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Hypertension and Associated Neurological and Non-Neurological Symptoms in Different Age Groups: A Cross-Sectional Observational Study among Hypertensive Patients

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Abstract

Background: Hypertension is considered to be one of the most common chronic diseases afflicting the world population that is associated with increased mortality. It is estimated that more than a quarter of the world's adult population had hypertension in the year 2000, and that such prevalence increases with age all over the world.

Objective: To identify and compare the hypertension associated neurological and non-neurological signs and symptoms among different age groups.

Methods: A cross-sectional multicenter study was carried out among patients with self-reported history of hypertension and on anti-hypertensive medication. The written informed consent was obtained from the patients after taking ethical approval. A total of 174 patients aged 18 years or above were included in the study using convenient sampling technique and the duration of study was from Jan 2017 till June 2017. Patients were divided in two groups according to their ages i.e. ≤40 years and >40 years old. A detailed history was taken from each patient about hypertension associated symptoms with the help of a structured questionnaire. Blood pressure was measured using sphygmomanometer with stethoscope to assess hypertension level. The patients with history of diabetes, thyrotoxicosis and liver diseases were excluded from the study. Date was analyzed by using SPSS version 20. Chi square and fisher exact test was used to assess the significance.

Results: A higher percentage of the patients in the >40 years age group had severe systolic and diastolic hypertension than patients in the ≤40years age group (4.0% vs. 1.4% and 9.0% vs. 1.4% respectively).Among the patients aged ≤40 years only fatigue (p=0.049) was significantly associated with systolic blood pressure while among patients aged >40 years severity of headache (p=0.026), dyspnea (p=0.022), fatigue (p=0.003) and confusion (p=0.006) were significantly associated with systolic blood pressure whereas edema (p=0.016) and fatigue (p=0.019) were significantly associated with diastolic blood pressure.

Conclusion: The symptoms significantly associated with systolic or diastolic hypertension increased with the increasing age of the patients. These findings give us local evidence emphasizing the need to focus more on the management of older hypertensive patients.

Keywords: Neurological and Non-neurological symptoms; Hypertension; Age Groups

Introduction

Hypertension is considered to be one of the most common chronic diseases afflicting the world population that is associated with increased mortality.[1] The comparative Risk Assessment Collaborating Group has identified hypertension as the leading global risk factor for mortality and as the third leading risk factor for disease burden.[2] One of the most common causes of death due to Hypertension is the cardiovascular disease making hypertension the most common reversible risk factor for cardiovascular diseases.[3,4] It is estimated that more than a quarter of the world's adult population-0.972 billion-had hypertension in the year 2000, that both men and women have similar overall prevalence of hypertension, and that such prevalence increases with age all over the world. Global hypertension prevalence is currently 26% which is expected to rise to 29% by the year 2025. The predictions for 2025 are based on the assumption that the country, age, and sex specific prevalence estimates will remain constant.[5] According to the World Health Organization, the total prevalence of high blood pressure in Pakistan is estimated to be 25.2% (25.6% in males and 24.8% in females).[6]

Hypertension is defined as a systolic blood pressure (SBP) of 140 mmHg or more, or a diastolic blood pressure (DBP) of 90 mmHg or more, or taking antihypertensive medication.[7] Based on 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 and stage 2. Normal indicates a systolic blood pressure of <120 mmHg; and a diastolic <80 mmHg. Pre-hypertension means a systolic blood pressure of 120-139 mmHg; while a diastolic of 80-89 mmHg. Stage 1 reads a systolic of 140-159 mmHg; and a diastolic of 90-99 mmHg. Stage 2 is considered to be severe and gives a systolic of 160 mmHg or greater; and a diastolic of 100 mmHg or greater. [8] WHO recognizes three levels of hypertension as levels 1, 2 and 3. Level 1 means a systolic BP between 140 and 159 mmHg and a diastolic BP between 90 and 99, level 2 means a systolic BP between 160 and 179 mmHg and a diastolic BP between 100-109 mmHg while level 3 means a systolic BP of 180 and above and a diastolic BP of 110 mmHg and above.[9]

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.[10] 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 (idiopathic or primary) hypertension.[11]

Hypertension can present with severe clinical presentation to an even asymptomatic picture depending upon the several factors such as age, gender, and severity of hypertension. Our objective was to find associations between the degree of hypertension and the severity of the associated symptoms among different age groups.

