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ORIGINAL ARTICLE

Effect of Age on Relationship between Hypertension and its Clinical Manifestations

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ABSTRACT

Aim: To evaluate the effect of age on the relationship between hypertension and its clinical signs and symptoms.
Methods: The present cross-sectional study was conducted in the outpatient department of Shahida Islam Medical Complex hospital, Lodhran. A total of 304 patients with history of hypertension and taking anti-hypertensive medication were included in the study. Each patient's demographic profile and hypertension related clinical signs and symptoms were recorded through interview, using a structured questionnaire whereas their blood pressure levels were measured by using a sphygmomanometer with stethoscope on upper arm. The patients were categorized into three age groups, I. II and III each between 18 to 35, 36 to 55 and 56 years or above age respectively.
Results: The predicted outcome of the study revealsthat among subjects aged up to 35 years only palpitation was notablylinked with systolic hypertension while only shortness of breath was notablyrelated with diastolic hypertension; among subjects between 36 to 55 years of age, smoking history, sleep apnea and palpitation were markedlylinked with systolic hypertension but only sleep apnea was considerablyrelated with diastolic hypertension while among patients aged 56 years or above, headache, vertigo. whereas both headache and palpitation were considerablyrelated with diastolic hypertension.
Conclusion: The clinical manifestations of hypertension tend to increase with advancing age of the patients.
Keywords: Age Groups, Hypertension, Signs and Symptoms

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 commendation 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 as:Normal (systolic<120 mm Hg, diastolic<80mmHg);Prehypertension (systolic 120-139mmHg, diastolic 80-89mmHg);Stage 1 Hypertension (systolic 140-159mmHg, diastolic 90-99mmHg) andStage 2 Hypertension (systolic 160mmHg or greater, diastolic 100mmHg or greater)[2].

The global prevalence of hypertension is not uniform, and this heterogeneity has been linked to several factors, such as lifestyle changes, racial and ethnic differences, nutritional status and birth weight of an individual.[3]Moreover, from 2000 to 2010, the age standardized prevalence of hypertension has decreased by 2.6% in highincome countries but increased by 7.7% in low and middleincome countries.[4]Recently it has alsobeen estimated that the highest prevalence of high blood pressure globally has transferred from high middle income countries to low 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]. Locally in Pakistan, the prevalence of hypertension was earlier reported to be 17%[7], though according to a more recent estimate, the total prevalence of high blood pressure in Pakistan is 25.2%[8].

Hypertension may present differently in different patients depending upon several factors, such as their gender, ageand severity of hypertension itself.Identification of such factors may play an important role in subsequent management of such patients. As the available local literature examining the influence of age on clinical manifestation of hypertension is scarce at best[9-12],

This study was therefore carried out with the objective of evaluating the effect of age on the relationship between hypertension and its clinical signs and symptoms in a Pakistani population.

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PATIENTS AND METHODS

After taking ethical approval from Institutional ethical and review board, present cross-sectional study was conducted in the outpatient department of Shahida Islam Medical Complex hospital, Lodhran for a period of 6 months between January 2020 to June 2020. About 304 patients aged 18 or above, having history of hypertension which is self-reported plus taking anti-hypertensive medication were included in the study. Subjects having history of diabetes, coronary artery disease, neurological deficits, GI diseases, epistaxis prior to the diagnosis of hypertension and morbid obesity were excluded. After checking eligibility, patients were included in the study by convenient sampling method.

Verbal and written informed consent was taken from each participant and then their demographic profile and hypertension related clinical signs and symptoms were recorded through interview by using a structured questionnaire designed specifically for the study; whereas their blood pressure levels were measured by using a sphygmomanometer with stethoscope. The patients were categorized into three age groups, I. II and III each between 18 to 35, 36 to 55 and 56 years or above age respectively. Data were analyzed using SPSS version 20. Percentages and frequencies were used for qualitative variables; Fisher's Exact Test was applied for inferential analysis. The significance level was kept at less than 0.05.

RESULTS

The total number of patients included were 304; out of which 157 (51.6%) were males whereas 166 (54.6%) belonged to group II. In group I, only palpitation (p=0.037) was statistically significant associated with systolic hypertension (Table 1A); only dyspnea (p=0.016) was statistically significantly associated with diastolic hypertension (Table 1B).

In group II, the smoking history (p=0.011), sleep apnea (p=0.030) and palpitation (p=0.042) were statistically significantly associated with systolic hypertension (Table 2A) whereas only sleep apnea (p=0.039) was significantly associated with diastolic hypertension (Table 2B).

In group III, headache (p=0.002), vertigo (p<0.001), vision problems (p=0.020), dyspnea (p=0.016), sleep apnea (p=0.033),

palpitation (p=0.002), fatigue (p=0.005) and confusion (p<0.001) were statistically significantly associated with systolic hypertension (Table 3A) whereas both headache (p=0.038) and palpitation (p=0.007) were statistically significantly associated with diastolic hypertension (Table 3B).

