

## Original Research Article

# Effect of hypertension duration on relationship between blood pressure and signs and symptoms in hypertensive patients: a cross sectional survey

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## ABSTRACT

**Background:** Hypertension is defined as a systolic blood pressure of 140 mmHg or more, or a diastolic blood pressure of 90 mmHg or more or taking anti-hypertensive medication. The clinical presentation of high blood pressure may depend upon several factors such as age, gender, severity and duration of hypertension. There is a paucity of data exploring the role hypertension duration may play in shaping the relationship between blood pressure and signs and symptoms of hypertension. To evaluate the effect of hypertension duration on relationship between blood pressure and signs and symptoms in hypertensive patients.

**Methods:** A cross-sectional study was carried out among 250 patients, aged 18 or above, with self-reported history of hypertension and on anti-hypertensive medication. Data were collected by means of a structured questionnaire whereas the blood pressure level was measured with the help of sphygmomanometer using stethoscope. Inferential analysis was performed by applying chi-square test whereas the significance level was set at 0.05.

**Results:** The study results revealed that among patients with  $\geq 5$  years duration of hypertension headache history ( $P=0.021$ ), edema ( $P=0.034$ ), increased urinary frequency ( $P=0.031$ ), sleep apnoea ( $P=0.016$ ), palpitation ( $P=0.005$ ) and confusion ( $p=0.021$ ) were significantly associated with systolic whereas only increased urinary frequency ( $P=0.009$ ) was significantly associated with diastolic blood pressure. Moreover, among patients with  $< 5$  years duration of hypertension vision problems ( $P=0.03$ ), sleep apnoea ( $P=0.015$ ) and palpitation ( $P=0.035$ ) were significantly associated with systolic whereas sleep apnoea ( $P=0.048$ ) and palpitation ( $P=0.028$ ) were significantly associated with diastolic blood pressure.

**Conclusions:** The study results showed that patients with higher blood pressure were more likely to have the signs and symptoms of hypertension. Also, patients with longer duration of hypertension had greater number of signs and symptoms associated with systolic hypertension.

**Keywords:** Blood pressure, Cross-sectional survey, Hypertension duration, Hypertensive patients, Signs and symptoms

## INTRODUCTION

Hypertension is defined as a systolic blood pressure (SBP) of 140 mmHg or more, or a diastolic blood pressure (DBP) of 90 mm Hg or more or taking anti-hypertensive medication.<sup>1</sup> Global hypertension prevalence is currently 26% which is expected to rise to 29% by the year 2025.<sup>2</sup> World Health Organization reported that 25.2% of the Pakistani population suffered from raised blood pressure in 2014.<sup>3</sup> A systematic review in 2009 concluded that prevalence, awareness, treatment and control of hypertension in developing countries are coming closer to those in developed countries.<sup>4</sup> It is known to increase the risk of various medical conditions such as heart attack, stroke, kidney failure and blindness.<sup>5</sup> The high prevalence of hypertension and poor hypertension control are cited as significant determinants of the rising epidemic of cardiovascular diseases in developing countries.<sup>6</sup> A meta-analysis in 2002 reported blood pressure to be strongly related to vascular mortality down to at least 115/75 mmHg.<sup>7</sup>

There are two types of hypertension namely essential and secondary. Essential hypertension can be defined as a rise in blood pressure of unknown cause that increases risk for cerebral, cardiac, and renal events.<sup>8</sup> Secondary hypertension is defined as increased systemic blood pressure due to an identifiable cause. Only 5-10% of patients suffering from arterial hypertension have a secondary form, whereas the vast majority has essential hypertension.<sup>9</sup>

On the recommendations of the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure, blood pressure for adults aged 18 years or older has been classified into four categories as normal, prehypertension, stage 1 hypertension and stage 2 hypertension: Normal-systolic <120 mm Hg, diastolic <80 mm Hg; Prehypertension-systolic 120-139 mm Hg, diastolic 80-89 mm Hg, Stage 1 Hypertension-systolic 140-159 mm Hg, diastolic 90-99 mm Hg and Stage 2 Hypertension-systolic 160 mm Hg or greater, diastolic 100 mm Hg or greater.<sup>10</sup> The clinical presentation of high blood pressure may depend upon several factors such as age, gender, severity and duration of hypertension. A through literature search did not reveal any pertinent data exploring the role hypertension duration may play in shaping the relationship between blood pressure and signs and symptoms of hypertension. This study, therefore, was planned to evaluate the effect of hypertension duration on relationship between blood pressure and signs and symptoms in hypertensive patients.

## METHODS

A cross-sectional study was carried out among patients with self-reported history of hypertension and on anti-hypertensive medication. The duration of the study was 6

months, from July 2018 to December 2018. Patients were divided into two groups according to the duration of hypertension i.e. those with hypertension duration of 5 years or above and those with hypertension duration of less than 5 years.

