

An Observational Study on Association of Clinical Features Of Hypertension with Duration of Hypertension

Ayesha Syed Iftikhar¹, Sadaf Sachwani², Aqsa Syed Iftikhar³, Amna Arshad⁴, Hafiza Uroosa⁵,

Ayesha Anum⁶ and Adnan Anwar^{7*}

¹MBBS, Baqai Medical University

²MBBS, Sir Syed Medical College

³Medical student, Liaqat national Medical College

⁴MBBS, Hamdard College of Medicine and Dentistry

⁵Pharm D, Senior Officer, Regulatory Affairs

⁶MBBS, House Officer, Jinnah Post Graduate Medical Center

⁷MBBS, M.Phil Assistant Professor, Altibri Medical College

Received: July 07, 2019; Accepted: August 09, 2019; Published: August 21, 2019

*Corresponding author: Dr. Adnan Anwar, MBBS, M.Phil, Assistant Professor Department of Physiology Al Tibri Medical College Karachi, Email: anwaradnan32@gmail.com

Abstract

Objective: To evaluate the effects of duration of hypertension on relationship between hypertension and its clinical signs and symptoms in hypertensive patients.

Methods: A cross-sectional study was carried out in the outpatient department of a secondary care hospital of Karachi. A total of 304 patients were included in the study by employing convenient sampling technique. All data were collected by using a structured questionnaire designed specifically for the study whereas the blood pressure level was measured by a sphygmomanometer and stethoscope. Statistical package for social sciences version 20 was used for data analysis. Chi-square test was applied for inferential analysis whereas the duration of study was 6 months.

Results: The study results showed that among patients with hypertension duration of up to 3 years smoking history ($p=0.009$), vision problems ($p=0.018$), sleep apnea ($p=0.018$) and palpitation ($p=0.011$) were significantly associated with systolic hypertension whereas only vision problems ($p=0.034$) and palpitation ($p=0.005$) were significantly associated with diastolic hypertension. The study results further showed that among patients with hypertension duration of 4 years or more vertigo ($p=0.014$), increased urinary frequency ($p=0.013$), sleep apnea ($p=0.006$), palpitation ($p=0.002$) and confusion ($p=0.038$) were significantly associated with systolic hypertension whereas only increased urinary frequency ($p=0.033$) was significantly associated with diastolic hypertension.

Conclusion: Based on study results it can be concluded that the symptomatology of hypertensive patients differed with the duration of their disease, albeit slightly. Further evaluation of study findings with more rigorous research designs is recommended for generation of more credible evidence with broader generalizability.

Keywords: Hypertension; Signs and Symptoms; Cross-sectional analysis.

Introduction

Hypertension has been defined as a systolic blood pressure (SBP) of 140 mm Hg or more, or a diastolic blood pressure (DBP) of 90 mm Hg or more, or taking antihypertensive medication [1]. As per the recommendations of the seventh report of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure (JNC 7), blood pressure for adults aged 18 years or older has been classified into four categories as normal, pre hypertension, 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) [2].

The types of hypertension have been defined to be two, essential and secondary. Essential hypertension is a rise in blood pressure of unknown cause that increases risk for cerebral, cardiac, and renal events [3]. Secondary hypertension is an increased systemic blood pressure due to an identifiable cause [4].

It was recently reported that in 2010, 31.1% of the world's adults had hypertension; 28.5% in high-income countries and 31.5% in low and middle-income countries [5]. In 2010, the East Asia and Pacific region had the highest burden of hypertension in the world, with 439 million people suffering from it [6]. It has also been reported recently that from 1990 to 2015, the rate of systolic blood pressure of at least 110 to 115 mm Hg increased from 73 119 to 81 373 per 100 000, and systolic blood pressure of 140 mm Hg or higher increased from 17 307 to 20 526 per 100 000; the annual death rate per 100 000 associated with

systolic blood pressure of at least 110 to 115 mm Hg increased from 135.6 to 145.2 while that for systolic blood pressure of 140 mm Hg or higher increased from 97.9 to 106.3; the loss of disability adjusted life years associated with systolic blood pressure of 140 mm Hg or higher increased from 95.9 million to 143.0 million, and that for systolic blood pressure of 140 mm Hg or higher increased from 5.2 million to 7.8 million[7]. Worldwide, 7.6 million premature deaths and 92 million disability adjusted life years are attributed to high blood pressure while over 80% of the attributable burden of this disease is seen in low-income and middle-income countries of the world [8]. Its high prevalence and poor control are significantly implicated in the increasing epidemic of cardiovascular diseases in developing countries [9].