Table 1A: relationship between Systolic Hypertension and signs and symptoms of hypertension in Group I

Variables (n=49)	Systolic Blood Pressure		p-value
	Normotensive/Pre Hypertensive	Stage 1/Stage 2 Hypertensive	
	n(%)	n(%)	
Smoking History			
Yes	Nil	3(100)	0.242
No	22(47.8)	24(52.2)	
Headache History			
Yes	20(46.5)	23(53.5)	0.678
No	2(33.3)	4(66.7)	
Vertigo			
Yes	8(42.1)	11(57.9)	0.754
No	14(46.7)	16(53.3)	
Edema			
Yes	8(57.1)	6(42.9)	0.276
No	14(40.0)	21(60.0)	
Chest Pain			
Yes	7(46.7)	8(53.3)	0.869
No	15(44.1)	19(55.9)	
Vision Problems			
Yes	11(50.0)	11(50.0)	0.517
No	11(40.7)	16(59.3)	
Dyspnea			
Yes	9(39.1)	14(60.9)	0.445
No	13(50.0)	13(50.0)	
Epistaxis			
Yes	Nil	1(100)	>0.999
No	22(45.8)	26(54.2)	
Increased Urinary Frequency			
Yes	6(50.0)	6(50.0)	0.683
No	16(43.2)	21(56.8)	
Nausea			
Yes	5(35.7)	9(64.3)	0.414
No	17(48.6)	18(51.4)	
Sleep Apnea			
Yes	2(20.0)	8(80.0)	0.152
No	20(51.3)	19(48.7)	
Palpitation			
Yes	5(26.3)	14(73.7)	0.037
No	17(56.7)	13(43.3)	
Fatigue			
Yes	15(44.1)	19(55.9)	0.869
No	7(46.7)	8(53.3)	
Confusion			
Yes	11(39.3)	17(60.7)	0.362
No	11(52.4)	10(47.6)	

Table 1B: Relationship between Diastolic Hypertension and signs and symptoms of hypertension in Group I

Variables (n=166)	Systolic Blood Pressure		p-value
	Normotensive/Pre Hypertensive	Stage 1/Stage 2 Hypertensive	
	n(%)	n(%)	
Smoking History			
Yes	1(33.3)	2(66.7)	0.594
No	25(54.3)	21(45.7)	
Headache History			
Yes	23(53.5)	20(46.5)	>0.999
No	3(50.0)	3(50.0)	
Vertigo			
Yes	7(36.8)	12(63.2)	0.07
No	19(63.3)	11(36.7)	
Edema			
Yes	7(50.0)	7(50.0)	0.786
No	19(54.3)	16(45.7)	
Chest Pain			
Yes	7(46.7)	8(53.3)	0.551
No	19(55.9)	15(44.1)	
Vision Problems			
Yes	11(50.0)	11(50.0)	0.698
No	15(55.6)	12(44.4)	
Dyspnea			
Yes	8(34.8)	15(65.2)	0.016
No	18(69.2)	8(30.8)	
Epistaxis			
Yes	1(100)	Nil	>0.999
No	25(52.1)	23(47.9)	
Increased Urinary Frequency			
Yes	7(58.3)	5(41.7)	0.674
No	19(51.4)	18(48.6)	
Nausea			
Yes	8(57.1)	6(42.9)	0.717
No	18(51.4)	17(48.6)	
Sleep Apnea			
Yes	4(40.0)	6(60.0)	0.483
No	22(56.4)	17(43.6)	
Palpitation			
Yes	8(42.1)	11(57.9)	0.221
No	18(60.0)	12(40.0)	
Fatigue			
Yes	17(50.0)	17(50.0)	0.518
No	9(60.0)	6(40.0)	
Confusion			
Yes	15(53.6)	13(46.4)	0.934
No	11(52.4)	10(47.6)	

Table 2A: Relationship between Systolic Hypertension and signs and symptoms of hypertension in Group II

