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ORIGINAL RESEARCH

Assessment of hypertension and its determinants in patients with Type 2 diabetes mellitus attending a tertiary care hospital

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Abstract
Background: There are several co-existing factors in diabetic patient which contribute for and accelerate the progression of the atherosclerotic vascular complications. The present study was conducted to assess hypertension and determinants of poor blood pressure control in patients with Type 2 diabetes mellitus.
Materials & Methods: 112 Type 2 diabetes mellitus patients of both genders were included. Socio-demographic and clinical baseline characteristics were recorded.
Results: Out of 112 patients, males were 66 and females were 46. We found that out of 112 type II DM patients, 42 had hypertension and 70 had not. Age <60 years were 63 and >60 years were 49.67 patients had normal BMI,45 were overweight or obese. Glycaemic control (HbAlc) <7% was seen in 67 and >7% in 45 subjects. Duration of diabetes <10 years was seen in 66 and >10 years in 46 patients. .Patients with <7 hours sleep was 39 and >7hours was 73.50 patients were doing physical exercise. The difference was significant (P< 0.05).
Conclusion: Age >60 years, high BMI and duration of diabetes >10 years, sleep <7hours and Physical inactive were risk factors of hypertension among patients with Type 2 diabetes mellitus.
Key words: Diabetes, Hypertension, Glycaemic

Introduction

Hypertension is a major non-communicable disease and is identified as a global disease burden that is ranked as the third-largest cause of disability-adjusted life years. Globally, there were 972 million hypertensive adults in the year 2000, and this number is on track to increase by 60% to 1.56 billion by 2025.[1] It has been reported that people with hypertension are twice as likely to develop cardiovascular disease, four times as likely to develop congestive heart failure and seven times as likely to develop cerebrovascular disease or stroke when compared to non-hypertensive subjects.[2]

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There are several co-existing factors in diabetic patient which contribute for and accelerate the progression of the atherosclerotic vascular complications. Hypertension, which is the most prevalent and independent cardiovascular risk factor in the general population, is extremely common problem in diabetics.[3] Diabetes approximately doubles risk of cardiovascular disease and concomitant hypertension nearly doubles that risk again. In addition to diabetes related renal dysfunction, hyperinsulinemia, extracellular fluid volume expansion, and increased arterial stiffness have been proposed as contributing factors for the development of hypertension in diabetics.[4]

In mild-to-moderate hyperglycaemia, there is increased retention of sodium, which leads to an increase in the total exchangeable sodium and blood pressure.[5] Another plausible explanation is that the upregulation of the renin-angiotensin-aldosterone system in diabetes has a direct effect on hypertension.[6] The present study was conducted to assess the hypertension and its determinants in patients with Type 2 diabetes mellitus.

Materials & Methods

The present cross sectional study was conducted in Bolangir, Odisha from July 2021 to May 2022. Comprised of 112 Type 2 diabetes mellitus patients of both genders. Consent was taken from all the participants in the study. Patients with T1DM, and those who had gestational diabetes, sever ill patients and those with psychiatric illness were excluded from the study. Data such as Socio-Demographic and clinical baseline characteristics were recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Operational Definition-

Hypertension – Defined as mean systolic blood pressure (SBP) and diastolic blood pressure (DBP) of 140/90 mmHg or greater, confirmed by two measures taken at least 5 minutes apart and hypertensive patients on regular drug therapy or follow-up for hypertension

BMI – 18.5–24.9 is considered as normal while BMI ≥ 25 kg/m2 is considered as overweight or obese

Physically active – An individual who performs physical exercise for at least 30 min per day for at least 5 days per week