The global prevalence of hypertension is not uniform however, and this heterogeneity has been linked to various factors, including urbanization with its associated lifestyle changes, racial and ethnic differences, and nutritional status and birth weight of an individual [10]. Locally in Pakistan, the available prevalence estimates about hypertension are scarce at best. A meta-analysis published in 2014 reported the pooled prevalence of hypertension to be 17% (95% CI 13.08% to 20.92%) in Pakistan based on data gathered prior to 2014 in Pakistan [11]. The World Health Organization however recently estimated that 25.2% of the Pakistani population suffered from raised blood pressure in 2014[12].

Several factors may potentially influence the clinical presentation of hypertension in hypertensive patients like their age, gender, severity and duration of their disease. A through literature search by the authors did not reveal any relevant literature exploring the influence of hypertension duration on relationship between hypertension and its signs and symptoms. This study was therefore intended to evaluate the effects of duration of hypertension on relationship between hypertension and its clinical signs and symptoms in hypertensive patients.

Materials and Methods

A cross-sectional study was carried out in the outpatient

department of a secondary care hospital of Karachi after taking necessary ethical approval. Patients aged 18 or above, with self-reported history of hypertension and taking anti-hypertensive medication were included in the study. Patients with history of diabetes, cardiac events, neurological disorders, cluster headache, gastrointestinal disease, visual problems, and morbid obesity were excluded from the study. After checking eligibility, patients were included in the study using convenient sampling technique.

All necessary data were collected from the participants after taking verbal informed consent by using a structured questionnaire designed specifically for the study. Their blood pressure levels were measured by a sphygmomanometer and stethoscope. The data were cleaned, entered and analyzed on SPSS version 20. The inferential analysis was performed using chi-square test whereas the significance level was kept at 0.05. The study duration spanned over 6 months.

Results

Data of total 304 patients were analyzed for the study. 51.6% of the patients were male whereas 70.7% of them aged 41 years or above.

The study results showed that among patients with hypertension duration of up to 3 years smoking history (p=0.009), vision problems (p=0.018), sleep apnea (p=0.018) and palpitation (p=0.011) were significantly associated with systolic hypertension where patients with a positive history of smoking, complain of vision problems, sleep apnea and palpitation were more likely to have stage 1/stage 2 systolic hypertension than those who did not (100% vs. 61.4%, 73.7% vs. 55.3%, 79.1% vs. 58.7% and 77.8% vs. 57.1% respectively) (table 1A). Moreover, only vision problems (p=0.034) and palpitation (p=0.005) were significantly associated with diastolic hypertension where patients with complain of vision problems and palpitation were more likely to have stage 1/stage 2 diastolic hypertension than those who did not (52.6% vs. 35.5% and 59.3% vs. 35.7% respectively) (Table 1B).

Table 1A: Participant Profile and Systolic Hypertension (Hypertension Duration up to 3 Years)

Variables (n=152)		Systolic Blood Pressure		
		Normotensive/Pre Hypertensive n (%)	Stage 1/Stage 2 Hypertensive n (%)	p
Smoking History	Yes	Nil	12(100)	0.009*
	No	54(38.6)	86(61.4)	
Headache History	Yes	38(32.8)	78(67.2)	0.201
	No	16(44.4)	20(55.6)	
Vertigo	Yes	24(33.8)	47(66.2)	0.678
	No	30(37.0)	51(63.0)	
Edema	Yes	20(32.8)	41(67.2)	0.563
	No	34(37.4)	57(62.6)	
Chest Pain	Yes	20(34.5)	38(65.5)	0.833
	No	34(36.2)	60(63.8)	