Variables (n=166)	Systolic Blood Pressure		p-value
	Normotensive/Pre Hypertensive	Stage 1/Stage 2 Hypertensive	
	n(%)	n(%)	
Smoking History			
Yes	1(5.6)	17(94.4)	0.011
No	52(35.1)	96(64.9)	
Headache History			
Yes	36(29.8)	85(70.2)	0.324
No	17(37.8)	28(62.2)	
Vertigo			
Yes	32(32.3)	67(67.7)	0.894
No	21(31.3)	46(68.7)	
Edema			
Yes	23(29.9)	54(70.1)	0.597
No	30(33.7)	59(66.3)	
Chest Pain			
Yes	22(28.9)	54(71.1)	0.449
No	31(34.4)	59(65.6)	
Vision Problems			
Yes	26(27.7)	68(72.3)	0.178
No	27(37.5)	45(62.5)	
Dyspnea			
Yes	28(31.8)	60(68.2)	0.974
No	25(32.1)	53(67.9)	
Epistaxis			
Yes	1(16.7)	5(83.3)	0.665
No	52(32.5)	108(67.5)	
Increased Urinary Frequency			
Yes	20(27.4)	53(72.6)	0.267
No	33(35.5)	60(64.5)	
Nausea			
Yes	7(18.9)	30(81.1)	0.054
No	46(35.7)	83(64.3)	
Sleep Apnea			
Yes	10(20.0)	40(80.0)	0.03
No	43(37.1)	73(62.9)	
Palpitation			
Yes	13(22.0)	46(78.0)	0.042
No	40(37.4)	67(62.6)	
Fatigue			
Yes	39(32.8)	80(67.2)	0.71
No	14(29.8)	33(70.2)	
Confusion			
Yes	34(32.4)	71(67.6)	0.869
No	19(31.1)	42(68.9)	

Table 2B: Relationship of Diastolic Hypertension and signs and symptoms of hypertension in Group II

Variables (n=166)	Diastolic Blood Pressure		p-value
	Normotensive/Pre Hypertensive	Stage 1/Stage 2 Hypertensive	
	n(%)	n(%)	
Smoking History			
Yes	5(27.8)	13(72.2)	0.066
No	75(50.7)	73(49.3)	
Headache History			
Yes	60(49.6)	61(50.4)	0.556
No	20(44.4)	25(55.6)	
Vertigo			
Yes	52(52.5)	47(47.5)	0.174
No	28(41.8)	39(58.2)	
Edema			
Yes	40(51.9)	37(48.1)	0.368
No	40(44.9)	49(55.1)	
Chest Pain			
Yes	40(52.6)	36(47.4)	0.293

No	40(44.4)	50(55.6)	
Vision Problems			
Yes	41(43.6)	53(56.4)	0.178
No	39(54.2)	33(45.8)	
Dyspnea			
Yes	42(47.7)	46(52.3)	0.899
No	38(48.7)	40(51.3)	
Epistaxis			
Yes	1(16.7)	5(83.3)	0.212
No	79(49.4)	81(50.6)	
Increased Urinary Frequency			
Yes	31(42.5)	42(57.5)	0.191
No	49(52.7)	44(47.3)	
Nausea			
Yes	14(37.8)	23(62.2)	0.153
No	66(51.2)	63(48.8)	
Sleep Apnea			
Yes	18(36.0)	32(64.0)	0.039
No	62(53.4)	54(46.6)	
Palpitation			
Yes	23(39.0)	36(61.0)	0.078
No	57(53.3)	50(46.7)	
Fatigue			
Yes	57(47.9)	62(52.1)	0.904
No	23(48.9)	24(51.1)	
Confusion			
Yes	51(48.6)	54(51.4)	0.898
No	29(47.5)	32(52.5)	

Table 3A: Relationship of Systolic Hypertension and signs and symptoms of hypertension in Group III

Variables (n=89)	Systolic Blood Pressure		p-value
	Normotensive/Pre Hypertensive	Stage 1/Stage 2 Hypertensive	
	n(%)	n(%)	
Smoking History			
Yes	1(11.1)	8(88.9)	0.436
No	24(30.0)	56(70.0)	
Headache History			
Yes	10(17.2)	48(82.8)	0.002
No	15(48.4)	16(51.6)	
Vertigo			
Yes	7(13.7)	44(86.3)	<0.001
No	18(47.4)	20(52.6)	
Edema			
Yes	9(25.0)	27(75.0)	0.593
No	16(30.2)	37(69.8)	
Chest Pain			
Yes	9(20.9)	34(79.1)	0.146
No	16(34.8)	30(65.2)	
Vision Problems			
Yes	8(17.4)	38(82.6)	0.02
No	17(39.5)	26(60.5)	
Dyspnea			
Yes	9(18.0)	41(82.0)	0.016
No	16(41.0)	23(59.0)	
Epistaxis			
Yes	Nil	2(100)	>0.999
No	25(28.7)	62(71.3)	
Increased Urinary Frequency			
Yes	8(20.0)	32(80.0)	0.125
No	17(34.7)	32(65.3)	
Nausea			
Yes	6(27.3)	16(72.7)	0.922
No	19(28.4)	48(71.6)	
Sleep Apnea			
Yes	7(17.1)	34(82.9)	0.033
No	18(37.5)	30(62.5)	
Palpitation			
Yes	4(10.8)	33(89.2)	0.002
No	21(40.4)	31(59.6)	
Fatigue			
Yes	14(20.6)	54(79.4)	0.005
No	11(52.4)	10(47.6)	
Confusion			
Yes	9(14.8)	52(85.2)	<0.001
No	16(57.1)	12(42.9)	