Patients and Methods

A cross-sectional multicenter study was carried out among patients with self-reported history of hypertension and on anti-hypertensive medication. After taking ethical approval from Urban Hospital, North Karachi. A total of 174patients aged 18 years or above were included in the study using convenient sampling technique. Patients were divided in two groups according to their ages i.e. ≤40 years and >40 years old. A detailed history was taken from each patient about hypertension associated symptoms with the help of a structured questionnaire. The questionnaire was designed based on 12 major or most frequently encountered symptoms by the hypertensive patients. The site, duration, and severity of each symptom were documented. Each symptom was graded from mild to severe to assess the severity of the symptoms. The presence of edema was noted with its laterality and grading. The appearance of chest pain was noted with its severity. The problems of vision were noted and classified according to the loss in field of vision. The history of epistaxis and urinary symptoms were noted with frequency. Few additional symptoms such as nausea, sleep apnea, palpitations, fatigue and confusion were also assessed subjectively. Blood pressure was measured using sphygmomanometer with stethoscope to assess hypertension level.

To classify hypertension, the British Hypertension Society Classification, consistent with the European Hypertension Society and World Health Organization International Society of Hypertension, was used.[12]Similar to WHO classification, it also recognizes three grades of hypertension as grade 1, 2 and 3. Grade I (Mild hypertension) means a systolic BP between 140 and 159 mmHg and a diastolic BP between 90 and 99, Grade II (Moderate hypertension) means a systolic BP between 160 and 179 mmHg and a diastolic BP between 100-109 mmHg whereas Grade III (Severe Hypertension) means a systolic BP of ≥ 180 mmHg and a diastolic BP ≥ 110 mmHg.

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

For statistical analysis, statistical package for social sciences (SPSS version 21) was used. Chi-square test was performed to assess associations between various study variables and hypertension across different age groups. P-values less than 0.05 were considered statistically significant. The duration of the study was 6 months.

Results

The study results showed that the mean age of patients aged ≤40 years was 31.19±7.44 years whereas that of patients aged >40 years was 54.34±9.13 years. A majority of patients aged ≤40 years were females whereas that of patients aged >40 years were males (58.1% and 62.0% respectively). A higher percentage of the patients in the >40 years age group had severe systolic and diastolic hypertension than patients in the ≤40years age

group (4.0% vs. 1.4% and 9.0% vs. 1.4% respectively). Both the mean systolic and diastolic blood pressures were slightly higher in patients aged ≤40 years than those>40 years old (148.23±13.62 mmHg vs. 146.11±16.74 mmHg and 92.86±5.02 mmHg vs. 91.41±10.24 mmHg respectively). The mean duration of hypertension was higher in patients belonging to the older age group (4.62±3.51 years vs. 4.11±2.99 years) whereas a slightly higher percentage of them were smokers as well (15.0% vs. 8.1%). A higher percentage of the older patients had positive clinical history of headache (58.0% vs. 40.5%) whereas the most common site of headache was occipital in the younger and temporal in the older age group (46.7% and 24.1% respectively). The severity of headache was moderate in a majority of the patients belonging to the younger as well as the older age group (56.7% and 44.8% respectively). A higher percentage of the patients belonging to the older age group had vertigo than the younger age group (44.0% vs. 21.6% respectively) whereas a similar majority of both age groups reported its severity to be mild (68.8% and 68.9% respectively). A higher percentage of the older patients had edema (28.0% vs. 17.6%) but it was seen to be bilateral in a similar percentage of both the younger and the older age groups (61.5% and 64.3% respectively). The edema was of moderate grading in a higher percentage of the younger patients (61.5% vs. 39.3%). A higher percentage of the older patients gave a positive history of chest pain (30.0% vs. 17.6%) and a higher percentage of those patients in the older age group needed pain relieving medication for it to subside (58.6% vs. 30.8%). A markedly higher percentage of patients belonging to the older age group gave a positive history of vision problems (54.0% vs. 24.3%) whereas the most common type of vision problem in both the younger and the older patients was dark spots in the field of vision (44.4% and 40.0% respectively). A markedly higher percentage of patients belonging to the older age group gave a positive history of dyspnea (51.0% vs. 25.7%) whereas most of both the younger and the older patients reported it to be of moderate severity (47.4% and 49% respectively).Though an almost similar percentage of patients belonging to both the younger and the older age groups suffered from nausea (21.9% and 19.0% respectively),a markedly higher percentage of older patients reported to suffer from sleep apnea, irregular heartbeat/palpitation, fatigue and confusion(52.0% and 27.0%, 43.0% and 23.0%, 72.0% and 45.2% and 62.0% and 28.8% respectively) [Table 1].