Vision Problems	Yes	20(26.3)	56(73.7)	0.018
	No	34(44.7)	42(55.3)	
Dyspnea	Yes	25(32.1)	53(67.9)	0.358
	No	29(39.2)	45(60.8)	
Epistaxis	Yes	1(16.7)	5(83.3)	0.423*
	No	53(36.3)	93(63.7)	
Increased Urinary Frequency	Yes	18(36.7)	31(63.3)	0.83
	No	36(35.0)	67(65.0)	
Nausea	Yes	10(27.0)	27(73.0)	0.214
	No	44(38.3)	71(61.7)	
Sleep Apnea	Yes	9(20.9)	34(79.1)	0.018
	No	45(41.3)	64(58.7)	
Palpitation	Yes	12(22.2)	42(77.8)	0.011
	No	42(42.9)	56(57.1)	
Fatigue	Yes	35(33.7)	69(66.3)	0.478
	No	19(39.6)	29(60.4)	
Confusion	Yes	28(31.1)	62(68.9)	0.171
	No	26(41.9)	36(58.1)	

*Fisher's Exact Test

Table 1B: Participant Profile and Diastolic Hypertension (Hypertension Duration up to 3 Years)

Variables (n=152)		Diastolic Blood Pressure		p
		Normotensive/Pre Hypertensive n (%)	Stage 1/Stage 2 Hypertensive n (%)	
Smoking History	Yes	5(41.7)	7(58.3)	0.3
	No	80(57.1)	60(42.9)	
Headache History	Yes	66(56.9)	50(43.1)	0.664
	No	19(52.8)	17(47.2)	
Vertigo	Yes	42(59.2)	29(40.8)	0.452
	No	43(53.1)	38(46.9)	
Edema	Yes	35(57.4)	26(42.6)	0.767
	No	50(54.9)	41(45.1)	
Chest Pain	Yes	36(62.1)	22(37.9)	0.23
	No	49(52.1)	45(47.9)	
Vision Problems	Yes	36(47.4)	40(52.6)	0.034
	No	49(64.5)	27(35.5)	
Dyspnea	Yes	42(53.8)	36(46.2)	0.597
	No	43(58.1)	31(41.9)	
Epistaxis	Yes	2(33.3)	4(66.7)	0.406*
	No	83(56.8)	63(43.2)	
Increased Urinary Frequency	Yes	28(57.1)	21(42.9)	0.834
	No	57(55.3)	46(44.7)	

Nausea	Yes	18(48.6)	19(51.4)	0.306
	No	67(58.3)	48(41.7)	
Sleep Apnea	Yes	19(44.2)	24(55.8)	0.067
	No	66(60.6)	43(39.4)	
Palpitation	Yes	22(40.7)	32(59.3)	0.005
	No	63(64.3)	35(35.7)	
Fatigue	Yes	57(54.8)	47(45.2)	0.684
	No	28(58.3)	20(41.7)	
Confusion	Yes	51(56.7)	39(43.3)	0.823
	No	34(54.8)	28(45.2)	

*Fisher's Exact Test

The study results further showed that among patients with hypertension duration of 4 years or more vertigo ($p=0.014$), increased urinary frequency ($p=0.013$), sleep apnea ($p=0.006$), palpitation ($p=0.002$) and confusion ($p=0.038$) were significantly associated with systolic hypertension where patients with complain of vertigo, increased urinary frequency, sleep apnea, palpitation, and confusion were more likely to have stage 1/stage 2 systolic hypertension than those who did not (76.5% vs. 57.4%,

78.9% vs. 60.5%, 82.8% vs. 61.7%, 83.6% vs. 60.4% and 75.0% vs. 58.3% respectively) (Table 2A). Moreover, only increased urinary frequency ($p=0.033$) was significantly associated with diastolic hypertension where patients with complain of increased urinary frequency were more likely to have stage 1/stage 2 diastolic hypertension than those who did not (65.8% vs. 48.7%) (Table 2B).

