

The Burden of Non-Communicable Diseases in Middle Age Population of Karachi, Pakistan

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ABSTRACT

Aim: To evaluate burden of diabetes in middle age population (36-56 years) and the associated clinical and participant characteristics living in Karachi.

Study design: Retrospective study.

Place and duration of study: Two GP Clinics @ Karachi over a period of 6 Months from 1st September 2020 to 28th February 2021.

Methodology: Three hundred and eighteen type II diabetic patients were registered. Complete history and physical examination done for all registered patients. The age, sex, occupation, address, family history of diabetes, addiction was recorded.

Results: Two hundred and twenty seven (71.4%) were females. The mean age was 46.7±7.1. The burden of diabetes was significant (p <0.001) in the rural population (54.7%). There is a higher prevalence of diabetes in Pashtun population of Karachi than other Ethnicities 96 (30.2%). There is significant positive correlation in patients with poor, the median HbA1c was 8.4.

Conclusion: This study determined the burden of diabetes mellitus in middle age group (36-56 years) and established its association with obesity, sedentary lifestyle and high HbA1c levels.

Key words: Diabetes, Prevalence, HbA1c, Glycemic control

INTRODUCTION

Non-Communicable diseases are considered a major health burden worldwide and most modifiable risk factors apply in both developed and developing countries.¹ Diabetes is a endocrine disorder which results due to inadequate insulin secretion and altered insulin functions or both, diabetes also increase the risk of mortality with cardiovascular disorders, blindness, renal failure and amputations of lower limbs.² Diabetic patient considered at equal risk of death due to cardiovascular disease as any atherosclerotic disorder in a large number, there was 5% increase in premature mortality.³

In 2014 422 million adults were diagnosed with diabetes, which was very high compare to the 108 million in year 1980. The prevalence of this complicated disorder is increasing at double speed since 1980 in different populations.⁴

Prevalence of diabetes is increasing with more pace in low socioeconomic population compare to the developed populations in past decade. Deaths due to diabetes were 1.5 million in year 2012, diabetes can increase mortality and morbidity if not controlled or not archived the optimal glucose levels. The number of deaths are in low socio economic countries due to lack of diabetic awareness, less developed health system, low GDP, less budget for non-communicable disorders like diabetes.⁵

In last decades, 60% of diabetic population is living in Asia, due to the increase trends of urbanization, economic developments and poor transition of nutritional status. These factors contributes in the increasing prevalence of diabetes.^{6,7}

In China only 1% of people were diagnosed with diabetes in year of 2008 compare to recent 10%. It is estimated that more than 92 million are diagnosed with diabetes and 148 million are with pre-diabetes. Indian populations was remain epicentres of diabetes but recently numbers shows China is becoming new epicentre of diabetes in Asia.⁸

In urban population of India is at 20%. Asians also developing this endocrine disorder at younger ages compared to the Western countries, Asian are also prone to diabetes even with

normal BMI levels the rate of conversion from pre-diabetes to diabetes is also high.⁹

Women with gestational diabetes are at greater risk of development of diabetes and also their offspring's are genetically predisposed for development of diabetes in their early life.¹⁰ In Pakistan the prevalence is 11.77 with includes both male (11.20) and female (9.19%).¹¹

Diabetes is a very complex disorder which also arise many metabolic disorders, diabetic dyslipidemia is very common which results with different abnormal levels of cholesterols, this often called diabetic dyslipidemia which play important role in development of risk of cardiovascular disease, insulin resistance. Insulin resistance can increase the atherogenic lipoproteins which are responsible for atherogenic disorders which causes the morbidity and mortality in diabetic population.^{12,13} European guidelines for the management of dyslipidemia recommend an LDL-cholesterol goal of less than 100 mg/dl and a TG goal of less than 150 mg/dl in diabetic patients without cardiovascular events.¹⁴

The purpose of this study is to evaluate the diabetes burden in middle age population (36-56 years) and the associated clinical and participant characteristics living in Karachi, Pakistan.

MATERIALS AND METHODS

After IRB permission, this retrospective study performed in 318 patients diagnosed with Type 2 Diabetes mellitus during the last one year from Karachi Pakistan both urban and rural areas population were enrolled. Non-probability consecutive sampling strategy was used to collect the data. Demographic characteristics, plasma LDL-c and triglycerides level and HbA1c were measured among both male and females aged 36 years to 56 years of different ethnicity to investigate the impact of dyslipidemia on prognosis in diabetes mellitus and hypertension. The questionnaire was developed and filled with 22 variables to identify the burden of diabetes and dyslipidemia. The data was taken on patients who visited in Outpatient Department, vitals were taken, and their blood sample taken to measure different lab tests and recorded on prescribed forms. Data was analyzed using STATA statistical software version 15.1.

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RESULTS

There were 91 (28.6%) males and 227 (71.4%) females with mean age was 46.7±7.1 years (Fig. 1). Comparatively the burden of diabetes in urban population was less (45.3%) than the rural population (54.7%) (p <0.001), there is a higher prevalence of diabetes in Pashtun population of Karachi than other Ethnicities 96 (30.2%). The Housewives found to be more affected from diabetes in this study, 224 (70.4%) (p 0.02).

