

STUDY OF EVALUATION OF HYPERTENSION AND ITS ASSOCIATED FACTORS AMONG DIABETICS

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Abstract

Background: Diabetes mellitus (DM), also known simply as diabetes is a complex metabolic disorder characterized by hyperglycemia, a physiologically abnormal condition represented by continued elevated blood glucose levels. Hypertension is both a disease and a major risk factor for other diseases. Hence, the present study was undertaken for assessing the presence of Hypertension and its associated factors among type 2 diabetes mellitus patients in a tertiary care center. **Materials and Methods:** A total of 200 patients with type 2 diabetes were enrolled. Complete demographic and clinical details of all the patients were obtained. Blood pressure was measured in all the patients and incidence of hypertension was evaluated. Detailed habit history and clinical details of all the patients were recorded. Anthropometric variables were recorded separately. Blood samples were obtained and hemodynamic, biochemical along with glycemic profile was evaluated. Risk factors associated with the occurrence of hypertension were assessed. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. **Results:** Hypertension was seen in 142 subjects with type 2 diabetes. Hence, the overall prevalence of hypertension among diabetic subjects was 71 percent. Higher age, obesity, dyslipidemia, longer duration of diabetes and positive cigarette smoking habit were found to be significant risk factors associated with occurrence of hypertension among diabetic subjects. **Conclusion:** Occurrence of diabetes predisposes patients for occurrence of hypertension.

INTRODUCTION

Diabetes mellitus (DM), also known simply as diabetes, is a complex metabolic disorder characterized by hyperglycemia, a physiologically abnormal condition represented by continued elevated blood glucose levels. Hyperglycemia results from anomalies in either insulin secretion or insulin action or both and manifests in a chronic and heterogeneous manner as carbohydrate, fat, and protein metabolic dysfunctions. Diabetes follows a progressive pattern with complex pathogenesis and varied presentation.^[1-3]

Hypertension is both a disease and a major risk factor for other diseases. Population studies show an increasing rate of cardiovascular events such as stroke, myocardial infarction, heart failure, atrial fibrillation and premature mortality, with increasing blood pressure (from systolic blood pressures ≥ 115

mmHg). This relationship is exponential, and stronger for systolic pressure than for diastolic pressure. Untreated very high ($>180/110$ mmHg) or rapidly rising blood pressure (such as in eclampsia) can overcome normal microvascular autoregulation. This leads to acute damage in the microcirculation and results in a multisystem clinical syndrome of accelerated or malignant hypertension, or cerebral haemorrhage, which are immediate threats to life.^[4,5] Hypertension is a progressive CV syndrome arising from complex and interrelated etiologies. Early markers of the syndrome are often present before BP elevation is sustained; therefore, hypertension cannot be classified solely by discrete BP thresholds. Progression is strongly associated with functional and structural cardiac and vascular abnormalities that damage the heart, kidneys, brain, vasculature, and other organs and lead to premature morbidity and death. Reduction of BP when target organ damage is

demonstrable, or the functional precursor of target organ damage is present and still reversible generally reduces the risk for CV events. Note that we separate elevated BP (one manifestation of the disease) from hypertension (the disease).^[5,6] Hence; the present study was undertaken for assessing the presence of Hypertension and its associated factors among type 2 diabetes mellitus patients in a tertiary care center.

MATERIALS AND METHODS

The present study was undertaken for assessing the presence of hypertension and its associated factors among type 2 diabetes mellitus patients. A total of 200 patients with type 2 diabetes were enrolled. Complete demographic and clinical details of all the patients were obtained. Blood pressure was measured in all the patients and incidence of hypertension was evaluated. Detailed habit history and personal details

of all the patients were recorded. Anthropometric variables were recorded separately. Blood samples were obtained and hemodynamic, biochemical along with glycemic profile was evaluated. Risk factors associated with occurrence of hypertension were assessed. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

RESULTS

Hypertension was seen in 142 subjects with type 2 diabetes. Hence, the overall prevalence of hypertension among diabetic subjects was 71 percent. Higher age, obesity, dyslipidemia, longer duration of diabetes and positive cigarette smoking habit were found to be significant risk factors associated with occurrence of hypertension among diabetic subjects.