Table 2A: Participant Profile and Systolic Hypertension (Hypertension Duration 4 Years or more)

Variables (n=152)		Systolic Blood Pressure		
		Normotensive/Pre Hypertensive n (%)	Stage 1/Stage 2 Hypertensive n (%)	p
Smoking History	Yes	2(11.1)	16(88.9)	0.06
	No	44(32.8)	90(67.2)	
Headache History	Yes	28(26.4)	78(73.6)	0.117
	No	18(39.1)	28(60.9)	
Vertigo	Yes	23(23.5)	75(76.5)	0.014
	No	23(42.6)	31(57.4)	
Edema	Yes	20(30.3)	46(69.7)	0.993
	No	26(30.2)	60(69.8)	
Chest Pain	Yes	18(23.7)	58(76.3)	0.077
	No	28(36.8)	48(63.2)	
Vision Problems	Yes	25(29.1)	61(70.9)	0.715
	No	21(31.8)	45(68.2)	
Dyspnea	Yes	21(25.3)	62(74.7)	0.144
	No	25(36.2)	44(63.8)	
Epistaxis	Yes	Nil	3(100)	0.554
	No	46(30.9)	103(69.1)	
Increased Urinary Frequency	Yes	16(21.1)	60(78.9)	0.013
	No	30(39.5)	46(60.5)	
Nausea	Yes	8(22.2)	28(77.8)	0.229
	No	38(32.8)	78(67.2)	

Sleep Apnea	Yes	10(17.2)	48(82.8)	0.006
	No	36(38.3)	58(61.7)	
Palpitation	Yes	10(16.4)	51(83.6)	0.002
	No	36(39.6)	55(60.4)	
Fatigue	Yes	33(28.2)	84(71.8)	0.313
	No	13(37.1)	22(62.9)	
Confusion	Yes	26(25.0)	78(75.0)	0.038
	No	20(41.7)	28(58.3)	

*Fisher's Exact Test

Table 2B: Participant Profile and Diastolic Hypertension (Hypertension Duration 4 Years or more)

Variables (n=152)		Diastolic Blood Pressure		p
		Normotensive/Pre Hypertensive n (%)	Stage 1/Stage 2 Hypertensive n (%)	
Smoking History	Yes	6(33.3)	12(66.7)	0.389
	No	59(44.0)	75(56.0)	
Headache History	Yes	41(38.7)	65(61.3)	0.122
	No	24(52.2)	22(47.8)	
Vertigo	Yes	41(41.8)	57(58.2)	0.756
	No	24(44.4)	30(55.6)	
Edema	Yes	31(47.0)	35(53.0)	0.358
	No	34(39.5)	52(60.5)	
Chest Pain	Yes	30(39.5)	46(60.5)	0.412
	No	35(46.1)	41(53.9)	
Vision Problems	Yes	36(41.9)	50(58.1)	0.797
	No	29(43.9)	37(56.1)	
Dyspnea	Yes	32(38.6)	51(61.4)	0.25
	No	33(47.8)	36(52.2)	
Epistaxis	Yes	1(33.3)	2(66.7)	>0.999*
	No	64(43.0)	85(57.0)	
Increased Urinary Frequency	Yes	26(34.2)	50(65.8)	0.033
	No	39(51.3)	37(48.7)	
Nausea	Yes	13(36.1)	23(63.9)	0.356
	No	52(44.8)	64(55.2)	
Sleep Apnea	Yes	20(34.5)	38(65.5)	0.105
	No	45(47.9)	49(52.1)	
Palpitation	Yes	21(34.4)	40(65.6)	0.089
	No	44(48.4)	47(51.6)	
Fatigue	Yes	48(41.0)	69(59.0)	0.429
	No	17(48.6)	18(51.4)	
Confusion	Yes	41(39.4)	63(60.6)	0.221
	No	24(50.0)	24(50.0)	