Patients with history of diabetes, cardiac events, neurological disorders, cluster headache, gastrointestinal disease, visual problems, epistaxis before diagnosed with hypertension and morbid obesity were excluded from the study.

After taking informed consent, each participant's information was collected by means of a structured questionnaire designed specifically for the study whereas the blood pressure level was measured with the help of sphygmomanometer using stethoscope.

The data were entered, coded and analysed on SPSS version 20. Inferential analysis was performed by applying chi-square test whereas the significance level was set at 0.05.

## RESULTS

The total data collected were of 372 patients but after excluding missing data for various study variables the final data analysed were of 250 patients. The study results revealed that among patients with  $\geq 5$  years duration of hypertension headache history ( $P=0.021$ ), edema ( $P=0.034$ ), increased urinary frequency ( $P=0.031$ ), sleep apnea ( $P=0.016$ ), palpitation ( $p=0.005$ ) and confusion ( $P=0.021$ ) were significantly associated with systolic blood pressure where patients who had stage 1/stage 2 systolic hypertension were more likely to have these symptoms than those who were normotensive/pre hypertensive (77.0% vs. 53.3%, 75.4% vs 53.3%, 63.9% vs. 40.0%, 45.9% vs 20.0%, 50.8% vs 20.0% and 77.0% vs. 53.3% respectively) (Table 1).

The study results further revealed that among patients with  $\geq 5$  years duration of hypertension only increased urinary frequency ( $P=0.009$ ) was significantly associated with diastolic blood pressure where patients who had stage 1/stage 2 diastolic hypertension were more likely to have this symptom than those who were normotensive/pre hypertensive (69.6% vs 42.2%) (Table 2).

Moreover, the study results showed that among patients with <5 years duration of hypertension vision problems ( $P=0.03$ ), sleep apnoea ( $P=0.015$ ) and palpitation ( $P=0.035$ ) were significantly associated with systolic blood pressure where patients who had stage 1/stage 2 systolic hypertension were more likely to have these symptoms than those who were normotensive/pre hypertensive (57.3% vs. 39.3%, 32.0% vs. 14.3% and 39.8% vs. 23.2% respectively) (Table 3).

**Table 1: Relationship between systolic blood pressure and signs and symptoms of hypertension with  $\geq 5$ -year duration.**

Variables (n=91)		Systolic Blood Pressure		P
		Stage 1/Stage 2 Hypertensive	Normotensive/Pre-hypertensive	
		Frequency (%)	Frequency (%)	
Headache history	Yes	47 (77.0)	16 (53.3)	0.021
	No	14 (23.0)	14 (46.7)	
Vertigo	Yes	46 (75.4)	16 (53.3)	0.034
	No	15 (24.6)	14 (46.7)	
Edema	Yes	33 (54.1)	11 (36.7)	0.118
	No	28 (45.9)	19 (63.3)	
Chest pain	Yes	38 (62.3)	13 (43.3)	0.087
	No	23 (37.7)	17 (56.7)	
Vision problems	Yes	36 (59.0)	16 (53.3)	0.607
	No	25 (41.0)	14 (46.7)	
Dyspnoea	Yes	37 (60.7)	15 (50.0)	0.334
	No	24 (39.3)	15 (50.0)	
Epistaxis	Yes	2 (3.3)	Nil	>0.999*
	No	59 (96.7)	30 (100)	
Increased urinary frequency	Yes	39 (63.9)	12 (40.0)	0.031
	No	22 (36.1)	18 (60.0)	
Nausea	Yes	18 (29.5)	6 (20.0)	0.333
	No	43 (70.5)	24 (80.0)	
Sleep apnea	Yes	28 (45.9)	6 (20.0)	0.016
	No	33 (54.1)	24 (80.0)	
Palpitation	Yes	31 (50.8)	6 (20.0)	0.005
	No	30 (49.2)	24 (80.0)	
Fatigue	Yes	49 (80.3)	20 (66.7)	0.152
	No	12 (19.7)	10 (33.3)	
Confusion	Yes	47 (77.0)	16 (53.3)	0.021
	No	14 (23.0)	14 (46.7)	

**Table 2: Relationship between diastolic blood pressure and signs and symptoms of hypertension with  $\geq 5$  year duration.**