Table 1: Description of participants' characteristics: Age wise comparison

Variables		≤40 Years (n=74)	>40 Years (n=100)
		Frequency(%)/ Mean±S.D.	Frequency(%)/ Mean±S.D.
Age (Years)		31.19±7.44	54.34±9.13
Gender	Male	31(41.9)	62(62.0)
	Female	43(58.1)	38(38.0)
Systolic Blood Pressure	Mild Hypertension	63(85.1)	71(71.0)
	Moderate Hypertension	10(13.5)	25(25.0)
	Severe Hypertension	1(1.4)	4(4.0)
Diastolic Blood Pressure	Mild Hypertension	69(93.2)	77(77.0)
	Moderate Hypertension	4(5.4)	14(14.0)
	Severe Hypertension	1(1.4)	9(9.0)
Systolic Blood Pressure (mm Hg)		148.23±13.62	146.11±16.74
Diastolic Blood Pressure (mm Hg)		92.86±5.02	91.41±10.24
Hypertension Duration (Years)		4.11±2.99	4.62±3.51
Smoking	Yes	6(8.1)	15(15.0)
	No	68(91.9)	85(85.0)
Clinical History of Headache	Yes	30(40.5)	58(58.0)
	No	44(59.5)	42(42.0)
Site of Heacache[1]	Temporal	6(20.0)	14(24.1)
	Parietal	4(13.3)	8(13.8)
	Occipital	14(46.7)	12(20.7)
	Frontal	Nil	5(8.6)
	Complete	6(20.0)	19(32.8)

Severity of Headache[1]	Mild	5(16.6)	9(15.5)
	Moderate	17(56.7)	26(44.8)
	Severe	8(26.7)	23(39.7)
Vertigo	Yes	16(21.6)	44(44.0)
	No	58(78.4)	56(56.0)
Severity of Vertigo[2]	Mild	11(68.8)	31(68.9)
	Moderate	5(31.2)	11(24.4)
	Severe	Nil	3(6.7)
Edema	Yes	13(17.6)	28(28.0)
	No	61(82.4)	72(72.0)
Laterality of Edema[3]	Bilateral	8(61.5)	18(64.3)
	Unilateral	5(38.5)	10(35.7)
Grading of Bilateral Edema[3]	Mild	1(7.7)	8(28.6)
	Moderate	8(61.5)	11(39.3)
	Severe	4(30.8)	9(32.1)
Chest Pain	Yes	13(17.6)	30(30.0)
	No	61(82.4)	70(70.0)
Severity of Chest Pain[4]	Improves with rest	7(53.8)	8(27.6)
	Needs pain relieving medication	4(30.8)	17(58.6)
	Requires hospital visit	2(15.4)	4(13.8)
Vision Problems	Yes	18(24.3)	54(54.0)
	No	56(75.7)	46(46.0)
Type of Vision Problem[5]	Loss of Central Vision	2(11.1)	6(12.0)
	Loss of Peripheral Vision	5(27.8)	13(26.0)
	Dark Spots in field of Vision	8(44.4)	20(40.0)
	Pain in Eyes	3(16.7)	11(22.0)
Dyspnea	Yes	19(25.7)	51(51.0)
	No	55(74.3)	49(49.0)
Dyspnea Severity[6]	Mild	4(21.1)	8(15.7)
	Moderate	9(47.4)	25(49.0)
	Severe	6(31.6)	18(35.3)
Nausea[7]	Yes	16(21.9)	19(19.0)
	No	57(78.1)	81(81.0)
Sleep Apnea	Yes	20(27.0)	52(52.0)
	No	54(73.0)	48(48.0)
Irregular Heartbeat/ Palpitation	Yes	17(23.0)	43(43.0)
	No	57(77.0)	57(57.0)
Fatigue[7]	Yes	33(45.2)	72(72.0)
	No	40(54.8)	28(28.0)
Confusion[7]	Yes	21(28.8)	62(62.0)
	No	52(71.2)	38(38.0)

