

# Determine the Frequency of Blood Pressure Control among Hypertensive Patients and its Relationship with Diabetes Mellitus

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## ABSTRACT

**Background:** Hypertension plays an important role in the development of secondary comorbidity in the patients. It is also noted that it also plays a role in the onset of diabetes among the patients.

**Objective:** To evaluate the blood pressure control among hypertensive patients and its relationship with diabetes mellitus.

**Study Design:** Cross-sectional study

**Place and Duration of Study:** Department of Medicine, Social Security Teaching Hospital, Ferozpur Road Lahore from 1<sup>st</sup> March 2021 to 31<sup>st</sup> August 2021.

**Methodology:** Two hundred and twenty seven patients with hypertension between 16-60 years of age of either gender were enrolled. Two readings of blood pressure of the patient was measured in supine position from brachial artery 20 minutes apart by the researcher himself and control of blood pressure was noted. Patients were assessed for having diabetes mellitus.

**Results:** The mean age was 38.19±8.93 years and 117 (51%) were males and 110 (49%) were females. Forty four (19.4%) cases were having good blood pressure control. Eighty (35%) cases were having the diabetes mellitus. There were 20 (25%) cases who have diabetes and blood pressure control while 24 (16.3%) cases did not have diabetes but have blood pressure control with non-significant difference.

**Conclusion:** Majority of patients had poor blood pressure control and there was a statistically non-significant relationship between diabetes mellitus and blood pressure control among hypertensive.

**Keywords:** Blood pressure, Diabetes mellitus, Hypertension, Smoking

## INTRODUCTION

Chronic hypertension is creating chaos for public health in coming years with its current burden representing only the tip of the iceberg.<sup>1</sup> It usually remains asymptomatic during the initial years but still causes severe harm to the body in the form of target organ damage, hence named as silent killer by WHO.<sup>2</sup> It is also estimated to be attributable for nearly 10% of all deaths with 57% deaths in stroke patients and 24% in patients of coronary artery disease.<sup>3</sup> Thus its rapid diagnosis and achieving a timely blood pressure control can significantly decrease the disease burden due to hypertension.<sup>4</sup>

Control of blood pressure is closely related to its early diagnosis and adherence to the prescribed treatment. But the studies conducted so far have shown that majority of the patients have poor control of blood pressure. The results of these studies have shown the frequency of blood pressure control ranging from 18%<sup>4</sup> to 51.5%.<sup>5</sup> Moreover, it is usually seen in co-existence with diabetes mellitus but its relationship regarding control of blood pressure is also controversial reported by different studies. Baynouna et al<sup>6</sup> reported no significant relationship of diabetes mellitus with control of blood pressure while Bulatova et al<sup>7</sup> reported a significant relationship with 36.9% of the diabetic patients with controlled blood pressure and 63.1% in uncontrolled group.

This purpose of the study is to evaluate the blood pressure control and its relationship with diabetes mellitus among hypertensive patients. The existing literature has shown inconsistency regarding the control of blood pressure in various studies conducted in different regions. Similar variations are observed regarding its relationship with diabetes mellitus.

## MATERIALS AND METHODS

This cross-sectional study was done at Medical Unit of Social Security Teaching Hospital, Ferozpur Road Lahore from 1<sup>st</sup> March 2021 to 31<sup>st</sup> August 2021 and 227 patients with hypertension between 16-60 years for age of either gender with confirmed cases of hypertension were enrolled. Patients having chronic kidney disease determined by history and an estimated glomerular filtration rate <60 mL/min/1.73 m<sup>2</sup> determined by MDRD equation, Cushing syndrome and pregnancy were excluded. Diagnosis of blood pressure (BP >140/90 mmHg) or taking any antihypertensive

medication for last one year determined on history and medical record was labelled as hypertensive. Blood pressure control was defined as systolic BP <135 mmHg and diastolic BP <90 mmHg on any of two different readings taken 20 minutes apart in supine position using same instrument was labelled as blood pressure control and diabetes mellitus was defined as fasting blood sugar level >126 mg/dl or taking anti-diabetic treatment was labelled as having diabetes mellitus. Two readings of blood pressure of the patient were measured in supine position from brachial artery 20 minutes apart by the researcher himself and control of blood pressure was noted. Patients were assessed for having diabetes mellitus. Data was entered and analyzed using SPSS-20. Chi-square test was applied to check statistical significance. P<0.05 was considered as significant.