*Fisher's Exact Test

Discussion

This study was an attempt to evaluate the effect of duration of hypertension on symptomatology of hypertensive patients in a Pakistani population. A cross-sectional survey was performed among known hypertensive outpatient department patients in this context. The study results showed that among patients with hypertension duration of up to 3 years smoking history, vision problems, sleep apnea and palpitation were significantly associated with systolic hypertension whereas only vision problems and palpitation were significantly associated with diastolic hypertension. The study results further showed that among patients with hypertension duration of 4 years or more vertigo, increased urinary frequency, sleep apnea, palpitation and confusion were significantly associated with systolic hypertension whereas only increased urinary frequency was significantly associated with diastolic hypertension.

Duration of hypertension is known to negatively influence various hypertension related outcomes. It has been found to be an independent predictor of anxiety symptoms in hypertensive patients [13]. Moreover, it has been found to negatively affect the survival in such patients [14]. It has also been reported to be a predictor in surgical cure of Reno-vascular hypertension [15]. Both short and long term durations of elevated blood pressure have also been found to be possibly crucial in the pathogenesis related to carotid arteries [16]. Literature also relates long-standing hypertension with presence of white matter lesions and suggests that adequate treatment of hypertension may prevent white matter lesions and the associated cognitive decline in hypertensive patients [17].

Agrawal *Betal.*, in 1996 reported qualitative microalbuminuria to be significantly associated with duration of hypertension in hypertensive patients [18]. Also, Carlsson *AC et al.*, in 2013 reported that participants with greater duration of hypertension had higher circulating endostatin, a biologically active derivate of collagen XVIII and a relevant marker for extracellular matrix turnover and remodeling, that significantly associated with higher left ventricular mass, worsened endothelial function, and higher urinary albumin/creatinine ratio [19].

As published literature confirms that blood pressure control while on anti-hypertensive medications can vary considerably among hypertensive patients, from 5.4% to 58% [20]; it is plausible that such uncontrolled hypertension, by virtue of continued vascular damage, may increase the number and severity of clinical manifestations in a hypertensive patient with poor blood pressure control. Unfortunately, with regard to the study findings about differences in symptomatology of hypertensive patients with regard to duration of their disease, a direct and meaningful comparison could not be made as even an exhaustive literature search did not reveal any relevant published data. In any case, such observed differences are worth exploring further as they may help in defining a risk profile of hypertensive patients based on the duration of their disease which could prove useful in their targeted management.

Limitations

Use of convenient sampling technique due to resource constraint and potential limitation in recall because of a cross-sectional design are acknowledged as the main limitations of this study.

Conclusion and Recommendation

Based on study results it can be concluded that the symptomatology of hypertensive patients differed with the duration of their disease, albeit slightly. Further evaluation of study findings with more rigorous research designs is recommended for generation of more credible evidence with broader generalizability.

Conflict of Interests

The authors report no conflict of interests.

