 16.3% (45) of the total males and females 11 %(40). Stroke was found in 19 patients (2.3%) equally distributed in both genders. Mean Body mass Index was 28.02 (+/- 5.31) with 135 (16.3%) being overweight and 529 (64.2%) obese. Dyslipidemia was present in 250 (42.3%) out of 591 patients. Smoking history taken in 614 patients showed that 73 (11.8%) were smokers and/or chewed tobacco. Out of a total of 595 patients, 372 (62.5%) patients had metabolic syndrome. **Conclusion:** There is a strong association and high prevalence of cardiovascular risk factors in diabetics in a low socioeconomic group. Factors such as hypertension, dyslipidemia, obesity, and smoking further multiply the cardiovascular risk ratio in diabetics.

Key words: Diabetes, Hypertension, Dyslipidemia, Cardiovascular risk Factors, Obesity.

INTRODUCTION
Cardio Vascular Diseases are accountable for three fourths of the deaths worldwide in lower socioeconomic status cluster. The World Health Organization states that 17.5 million people died from cardiovascular diseases in 2012, representing 31% of the global deaths - 7.4 million were by ischemic heart disease and 6.7 million were due to stroke.[1]

The statistics on diabetes is a genuine reason of apprehension as the disease is spreading as an epidemic with future estimates reported to double by 2030 from 2.8% to 4.4%, principally in developing countries like Pakistan.[2]

Diabetes is one major risk factor when associated with hypertension, smoking, hypercholesterolemia and obesity resulting in additional complications. Diabetics are much more likely to develop cardiovascular diseases.[3] Ischemic heart disease (IHD) is a principal basis of morbidity and mortality among diabetics. The development of atherosclerotic events in diabetics is a reason for hospitalization, premature morbidity and mortality along with an increased medical expenditure.[4] 70% of the diabetes related total cost are due to complications of diabetes particularly macro vascular diseases.[5]

This study is an outlook of the clustering pattern of cardiometabolic risk factors among patients with type 2 diabetes in multicentral tertiary care hospitals catering to a low socioeconomic

group. It is to acknowledge the growing counts of cardiovascular risk elements in diabetics especially in the low socioeconomic strata so as to emphasize on their lifestyle modification and counseling to bring awareness regarding the sequels of the disease.

METHODS

This multicenter cross-sectional study was conducted in three major tertiary care hospitals of Karachi serving a low socioeconomic income class. We randomly selected 824 diagnosed type 2 diabetics irrespective of age and gender. Patients suffering from type 1 diabetes or women with gestational diabetes were excluded. After taking consent, the history regarding ischemic heart disease, smoking, and episode of stroke was taken. Cardiovascular disease (coronary artery disease and/or stroke) was accepted if there was a history of coronary heart disease (angina, myocardial infarction) verified through medical records. The variables such as blood pressure, height, and weight were noted on examination and Body mass index (BMI) was calculated. Lipid profile was done for dyslipidemia. Metabolic syndrome was seen in accordance with the WHO clinical criteria (given below).

OBJECTIVE DEFINITIONS

Obesity
Asian cutoff values define obesity as BMI ≥ 25 kg/ m2
(Normal: 18-22.9, Overweight: 23-24.99, Obese 1: 25-26.99, Obese2: 27-29.99. Obese 3 >30)

Dyslipidemia
Dyslipidemia was said to be present when two or more of the following are present: (1) a raised triglyceride level (>150 mg/dL) or on treatment for high triglycerides; (2) an elevated LDL-cholesterol level (>100 mg/dL) or drug treatment for high LDL; (3) a low HDL-cholesterol (men <40 mg/d, women <50 mg/dL) or on drug treatment.

Hypertension
Systolic blood pressure (SBP) ≥ 135 mmHg and/or diastolic blood pressure (DBP) ≥ 85 mmHg.