Variables (n=91)		Diastolic Blood Pressure		P
		Stage 1/Stage 2 hypertensive	Normotensive/Pre-hypertensive	
		Frequency (%)	Frequency (%)	
Headache history	Yes	35 (76.1)	28 (62.2)	0.152
	No	11 (23.9)	17 (37.8)	
Vertigo	Yes	33 (71.7)	29 (64.4)	0.455
	No	13 (28.3)	16 (35.6)	
Edema	Yes	22 (47.8)	22 (48.9)	0.919
	No	24 (52.2)	23 (51.1)	
Chest Pain	Yes	29 (63.0)	22 (48.9)	0.174
	No	17 (37.0)	23 (51.1)	
Vision problems	Yes	28 (60.9)	24 (53.3)	0.468
	No	18 (39.1)	21 (46.7)	
Dyspnoea	Yes	29 (63.0)	23 (51.1)	0.25
	No	17 (37.0)	22 (48.9)	
Epistaxis	Yes	1 (2.2)	1 (2.2)	>0.999*
	No	45 (97.8)	44 (97.8)	
Increased urinary frequency	Yes	32 (69.6)	19 (42.2)	0.009
	No	14 (30.4)	26 (57.8)	

Variables (n=91)		Stage 1/Stage 2 hypertensive		Normotensive/Pre-hypertensive	P
		Frequency (%)		Frequency (%)	
Nausea	Yes	14 (30.4)		10 (22.2)	0.374
	No	32 (69.6)		35 (77.8)	
Sleep apnoea	Yes	19 (41.3)		15 (33.3)	0.432
	No	27 (58.7)		30 (66.7)	
Palpitation	Yes	23 (50.0)		14 (31.1)	0.067
	No	23 (50.0)		31 (68.9)	
Fatigue	Yes	35 (76.1)		34 (75.6)	0.953
	No	11 (23.9)		11 (24.4)	
Confusion	Yes	36 (78.3)		27 (60.0)	0.059
	No	10 (21.7)		18 (40.0)	

\*Fisher's Exact Test.

**Table 3: Relationship between systolic blood pressure and signs and symptoms of hypertension with <5 year duration.**

Variables (n=159)		Systolic blood pressure		p
		Stage 1/Stage 2 Hypertensive	Normotensive/Pre hypertensive	
		Frequency (%)	Frequency (%)	
Headache history	Yes	81(78.6)	42(75.0)	0.6
	No	22(21.4)	14(25.0)	
Vertigo	Yes	55(53.4)	26(46.4)	0.401
	No	48(46.6)	30(53.6)	
Edema	Yes	28(38.9)	35(40.2)	0.863
	No	44(61.1)	52(59.8)	
Chest pain	Yes	39(37.9)	21(37.5)	0.964
	No	64(62.1)	35(62.5)	
Vision problems	Yes	59(57.3)	22(39.3)	0.03
	No	44(42.7)	34(60.7)	
Dyspnoea	Yes	55(53.4)	26(46.4)	0.401
	No	48(46.6)	30(53.6)	
Epistaxis	Yes	5(4.9)	1(1.8)	0.666*
	No	98(95.1)	55(98.2)	
Increased urinary frequency	Yes	38(36.9)	19(33.9)	0.71
	No	65(63.1)	37(66.1)	
Nausea	Yes	28(27.2)	10(17.9)	0.188
	No	75(72.8)	46(82.1)	
Sleep apnea	Yes	33(32.0)	8(14.3)	0.015
	No	70(68.0)	48(85.7)	
Palpitation	Yes	41(39.8)	13(23.2)	0.035
	No	62(60.2)	43(76.8)	
Fatigue	Yes	72(69.9)	37(66.1)	0.619
	No	31(30.1)	19(33.9)	
Confusion	Yes	64(62.1)	29(51.8)	0.206
	No	39(37.9)	27(48.2)	

\*Fisher's Exact Test.

The study results further showed that among patients with <5 years duration of hypertension sleep apnea (P=0.048) and palpitation (P=0.028) were significantly associated with diastolic blood pressure where patients who had

stage 1/stage 2 diastolic hypertension were more likely to have these symptoms than those who were normotensive/pre hypertensive (33.3% vs. 19.5% and 43.1% vs. 26.4% respectively) (Table 4).