References

1. Roger VL, Go AS, Lloyd-Jones DM, Benjamin EJ, Berry JD, Borden WB. Heart disease and stroke statistics--2012 update: a report from the American Heart Association. *Circulation*. 2012; 125(1):2-220. doi: 10.1161/CIR.0b013e31823ac046
2. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo Jr JL. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report. *JAMA*. 2003; 289(19):2560-2572. doi: 10.1001/jama.289.19.2560
3. Messerli FH, Williams B, Ritz E. Essential hypertension. *Lancet*. 2007; 370(9587):591-603. doi: 10.1016/S0140-6736(07)61299-9
4. Mancia G, Fagard R, Narkiewicz K, Redon J, Zanchetti A, Böhm M. 2013 ESH/ESC guidelines for the management of arterial hypertension: the Task Force for the Management of Arterial Hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC). *Blood pressure*. 2013; 22(4):193-278. doi:10.1093/eurheartj/eh1151
5. Mills KT, Bundy JD, Kelly TN, Reed JE, Kearney PM, Reynolds K. Global Disparities of Hypertension Prevalence and Control: A Systematic Analysis of Population-based Studies from 90 Countries. *Circulation*. 2016; 134(6): 441-50. Doi: 10.1161/CIRCULATIONAHA.115.018912
6. Reynolds K, Chen J, He J. Global Disparities of Hypertension Prevalence and Control A Systematic Analysis of Population-based Studies from 90 Countries. *Circulation*. 2016; 2016(134):441-50. doi: 10.1161/CIRCULATIONAHA.115.018912
7. Forouzanfar MH, Liu P, Roth GA, Ng M, Biryukov S, Marczak L. Global Burden of Hypertension and Systolic Blood Pressure of at Least 110 to 115 mm Hg, 1990-2015. *JAMA*. 2017; 317(2):165-182 doi: 10.1001/jama.2016.19043
8. Lawes CM, Vander Hoorn S, Rodgers A. Global burden of blood-pressure-related disease, 2001. *Lancet*. 2008; 371:1513-1518. doi: 10.1016/S0140-6736(08)60655-8
9. Ibrahim MM, Damasceno A. Hypertension in developing countries. *Lancet*. 2012; 380(9841):611-619. doi: 10.1016/S0140-6736(12)60861-7
10. Mittal BV, Singh AK. Hypertension in the developing world: challenges and opportunities. *American journal of kidney diseases: the official journal of the National Kidney Foundation*. 2010; 55(3):590-598. doi: 10.1053/j.ajkd.2009.06.044

11. Neupane D, McLachlan CS, Sharma R, Gyawali B, Khanal V, Mishra SR. Prevalence of hypertension in member countries of South Asian Association for Regional Cooperation (SAARC): systematic review and meta-analysis. *Medicine*. 2014; 93(13):74. doi: 10.1097/MD.0000000000000074.
12. No communicable Diseases Country Profile 2014. World Health Organization. 2014;
13. Wei TM, Wang L. Anxiety symptoms in patients with hypertension: a community-based study. *The International Journal of Psychiatry in Medicine*. 2006; 36(3):315-22. doi: 10.2190/5LX9-D3BH-FUA3-PQF0
14. D'Alonzo GE, Barst RJ, Ayres SM, Bergofsky EH, Brundage BH, Detre KM. Survival in patients with primary pulmonary hypertension. Results from a national prospective registry. *Annals of internal medicine*. 1991; 115(5):343-349. doi: 10.7326/0003-4819-115-5-343
15. Hughes JS, Dove HG, Gifford Jr RW, Feinstein AR. Duration of blood pressure elevation in accurately predicting surgical cure of renovascular hypertension. *American heart journal*. 1981; 101(4):408-413. doi: 10.1016/0002-8703(81)90129-0
16. Su TC, Lee YT, Chou S, Hwang WT, Chen CF, Wang JD. Twenty-four-hour ambulatory blood pressure and duration of hypertension as major determinants for intima-media thickness and atherosclerosis of carotid arteries. *Atherosclerosis*. 2006; 184(1):151-156. doi: 10.1016/j.atherosclerosis.2005.03.041
17. de Leeuw FE, de Groot JC, Oudkerk M, Witteman JC, Hofman A, van Gijn J. Hypertension and cerebral white matter lesions in a prospective cohort study. *Brain*. 2002; 125(4):765-772. doi: 10.1093/brain/awf077
18. Agrawal B, Berger A, Wolf K, Luft FC. Microalbuminuria screening by reagent strip predicts cardiovascular risk in hypertension. *Journal of hypertension*. 1996; 14(2):223-228.
19. Carlsson AC, Ruge T, Sundström J, Ingelsson E, Larsson A, Lind L. Association between circulating endostatin, hypertension duration, and hypertensive target-organ damage. *Hypertension*. 2013; 62(6):1146-1151. doi: 10.1161/HYPERTENSIONAHA.113.02250
20. Kearney PM, Whelton M, Reynolds K, Whelton PK, He J. Worldwide prevalence of hypertension: a systematic review. *Journal of hypertension*. 2004; 22(1):11-19.