Uncontrolled Diabetes
HbA1C > 7

WHO Clinical Criteria for Metabolic Syndrome[6]
Insulin resistance, suggested by **one** of the following:

- Type 2 diabetes • Impaired fasting glucose • Impaired glucose tolerance • or for those with normal fasting glucose levels (<110 mg/dL), glucose uptake below the lowest quartile for background population under investigation under hyperinsulinemic, euglycemic conditions

Plus any two of the following:
- Antihypertensive treatment and/or high blood pressure (≥135mm Hg systolic or ≥85 mm Hg diastolic)
- Plasma triglycerides ≥150 mg/dL (≥1.7 mmol/L)
- HDL cholesterol <35 mg/dL (<0.9 mmol/L) in men or <39 mg/dL (1.0 mmol/L) in women
- BMI >30 kg/m^2 and/or waist: hip ratio >0.9 in men, >0.85 in women
- Urinary albumin excretion rate ≥20 µg/min or albumin: creatinine ratio ≥30 mg/g

Categorical variables were expressed as frequencies and proportions. Means with standard deviations were calculated for continuous variables

RESULTS
There were 276 males (33%) and 548 females (67%) with a mean age of 52 years. (+/- 9.67). Mean duration of diabetes was 9.36 years. (+/- 6.39).

Hypertension was seen in 375 (45%) diabetics of which males were 33% and females were 66.6%. Frequency of hypertension in total diabetic males is found to be 45% (125) and females 45.6 %(140).

Ischemic heart disease was present in 105 patients (12.7%) in which males were 42.8% and females were 57.1%. The male percentage

of ischemic heart disease was 16.3 %(45) of the total males and females 11 %(40).

Stroke was found in 19 patients (2.3%) equally distributed in both genders.

Mean Body mass Index was 28.02 (+/- 5.31) with 135 (16.3%) being overweight and 529 (64.2%) obese. In the overweight group 60 were males (44.4%) and 75 were females (55.6%), whereas in the obese group 148 were males (28%) and 381 were females (72%).The BMI profile of male and female is given in Table-I.

Gender	Normal BMI N %		Overweight N %		Obese N %	
Male n=276	65	23.5	60	21.7	148	53.6
Female n=548	77	14.05	75	13.6	381	69.5

Table-I. The BMI profile of male and female diabetics

Dyslipidemia was present in 250 (42.3%) out of 591 patients.

Smoking history taken in 614 patients showed that 73 (11.8%) were smokers and/or chewed tobacco.

Out of a total of 595 patients, 372 (62.5%) patients had metabolic syndrome.

The cardio metabolic risk factors and their percentages in the diabetics of this study is summarized in Table-II

Risk Factors	Percentages %
Hypertension	45
Ischemic heart disease	13
Stroke	2.3
Obesity overweight obese	16.3 64.2
Smoking	11.8
Dyslipidemia	42.3
Metabolic Syndrome	62.5

Table-II. The cardio metabolic risk factors and their percentages at a glance

DISCUSSION

The social and financial burden of the diabetes augments with its cardiovascular complications. The forecast that diabetes incidence will increase markedly specifies a parallel rise in cardiovascular-related illness/death, which means an inexorable and deep impact on the healthcare. There is prediction that by 2025 Pakistan will be 5th most prevalent diabetic nation which is very ominous. The gravity of this situation further intensifies when the local data indicates that around more than half of the total population of diabetics are also suffering from cardiovascular compromise.

Our study of 824 diabetic patients from three different settings of low socioeconomic strata showed an alarming 45% of patients also suffering from hypertension. Nida et al in her study showed 53% of diabetics as having hypertension, [7] which is supported by Ali et al[8] showing 41% (n#1000) and Omer et al had 65%[9] of diabetics concurrently having hypertension. The lack of awareness of healthy balanced diet and regular exercise along with non compliance to the prescribed management was a common problem in this population with illiteracy and poverty a major contributors to this attitude. The occurrence of hypertension in diabetes multiples the risk of coronary artery disease and stroke along with other micro and macrovascular complications of diabetes. Hence, there is an urgent need to generate alertness and awareness among the community.

Our study shows the frequency of ischemic heart disease in diabetes to be 13% which is a lesser percentage compared to the research done by Nida et al[7] showing IHD to be in 30% of diabetics, but, similar to the study by Omer et al who showed a percentage of 13.7%.[9] A research in North Catalonia, Europe[10] on 307 diabetics showed frequency of IHD to be 18.9%, being more frequent in men.