Results

Table II Assessment of parameters

Parameters	Variables	Hypertension		P value
		Yes (42)	No (70)	
Gender	Male	26	40	0.61
	Female	16	30	
Age	<60 years	18	45	0.03
	>60 years	24	25	
Family history of hypertension	No	22	52	0.02
	Yes	20	18	
BMI	Normal	20	47	0.04
	Overweight or Obese	22	23	
Glycaemic control (HbAlc)	<7%	19	48	0.04
	>7%	23	22	
Duration of diabetes	<10 years	26	40	0.6
	>10 years	16	30	
Sleep duration	<7 hours	20	19	0.03
	>7 hours	22	51	
Physically active	No	24	26	0.04
	Yes	18	44	

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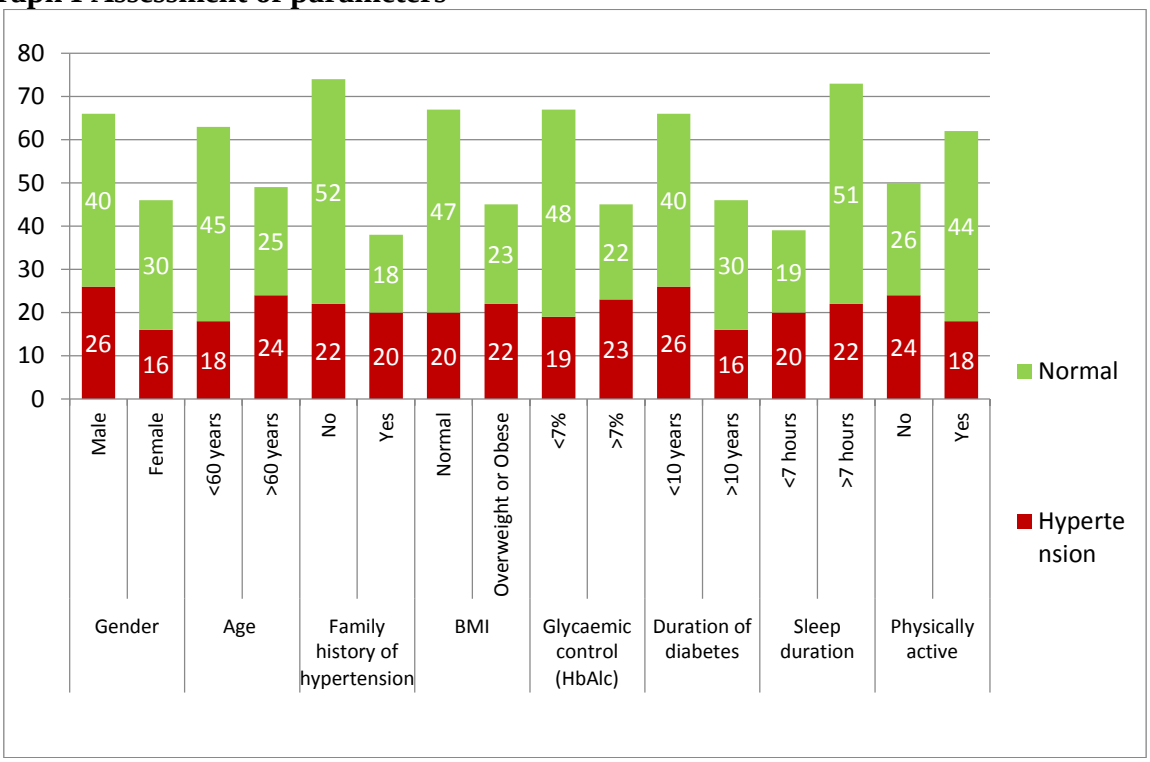
Table II, graph I shows that Out of 112 patients, males were 66 and females were 46. We found that out of 112 Type 2 DM patients, 42 had hypertension and 70 had not. Age <60 years were 63 and >60 years were 49.67 patients had normal BMI,45 were overweight or obese. Glycaemic control (HbAlc) <7% was seen in 67 and >7% in 45 subjects. Duration of diabetes <10 years was seen in 66 and >10 years in 46 patients. Patients with <7 hours sleep were 39 and >7hours were 73.50 patients were doing physical exercise. The difference was significant (P< 0.05).