Table 1: Characteristics of the participants associated with diabetes mellitus (n=397)

Variable	No.	%	P value
Gender			
Male	91	28.6	0.006
Female	227	71.4	
Location			
Urban	144	45.3	<0.001
Rural	174	54.7	
Ethnicity			
Sindhi	53	16.3	0.04
Urdu	68	21.3	
Punjabi	34	10.7	
Pashtun	96	30.2	
Others	67	21.1	
Marital status			
Married	275	86.5	0.04
Window/Widower	35	11.0	
Single	5	1.5	
Divorce/Separated	3	1.0	
Employment status			
Employed/job	9	2.8	0.02
Housewife	224	70.4	
Self employed/Business	73	23.0	
Un-employed	12	3.8	
Substance abuse			
No	249	78.6	0.05
Pan/Gutka	40	123.6	
Smoking & others	28	8.8	
Body Mass Index (BMI)			
<25.0	69	21.7	0.02
≥25.0-30.0	122	38.3	
>30.0	127	40.0	
Obese			
No	67	21.1	0.001
Yes	251	78.9	
Sedentary Lifestyle			
No	75	23.7	0.003
Yes	243	76.3	
Family History of Diabetes			
No	179	56.3	0.001
Yes	139	43.7	
Any complications due to DM			
No	191	60.1	0.02
Retinopathy	33	10.4	
Neuropathy	53	16.7	
Erectile dysfunction	8	2.5	
Stroke	9	2.8	
Others	24	7.5	
How was it diagnosed?			
Laboratory diagnosis	19	6.0	0.02
Doctor diagnosis	299	94.0	
Who diagnosed it?			
Consultant or Diabetologist	16	5.0	0.05
Family Physician or General Practitioner	302	95.0	

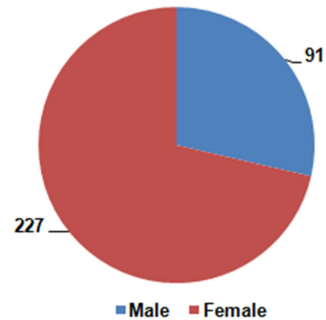
The findings such as LDL and TG parameters were high in obese patients with poor glycemic controls 251 (78.9%). Majority of the participants have BMI >30 (40%) and sedentary lifestyle was reported by 241 (76.3%) of participants. There is significant positive correlation in patients with poor glycemic control, the median HbA1c was 8.4 (p 0.002) and most of the tests was done in last 3 to 9 months (52.2%). Mean systolic blood pressure was

120 mm/hg and diastolic blood pressure 80 mm/hg. Median LDL was 100 mg/dl, triglycerides 163 mg/dl. The mean duration of clinically diagnosed hypertension was 4±4.7 years; mean duration to diagnosis of diabetes mellitus was 5.2±5.0 years. Family history of diabetes was reported by 139 (43.7%) participants. Neuropathy was the most significant complication 53 (16.7%) However the complications include retinopathy (10.4%), stroke (2.8%), and erectile dysfunction (2.5%). Diabetes was diagnosed through laboratory investigation in 19 (6%) and diagnosed by doctor in 299 (94%) (p 0.02) of participants, mostly the diagnosis was done by General practitioner or Family physician 302 (95%) followed by laboratory tests. Moreover, the results of this study did not show any correlation of diabetes with substance abuse (Tables 1-2).

Table 2: Descriptive statistics of the patients

Variable	
Age (years) (mean)	46.7±7.1
Systolic Blood Pressure mmHg (Median)	120
Diastolic Blood Pressure mmHg (Median)	80
HbA1c mmol/l (Median)	8.4
LDL (Median)	100
Triglyceride (Median)	163
Duration of Hypertension in years (Mean)	4.0±4.7
Duration of Diabetes Mellitus (years (Mean)	5.2±5.0

Fig. 1: Frequency of genders



DISCUSSION

Type II diabetes is a worldwide endocrine disorder with is a threat to health and economies of any nation, predominantly the under developed countries¹⁵. This disorder is increasing day by day in types of population due to the recent advancement, increasing urbanizations, technological advancements are making our population more and more inactive then before¹⁶.

This disorder is effecting Asian population more than western populations. Even on lower levels of BMI Asian are prone to diabetes, central obesity and insulin resistance is more prevalent in Asians.^{17,18} Poor pre natal nutritional status is also contributing factors of development of diabetes in early life.

Recent advances have substantially improved our understanding of the pathophysiology of diabetes, but the currently identified genetic susceptibility loci are insufficient to explain differences in diabetes risk across different ethnic groups or the rapid rise in diabetes prevalence over the past several decades.⁹

LDL-C and TG shows potential markers that can be used in predicting glycemic control in patients with type 2 diabetes mellitus.¹⁹ 78.9% patients were obese, and their sedentary lifestyle resulting insulin resistance and increase in LDL and triglycerides. Lifestyle modification, dietary habits rich in fruits and vegetable, physical activity and exercise can reduce the risk of events and insulin resistance and decrease atherosclerosis over production. The significant strength of the study was that the large sample size and looked to both clinical and laboratory findings for better understanding the burden of diabetes in middle age population of Karachi, Pakistan. However, the limitation was that the data was retrospective of past one year which may have caused the recall

bias and most of the participants were female and housewives so the burden in male was not identified properly.