[1]n=30 and 58 in ≤40 years and >40 years old respectively
[2]n=16 and 45 in ≤40 years and >40 years old respectively
[3]n=13 and 28 in ≤40 years and >40 years old respectively
[4]n=13 and 29 in ≤40 years and >40 years old respectively
[5]n=18 and 50 in ≤40 years and >40 years old respectively
[6]n=19 and 51 in ≤40 years and >40 years old respectively
[7]n=73 and 100 in ≤40 years and >40 years old respectively

The study findings further showed that among the patients aged ≤40 years only fatigue (p=0.049) was significantly associated with systolic blood pressure where those who had mild systolic hypertension very more likely to suffer from fatigue than those who had moderate/severe systolic hypertension (50.0% vs. 18.2% respectively). None of the other variables were found to be significantly associated with either systolic or diastolic blood pressure in this age group [Table 2].

Among patients aged >40 years severity of headache (p=0.026), dyspnea (p=0.022), fatigue (p=0.003) and confusion (p=0.006) were significantly associated with systolic blood pressure where those who had mild systolic hypertension were less likely to have mild/moderate headache, dyspnea, fatigue and confusion than those who had moderate/severe systolic hypertension (50.0% vs. 80.0%, 43.7% vs. 69.0%, 63.4% vs. 93.1% and 53.5% vs. 82.8% respectively) whereas edema (p=0.016) and fatigue (p=0.019) were significantly associated with diastolic blood pressure where those who had mild diastolic hypertension were less likely to have edema and fatigue than those who had moderate/severe diastolic hypertension (22.1% vs. 47.8% and 66.2% vs. 91.3% respectively).None of the other variables were found to be significantly associated with either systolic or diastolic blood pressure in this age group [Table 3].

Table 2: Relationship between blood pressure and patients' signs and symptoms in ≤40 year's age group

Variables		≤40 Years (n=74)			
		SBP		DBP	
		Mild Hypertension	Moderate/Severe Hypertension	Mild Hypertension	Moderate/Severe Hypertension
		Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Gender	Male	26(41.3)	5(45.5)	29(42.0)	2(40.0)
	Female	37(58.7)	6(54.5)	40(58.0)	3(60.0)
P		0.523*		0.653*	
Smoking	Yes	6(9.5)	Nil	6(8.7)	Nil
	No	57(90.5)	11(100)	63(91.3)	5(100)
P		0.367*		0.647*	
Clinical History of Headache	Yes	27(42.9)	3(27.3)	28(40.6)	2(40)
	No	36(57.1)	8(72.7)	41(59.4)	3(60)
P		0.266*		0.678*	
Severity of Headache	Mild/Moderate	20(74.1)	2(66.7)	20(71.4)	2(100)
	Severe	7(25.9)	1(33.3)	8(28.6)	Nil
P		0.621*		0.531*	
Vertigo	Yes	13(20.6)	3(27.3)	15(21.7)	1(20.0)
	No	50(79.4)	8(72.7)	54(78.3)	4(80.0)
P		0.44*		0.706*	
Edema	Yes	12(19.0)	1(9.1)	13(18.8)	Nil
	No	51(81.0)	10(90.9)	56(81.2)	5(100)
P		0.38*		0.369*	
Laterality of Edema	Bilateral	7(58.3)	1(100)	8(61.5)	Nil
	Unilateral	5(41.7)	Nil	5(38.5)	Nil