Graph I Assessment of parameters



Discussion

Hypertension in patients with diabetes is a well- recognized cardiovascular risk factor. Recently the 8th Report of the Joint National Committee on prevention, detection, evaluation and treatment of high blood pressure (JNC 8) concluded that BP measurement in diabetic patients should be 140/90 mmHg or less.[7] Hypertension is twice as common in persons with diabetes as it is in others. Hypertension is known to contribute to diabetic micro-and macro-vascular complications.[8] To reduce the risk, hypertension must be diagnosed accurately and promptly, and the patient must receive adequate treatment.[9] However, new guidelines have been published to stress on the importance of aggressive blood pressure control in diabetic.[10] The present study was conducted to assess hypertension and its determinants in patients with type 2 diabetes mellitus.

We found that out of 112 patients, males were 66 and females were 46. Semvua et al[11] found that the majority of study population were males, 161/295 (54.6%), and the median age was 57 years (IQR 50-64). The prevalence of hypertension was 206/295 (69.8%).

We found that out of of 112 patients, males were 66 and females were 46. We found that out of 112 type II DM patients, 42 had hypertension and 70 had not. The overall prevalence of hypertension among diabetic patients was found to be 37.5% This result was in line with studies conducted in Pakistan 40.45%,19 38% in Bahrain,20 Taiwan 39%21 and Jos, Nigeria 35%.In our study <60 years of age were in 63 and >60 years were in 49.47 patients had normal BMI,45 were overweight or obese. Muleta et al[12] observed that from a total of 131

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study participants 51.14% were males with the mean (SD) age of the 50.69 ± 13.71. The mean duration of time since the diagnosis of hypertension was 7.44 ± 5.11 years. The mean (SD) SBP was 149.79 ± 16.32 mmHg, while the mean (SD) DBP was 89.77 ± 9.34 mmHg. This study revealed that as age increases the incidence of hypertension increase. This result was in line with studies conducted in Jimma University Medical Center Ethiopia, Debre Tabor Ethiopia, Adama Ethiopia, Libya (Benghazi). This may be due to aging as generally various physiological functions decline with age. This study also revealed that respondents who were inactive in physical exercise were more likely to develop hypertension than those who were not doing physical exercise.This finding was consistent with those of previous studies, a case control study conducted in Tigray, Ethiopia18 and a cross-sectional study conducted in Libya.14 Physical exercise has been recommended by many professional committees and organizations such as the American College of Sports Medicine, American Heart Association, Canadian Hypertension Education Program, and the European Society of Hypertension/European Society of Cardiology, as a cornerstone of non-pharmacological therapy for hypertension. The findings of thisstudy are also supported by a cross-sectional study conducted at a hospital in Hosaena, Ethiopia

Alsaadon et al[13] determined the prevalence and factors associated with hypertension among people with type 2 diabetes mellitus (T2DM). The mean age of participants was 55.14 (± 12.51) years. Hypertension was found to be present among 67.2% of participants, Of these, 79 The mean duration of diabetes was 10.86 (± 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. our study showed that patients with higher BMI (≥25 kg/m2) have a higher risk of developing hypertension than ones with normal BMI. This finding agreed with the findings of previous studies conducted by Mengesha AY et all and Berraho M, et all. This is in line with cross-sectional studies conducted in Botswana [33], United Arab Emirates [34], Benghazi [35], Morocco [36], and Hossana, Ethiopia

Besides this, the current study also showed that family history of hypertension is also an independent predictor of hypertension among type 2 diabetes patients. The findings of this study are supported by the study conducted by Kotiso et al. It is believed that several genetic factors are responsible for the development of hypertension along with environmental factors. The limitation the study is small sample size.

Conclusion

Authors found that poor glycaemic control, age >60 years, high waist/ hip ration and duration of diabetes >10 years were risk factors of hypertension among patients with type 2 diabetes mellitus.

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