## RESULTS

The mean age of the patients was 38.19±8.93 years. There were 117 (51%) males and 110 (48.5%) females. Forty four (19.4%) patients have blood pressure control and 180 (80.6%) did not have any blood pressure control. Eighty (35%) patients were having the diabetes mellitus and 147 (64%) were not having diabetes mellitus. Seventy one (31%) patients were smokers and 156 (68%) were non-smokers. Twenty 20 (25%) cases who have diabetes and blood pressure control while 24 (16.3%) did not have diabetes but have control of blood pressure with non-significant difference (Table 1).

Table 1: Socio-demographic and clinical profile of subjects (n=227)

Variable	No.	%
Age (years)		
< 30	47	82.4
> 30	180	17.6
Gender		
Male	117	51.5
Female	110	48.5
Control on Blood Pressure		
Yes	44	19.4
No	183	80.6
Diabetes Mellitus		
Yes	80	35.2
No	147	64.8
Smoking history		
Smoker	71	31.3
Non smoker	156	68.7

On stratification, age group of 16-30 years have 27(57%) have control of blood pressure while 17(9.4%) were having control on blood pressure in age group of >30 years. There was no significant difference noted among gender of patients who have control of blood pressure as frequency was 20 (17%) of males as compared to 24 (21%) were females who have control. For smoking status, there was significant difference for the control of blood pressure (Table2).

Table 2: Comparison of age, gender, smoking status and diabetes mellitus in patients with and without control on blood pressure control (n=227)

Variable	Control of blood pressure		P value
	Yes	No	
Age (years)			
16 – 30	27 (57.4%)	20 (42.6%)	0.000
> 30	17 (9.4%)	163 (90.6%)	
Gender			
Male	20 (17.1%)	97 (82.9%)	0.40
Female	24 (21.8%)	86 (78.2%)	
Status of smoking			
Smoker	28 (39.4%)	43 (60.6%)	0.000
Non-smoker	16 (10.3%)	140 (89.7%)	
Presence of diabetes mellitus			
Yes	20 (25%)	60 (75%)	0.11
No	24 (16.3%)	123 (83.7%)	

### DISCUSSION

Normal or optimal blood pressure (BP) is defined as the level above which minimal vascular damage occurs. There is a continuous, consistent, and independent relationship between elevated BP and risk of cardiovascular events. This was clearly demonstrated in a meta-analysis that included 1,000,000 individuals with no history of vascular disease. Among this group, during 12.7 million person-years at risk, there were about 56000 deaths categorized as vascular in origin (12000 stroke, 34000 ischemic heart disease, and 10000 "other vascular") and 66000 other deaths at ages 40-89 years.<sup>8</sup>

Diabetes and hypertension both paved a path for various metabolic syndromes including coronary heart disease, congestive heart failure, renal damage and number of other comorbidities, thus timely treatment for both the condition is essential. Different studies report different guidelines regarding blood pressure in diabetic patients.<sup>9-14</sup> Likewise, different drugs can be used for hypertension treatment in diabetic patients.<sup>15</sup> Incidence of hypertension in diabetic population is quite higher than to the normal population.<sup>16</sup> Most often, they reported together in obese individuals. Their chances are also greatly increased with the advancement of age and underlying health conditions.

Researchers have proved that, coexistence of hypertension and diabetes lead to heart failure, stroke and coronary heart disease.<sup>17-20</sup> Blood pressure management considerably control diabetes as well.<sup>21,22</sup> Low income countries or developing countries report the highest number of hypertensive patients.<sup>23</sup> These two factors are the primary cause of cardiovascular diseases in developing countries.<sup>24</sup> Sometimes genetic and environmental factors also play a key role in the progression and severity of the disease.<sup>25,26</sup>

### CONCLUSION

Majority of patients had poor blood pressure control and there was a statistically non significant relationship between diabetes mellitus and blood pressure control among hypertensives.

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