Diabetes is seen in up to two-thirds of people having an acute stroke. Unfortunately, after an event of acute stroke has occurred even if aggressive management of glucose control is done neither an improvement in outcome nor a reduction in the incidence of recurrent strokes

has been seen. This then emphasizes that a need for active management of diabetes and the other cardiovascular risk factors is warranted so as to prevent a stroke episode from happening in the first place.[11] Stroke was 2.3% in our study which is similar to the Omer et al's study[9] (n=175) showing a similar stroke percentage - 2.3%. Hence, diabetics are at a 2–6 fold increased risk of stroke, compared to their age-matched counterparts.[12]

An notable observation in a Singapore based study is that for any given Body Fat % the BMI in Singaporean Chinese, Malays and Indians cohort was about 3 kg m(-2) lower than that of Caucasians, but, the absolute risks for having at least one of the risk factors (blood pressure, dyslipidemia, fasting glucose) were more, ranging from 41 to 81%, which validates the lower cutoff values for BMI, WC in ethnic groups of Asia. Asian Indians had been known to have increased incidence of cardiometabolic irregularities as compared to other ethnic groups.[13] Another research data based in United Kingdom concerning the relationship of obesity and ethnicity, observed that relative to other ethnicities, obese Pakistani males were three times and females five times more likely to develop diabetes. Coronary heart disease was also highest in the Pakistani origin (8%).[14]

In our study the obese group was alarmingly high with 80 % having an abnormal BMI (64% falling in the obese range) with females being more frequent, confirming that obesity and diabetes together increase the presentation of cardiovascular risk factors, especially in females. This is also similar to Amina et al's study done on type 2 diabetics showing 64% obesity.[15] Omer et al's study done in the same setting as ours also showed the mean BMI and total fat percentage to be higher in females than males corresponding to our results.[9]

The percentage of dyslipidemia is 42% in our study but previous studies done in Pakistan showed a higher percentage: a Rawalpindi study done on 226 type 2 diabetics showed dyslipidemia

to be 80%[16] while a study in Hyderabad showed hyperlipidemia to be 74% with a raised triglycerides levels, more marked in females.[17] This is seconded by an African study in Benin on diabetics showing a raised triglycerides.[18] A fortunate lower percentage in our study could be hopefully attributed to the growing awareness about consequences of dyslipidemia, change in dietary habits and lifestyle.

In our study smokers are 12% while Ali et al[8] stated that 9% were past smokers and 13% were current smokers showing a continuous trend to tobacco. It is acknowledged that, in Pakistan, up to 34% adults smoke cigarettes. This lower prevalence can be due to the fact that majority of the participants did not disclose that they smoked. Smoking is more common among men than women.[19] The European study also showed smokers to be 14.9% signifying a worldwide dilemma.[10]

Tariq and Hadi observed metabolic syndrome to be 77% in a cohort of 200 diabetic patients.[20] Ninety seven (63%) of these patients were between the age group 41 to 60 years which is a devastating data as this a very dynamic age for a developing country like Pakistan. It also reflects the attitude of non adherence to life style modification and treatment in diabetics. A research in Karachi in 2012[21] on 889 diabetics showed that 70% of the participants had metabolic syndrome, a percentage relating to our research value. In North Catalonia the metabolic syndrome's prevalence was 68.7% showing a global trend.[10]

The results of our study endorse the importance of adequate lifestyle modification. The overall metabolic control (blood pressure levels, glycemic control, lipid levels, and body mass index) of the participants was poor. The management and control of diabetes is a real task for health care providers. The lack of awareness about this disease, poor quality of healthcare and the cost for its management in resource-constrained countries are the main areas where improvement is needed for adequate control of the disease.[22] By conducting this study we hope to explicit the

outcomes and bring further reinforcement to the prevention healthcare strategy in diabetes.

LIMITATIONS OF THE STUDY

Further research and studies are needed to evaluate the reasons for poor diabetes care, and to identify the most cost-effective measures to address these issues. There was scarce reliable data on the overall prevalence of stoke in Pakistan to compare it with the prevalence of stroke in diabetics.

CONCLUSION

There is a strong association and high prevalence of cardiovascular risk factors in diabetics even in a low socioeconomic group. Factors such as hypertension, dyslipidemia, obesity, and smoking further multiply the cardiovascular risk ratio in diabetics.

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"Your greatness is not what you have,

It's what you give."

Unknown

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2	Dr. Saera Suhail Kidwai	Analysis of data and manuscript writing	
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