**Table 4: Relationship between diastolic blood pressure and signs and symptoms of hypertension with <5 year duration.**

Variables (n=159)		Diastolic blood pressure		P
		Stage 1/Stage 2 Hypertensive	Normotensive/Pre-hypertensive	
		Frequency (%)	Frequency (%)	
Headache history	Yes	55 (76.4)	68 (78.2)	0.79
	No	17 (23.6)	19 (21.8)	
Vertigo	Yes	36 (50.0)	45 (51.7)	0.829
	No	36 (50.0)	42 (48.3)	
Edema	Yes	28 (38.9)	35 (40.2)	0.863
	No	44 (61.1)	52 (59.8)	
Chest pain	Yes	23 (31.9)	37 (42.5)	0.171
	No	49 (68.1)	50 (57.5)	
Vision problems	Yes	42 (58.3)	39 (44.8)	0.09
	No	30 (41.7)	48 (55.2)	
Dyspnoea	Yes	38 (52.8)	43 (49.4)	0.674
	No	34 (47.2)	44 (50.6)	
Epistaxis	Yes	4 (5.6)	2 (2.3)	0.411*
	No	68 (94.4)	85 (97.7)	
Increased urinary frequency	Yes	26 (36.1)	31 (35.6)	0.95
	No	46 (63.9)	56 (64.4)	
Nausea	Yes	20 (27.8)	18 (20.7)	0.297
	No	52 (72.2)	69 (79.3)	
Sleep apnoea	Yes	24 (33.3)	17 (19.5)	0.048
	No	48 (66.7)	70 (80.5)	
Palpitation	Yes	31 (43.1)	23 (26.4)	0.028
	No	41 (56.9)	64 (73.6)	
Fatigue	Yes	52 (72.2)	57 (65.5)	0.365
	No	20 (27.8)	30 (34.5)	
Confusion	Yes	41 (56.9)	52 (59.8)	0.719
	No	31 (43.1)	35 (40.2)	

\*Fisher's Exact Test.

## DISCUSSION

The study results revealed that among patients with  $\geq 5$  years duration of hypertension headache history, edema, increased urinary frequency, sleep apnea, palpitation and confusion were significantly associated with systolic blood pressure whereas only increased urinary frequency was significantly associated with diastolic blood pressure where patients who had stage 1/stage 2 hypertension were more likely to have these symptoms than those who were normotensive/pre hypertensive.

The study results further revealed that among patients with <5 years duration of hypertension vision problems, sleep apnea and palpitation were significantly associated with systolic blood pressure whereas sleep apnea and palpitation were significantly associated with diastolic blood pressure where patients who had stage 1/stage 2 hypertension were more likely to have these symptoms than those who were normotensive/pre-hypertensive. Duration of hypertension is known to exert a negative influence on several hypertension related manifestations.

It has been reported to be an independent predictor of anxiety symptoms in hypertensive patients.<sup>11</sup> It has been found to negatively influence the survival in hypertensive patients.<sup>12</sup> It has also been shown to be a predictor in surgical cure of reno-vascular hypertension.<sup>13</sup> It has further been reported that both short term and long-term durations of elevated blood pressure are probably crucial in the pathogenesis concerning carotid arteries.<sup>14</sup> Furthermore, literature reports it to negatively affect the long-term beneficial effects of percutaneous transluminal renal angioplasty and surgery in cases of renal artery stenosis as well.<sup>15</sup>

Apart from the above mentioned consequences, international literature evaluating the role of duration of hypertension in affecting the relationship between blood pressure levels and the clinical manifestations of hypertension is limited at best, and a thorough literature search by the author did not show any local study conducted so far in the given contest. As it is known that blood pressure control while on anti-hypertensive medication can vary considerably, it is not unreasonable



to suspect that such uncontrolled blood pressure level can continue to cause vascular damage as the illness progresses and may result in an increase in the severity and count of clinical manifestations in any given hypertensive patient.<sup>16</sup>

Interestingly, the study results showed confusion to be significantly associated with systolic hypertension, but not with diastolic hypertension, only in patients with hypertension duration of 5 years or longer. On the contrary, the duration of hypertension had not been shown earlier to affect the impairment of cognitive functions in hypertensive patients.<sup>17</sup> This difference in the findings can be attributed to different methodological approach, sample size and population characteristics of both the studies.

Moreover, apart from palpitation for which relevant literature was not available for contrast, the only other symptom associated with systolic blood pressure irrespective of hypertension duration was sleep apnea, a finding well in line with published literature.<sup>18-24</sup> On the other hand, none of the symptoms studied was found to be significantly associated with diastolic blood pressure both in patients with  $\geq 5$  years and in patients with  $< 5$  years duration of hypertension.

Unfortunately, with regard to the rest of the study findings, a meaningful comparison, as intended, could not be made due to a dearth of pertinent published literature. Nevertheless, the association of a greater number of hypertension signs and symptoms with systolic hypertension in patients with longer duration of hypertension as found in the study is intriguing enough and warrants further exploration as an absence of evidence can never be taken as an absence of association.

Having a moderate sample size and using convenient sampling technique because of financial and time constraints were the prime limitations of the study. Moreover, it is also acknowledged that the study results may have suffered from limitation of recall, an inherent weakness of a cross-sectional study design.

## CONCLUSION

Patients with higher blood pressure were more likely to have the signs and symptoms of hypertension. Also, patients with longer duration of hypertension had greater number of signs and symptoms associated with systolic hypertension.

## Recommendations

In light of the study findings, it is recommended that the role of hypertension duration in the context of clinical presentation of hypertension should be evaluated further as it might have significant implications for management of hypertension by aiding in identifying the high-risk target groups.

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