Table 3B: Relationship between Diastolic Hypertension and signs and symptoms of hypertension in Group III

Variables (n=89)	Diastolic Blood Pressure		p-value
	Normotensive/Pre Hypertensive	Stage 1/Stage 2 Hypertensive	
	n(%)	n(%)	
Smoking History			
Yes	5(55.6)	4(44.4)	0.739
No	39(48.8)	41(51.2)	
Headache History			
Yes	24(41.4)	34(58.6)	0.038
No	20(64.5)	11(35.5)	
Vertigo			
Yes	24(47.1)	27(52.9)	0.603
No	20(52.6)	18(47.4)	
Edema			
Yes	19(52.8)	17(47.2)	0.604
No	25(47.2)	28(52.8)	
Chest Pain			
Yes	19(44.2)	24(55.8)	0.338
No	25(54.3)	21(45.7)	
Vision Problems			
Yes	20(43.5)	26(56.5)	0.245
No	24(55.8)	19(44.2)	
Dyspnea			
Yes	24(48.0)	26(52.0)	0.759
No	20(51.3)	19(48.7)	
Epistaxis			
Yes	1(50.0)	1(50.0)	>0.999
No	43(49.4)	44(50.6)	
Increased Urinary Frequency			
Yes	16(40.0)	24(60.0)	0.108
No	28(57.1)	21(42.9)	
Nausea			
Yes	9(40.9)	13(59.1)	0.356
No	35(52.2)	32(47.8)	
Sleep Apnea			
Yes	17(41.5)	24(58.5)	0.164
No	27(56.2)	21(43.8)	
Palpitation			
Yes	12(32.4)	25(67.6)	0.007
No	32(61.5)	20(38.5)	
Fatigue			
Yes	31(45.6)	37(54.4)	0.191
No	13(61.9)	8(38.1)	
Confusion			
Yes	26(42.6)	35(57.4)	0.058
No	18(64.3)	10(35.7)	

DISCUSSION

This study was carried out with the objective of evaluating the effect of age on the association between hypertension and its clinical signs and symptoms.In this context, hypertensive patients were selected from an outpatient department. The outcome of the study predicted that among patients aged up to 35 years only palpitation was notablyrelated with systolic hypertension while only shortness of breath was markedlylinked with diastolic hypertension; among patients between 36 to 55 years of age all of the smoking history, sleep apnea and palpitation were notablyrelated with systolic hypertension while only sleep apnea was appreciablyrelated with diastolic hypertension while among patients aged 56 years or above all of the headache history, vertigo, vision problems, dyspnea, sleep apnea, palpitation, fatigue and confusion were markedlylinked with systolic hypertension but both headache history and palpitation were significantly associated with diastolic hypertension.

The relationship between age and hypertension hasbeen explored previously and available literature exhibits thatwith increasing age of an individual, the chances of developing hypertension rise considerably.[13-17]According to the guidelines of British Hypertension Society all adults should gettheir blood pressure measured at least every five years until theyreach 80 years of age.[18] Even though the relationship between age and hypertension is well established, such is not the case with the effect of increasing age on the clinical manifestations of hypertension.

A systematic review published in 2001 revealed that simpler and less frequent dosing regimens result in better compliance.[19] Another systematic review published in 2004 reported blood pressure control while on anti-hypertensive medication to vary considerably, from 5.4% to 58%, in different regions of the world.[20]As anti-hypertensive medications are usually given as multiple therapies with multiple doses, especially in advanced age, there is every possibility that the blood pressure levels of hypertensive patients are not always well controlled.Such uncontrolled hypertension, particularly with increasing age, may continue to causehigh blood pressure related tissue damage that may potentially result in an increase in the clinical manifestations of hypertension, both in terms of count and severity.

Though current literature supplements the association of several symptoms with hypertension as also found in our study[21-30], such associations could not be found to be examined in the context of increasing age of the patients. As a result, the clear upward trend shown by the study resultsin the clinical manifestations of hypertension with increasing age of the patients could not be meaningfully compared with relevant published literature.

Though the findings of this study need to be verified by more rigorous study designs for broader generalizability, the study results unambiguously exhibited an increasing trend in the clinical manifestations of hypertension with advancing age of the patients.

CONCLUSION AND RECOMMENDATION

It can be concluded on the basis of the study results that the clinical manifestations of hypertension tend to increase with advancing age of the patients.Younger hypertensive patients therefore shouldbe the target of more careful screening while older hypertensive patients should be the target of more careful management by the clinicians.

Limitations: The prime limitation of the study was use of convenient sampling technique because of resource constraints, limiting the generalization of study findings. Furthermore, as the assessments of certain study variables were history based they may have suffered from limitation in recall.

Conflict of interest: Nil

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