Table 1: Prevalence of hypertension

Hypertension	Number	Percentage
Present	142	71
Absent	58	29
Total	200	100

Table 2: Hypertension associated factors

Variable	Hypertension present (n=142)	Hypertension absent (n=58)	p-value
Mean age (years)	53.9	45.1	0.001*
Males gender	89	35	0.856
Mean BMI (Kg/m ²)	31.2	26.7	0.003*
Dyslipidemia	109	23	0.000*
Mean duration of diabetes (years)	13.3	9.4	0.000*
Cigarette smoking habit	59	12	0.017*

*: Significant

DISCUSSION

According to the World Health Organization (WHO) diabetes mellitus is a chronic, metabolic disease characterized by elevated levels of blood glucose, which leads over time to damage to the heart, vasculature, eyes, kidneys and nerves. Over 90% of diabetes mellitus cases are T2DM, a condition marked by deficient insulin secretion by pancreatic islet β -cells, tissue insulin resistance (IR) and an inadequate compensatory insulin secretory response. Progression of the disease makes insulin secretion unable to maintain glucose homeostasis, producing hyperglycaemia.^[7,8] Hypertension screening is strongly recommended for all American adults older than age 18, according to the latest recommendations from the US Preventive Services Task Force and the American Academy of Family Physicians. Screening should be repeated every 2 years for patients with BP <120/80 mm Hg and annually for those with BP between 120 mm Hg to 39 mm Hg systolic BP and 80 mm Hg to 89 mm Hg diastolic BP. The key to the diagnosis of hypertension is accurate measurements of BP. Improper hand positioning, incorrect BP cuff size, and insufficient time to relax (<5 minutes) before BP measurements are common errors that can lead to falsely elevated readings. At least 2 BP

readings of $\geq 140/90$ mm Hg obtained at 3 different office visits and separated by 2 to 4 weeks are needed to make the diagnosis of hypertension.^[9-11] Hence; the present study was undertaken for assessing the presence of Hypertension and its associated factors among type 2 diabetes mellitus patients in a tertiary care center.

Hypertension was seen in 142 subjects with type 2 diabetes. Hence, the overall prevalence of hypertension among diabetic subjects was 71 percent. Higher age, obesity, dyslipidemia, longer duration of diabetes and positive cigarette smoking habit were found to be significant risk factors associated with occurrence of hypertension among diabetic subjects. Akalu Y et al determined the prevalence and associated factors of hypertension among type 2 diabetes mellitus patients. The prevalence of hypertension among T2DM patients was 59.5% (95% CI: 54.5–64.5). Stage 1 hypertension was the most common (30.95%). The odds of hypertension was higher among age group of 50–60 years (adjusted odds ratio (AOR)=2.5, 95% confidence interval (CI) (1.27–4.90)), patients from urban area (AOR = 2.8, 95% CI (1.08–7.18)), with longer duration of T2DM (AOR =1.16, 95% CI (1.08–1.25)), with BMI ≥ 25 kg/m² (AOR = 3.2, 95% CI (1.71–5.96)), with poor glycemic control (AOR = 3.0, 95% CI (1.75–5.19)),

and patients who were current cigarette smokers (AOR = 3.8, 95% CI (1.98–14.96)). The prevalence of hypertension is high, and the majority have poor blood pressure control.^[12] The prevalence, awareness and control of hypertension and factors associated with hypertension among people with type 2 diabetes mellitus (T2DM) was assessed in a previous study conducted by Alsaadon H et al. The mean age of participants was 55.14 (\pm 12.51) years. Hypertension was found to be present among 67.2% of participants, and 95.8% were aware that they had it. Of these, 79.5% attained blood pressure control. The mean duration of diabetes was 10.86 (\pm 7.73) years. The variables that were found to be related to hypertension include an age of above 60 years, physical inactivity, being overweight or obese, a longer duration of diabetes and chronic kidney disease. The prevalence of hypertension as well as its awareness and control were very high among people with known type 2 diabetes.^[13]

Al-Azzam, N et al determined the prevalence of HTN among patients with DM in Jordan and factors that might be associated with the concurrence of both diseases. A cross-sectional study was conducted to determine HTN prevalence and risk factors among diabetic outpatients. Patients were asked about their sociodemographic information and medical history. A descriptive analysis was used to determine HTN prevalence, and a fit bivariate logistic regression model was used to identify the significant risk factors of HTN in patients with type 2 DM (T2DM). HTN was found to be concurrently occurring in approximately 80% of T2DM patients. This was found to increase with age. In addition, dyslipidemia, gout disease, ischemic heart disease, renal impairment, or a family history of HTN were found to be associated with the concurrence of HTN among T2DM patients.^[14] Mengesha AY et al determined the prevalence of hypertension and related cardiovascular risk factors among DM patients. A total of 401 patients were included in a cross-sectional study during a three-month period. During the study it was found out that 61.2% of DM patients had hypertension, 56.4% obesity, 33.5% hypercholesterolemia and 38.9% hypertriglyceridemia. In the study, hypertension was associated with age, sex, type of DM, body mass index (BMI) and hypertriglyceridemia. The study found out that most of DM patients suffer from co-existing hypertension and related cardiovascular risk factors.^[15]

CONCLUSION

The occurrence of diabetes predisposes patients for occurrence of hypertension.

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