CONCLUSION

This study determined the burden of diabetes mellitus in middle age group (36-56 years) and established its association with obesity, sedentary lifestyle and high HBA1C levels. A community based large sample size follow-up study should be conducted with equal number of male and female from both rural and urban areas of Karachi, Pakistan within different age groups should be conducted to determine the association of diabetes mellitus with different clinical and participant characteristics.

REFERENCES

- Habib SH, Saha S. Burden of non-communicable disease: global overview. *diabetes & metabolic syndrome. Clin Res Rev* 2010;4(1):41-7.
- Athyros VG, Doumas M, Imprialos KP, Stavropoulos K, Georgiou E, Katsimardou A, et al. Diabetes and lipid metabolism. *Hormones (Athens)* 2018;17(1):61-7.
- Fan W. Epidemiology in diabetes mellitus and cardiovascular disease. *Cardiovascular Endocrinol* 2017;6(1):8.
- WHO. Global report on diabetes: executive summary. World Health Organization 2016.
- Ogurtsova K, da Rocha Fernandes J, Huang Y, Linnenkamp U, Guariguata L, Cho NH, et al. IDF Diabetes Atlas: Global estimates for the prevalence of diabetes for 2015 and 2040. *Diabetes Res Clin Prac* 2017;128:40-50.
- Bishwajit G. Nutrition transition in South Asia: the emergence of non-communicable chronic diseases. *F1000 Res* 2015;4.
- Uwaezuoke SN. Childhood diabetes mellitus and the "double burden of malnutrition": an emerging public health challenge in developing countries. *J Diabetes Metab* 2015;6(597):2.
- Hu C, Jia W. Diabetes in China: epidemiology and genetic risk factors and their clinical utility in personalized medication. *Diabetes* 2018;67(1):3-11.
- Pradeepa R, Mohan V. Prevalence of type 2 diabetes and its complications in India and economic costs to the nation. *Eur J Clin Nutr* 2017;71(7):816-24.
- Bandyopadhyay M, Small R, DAVEY MA, Oats JJ, Forster DA, Aylward A. Lived experience of gestational diabetes mellitus among immigrant South Asian women in Australia. *Austr NZ J Obstet Gynaecol* 2011;51(4):360-4.
- Basit A, Fawwad A, Qureshi H, Shera AS. Prevalence of diabetes, pre-diabetes and associated risk factors: second National Diabetes Survey of Pakistan (NDSP), 2016–2017. *BMJ Open* 2018;8(8):e020961.
- Tani S, Yagi T, Atsumi W, Kawauchi K, Matsuo R, Hirayama A. Relation between low-density lipoprotein cholesterol/apolipoprotein B ratio and triglyceride-rich lipoproteins in patients with coronary artery disease and type 2 diabetes mellitus: a cross-sectional study. *Cardiovasc Diabetol* 2017;16(1):1-13.
- Albai O, Roman D, Frandes M. Hypertriglyceridemia, an important and independent risk factor for acute pancreatitis in patients with type 2 diabetes mellitus. *Therapeu Clin Risk Management* 2017;13:515.
- Ray KK, Kastelein JJ, Matthijs Boekholdt S, Nicholls SJ, Khaw K-T, Ballantyne CM, et al. The ACC/AHA 2013 guideline on the treatment of blood cholesterol to reduce atherosclerotic cardiovascular disease risk in adults: the good the bad and the uncertain: a comparison with ESC/EAS guidelines for the management of dyslipidaemias 2011. *Eur Heart J* 2014; 35(15):960-8.
- Einarson TR, Acs A, Ludwig C, Panton UH. Economic burden of cardiovascular disease in type 2 diabetes: a systematic review. *Value Health* 2018;21(7):881-90.
- Sluijs I, Cadier E, Beulens J, Spijkerman A, Van der Schouw Y. Dietary intake of carotenoids and risk of type 2 diabetes. *Nutr Metab Cardiovasc Dis* 2015;25(4):376-81.
- Wheellock KM, Sinha M, Knowler WC, Nelson RG, Fufaa GD, Hanson RL. Metabolic risk factors and type 2 diabetes incidence in American Indian children. *J Clin Endocrinol Metab* 2016;101(4):1437-44.
- Hsu WC, Araneta MRG, Kanaya AM, Chiang JL, Fujimoto W. BMI cut points to identify at-risk Asian Americans for type 2 diabetes screening. *Diabetes Care* 2015;38(1):150-8.
- Artha IMJR, Bhargava A, Dharmawan NK, Pande UW, Triyana KA, Mahariski PA, et al. High level of individual lipid profile and lipid ratio as a predictive marker of poor glycemic control in type-2 diabetes mellitus. *Vascular Health Risk Management* 2019;15:149