P		0.615*		….	
Grading of Bilateral Edema	Mild/Moderate	8(66.7)	1(100)	9(69.2)	Nil
	Severe	4(33.3)	Nil	4(30.8)	Nil
P		0.692*		….	
Chest Pain	Yes	12(19.0)	1(9.1)	13(18.8)	Nil
	No	51(81.0)	10(90.0)	56(81.2)	5(100)
P		0.38*		0.369*	
Vision Problems	Yes	17(27.0)	1(9.1)	18(26.1)	Nil
	No	46(73.0)	10(90.9)	51(73.9)	5(100)
P		0.189*		0.237*	
Dyspnea	Yes	17(27.0)	2(18.2)	19(27.5)	Nil
	No	46(73.0)	9(81.8)	50(72.5)	5(100)
P		0.422*		0.216*	
Severity of Dyspnea	Mild/Moderate	12(70.6)	1(50.0)	13(68.4)	Nil
	Severe	5(29.4)	1(50.0)	6(31.6)	Nil
P		0.544*		….	
Nausea	Yes	14(22.6)	2(18.2)	15(22.1)	1(20.0)
	No	48(77.4)	9(81.2)	53(77.9)	4(80.0)
P		0.549*		0.700*	
Sleep Apnea	Yes	17(27.0)	3(27.3)	19(27.5)	1(20.0)
	No	46(73.0)	8(72.7)	50(72.5)	4(80.0)
P		0.621*		0.589*	
Irregular Heartbeat/ Palpitation	Yes	15(23.8)	2(18.2)	17(24.6)	Nil
	No	48(76.2)	9(81.8)	52(75.4)	5(100)
P		0.512*		0.260*	
Fatigue	Yes	31(50.0)	2(18.2)	31(45.6)	2(40.0)
	No	31(50.0)	9(81.8)	37(54.4)	3(60.0)
P		0.049*		0.592*	
Confusion	Yes	18(29.0)	3(27.3)	19(27.9)	2(40.0)
	No	44(71.0)	8(72.7)	49(72.1)	3(60.0)
P		0.609*		0.448*	

*Fisher's Exact Test

Table 3: Relationship between blood pressure and patients' signs and symptoms in >40 year's age group

Variables		**>40 Years (n=100)**			
		SBP		**DBP**	
		Mild Hypertension	**Moderate/Severe Hypertension**	**Mild Hypertension**	**Moderate/Severe Hypertension**
		Frequency(%)	**Frequency(%)**	**Frequency(%)**	**Frequency(%)**
Gender	Male	46(64.8)	16(55.2)	47(61.0)	15(65.2)
	Female	25(35.5)	13(44.8)	30(39.0)	8(34.8)
P		0.369		0.717	

Smoking	Yes	9(12.7)	6(20.7)	10(13.0)	5(21.7)
	No	62(87.3)	23(79.3)	67(87.0)	18(78.3)
P		0.235*		0.236*	
Clinical History of Headache	Yes	38(53.5)	20(69.0)	43(55.8)	15(65.2)
	No	33(46.5)	9(31.0)	34(44.2)	8(34.8)
P		0.156		0.424	
Severity of Headache	Mild/Moderate	19(50.0)	16(80.0)	23(53.5)	12(80.0)
	Severe	19(50.0)	4(20.0)	20(46.5)	3(20.0)
P		0.026		0.071	
Vertigo	Yes	29(40.8)	15(51.7)	34(44.2)	10(43.5)
	No	42(59.2)	14(48.3)	43(55.8)	13(56.5)
P		0.32		0.954	
Edema	Yes	17(23.9)	11(37.9)	17(22.1)	11(47.8)
	No	54(76.1)	18(62.1)	60(77.9)	12(52.2)
P		0.157		0.016	
Laterality of Edema	Bilateral	11(64.7)	7(63.6)	12(70.6)	6(54.5)
	Unilateral	6(35.3)	4(36.4)	5(29.4)	5(45.5)
P		0.632*		0.321*	
Grading of Bilateral Edema	Mild/Moderate	13(76.5)	6(54.5)	14(77.8)	5(50.0)
	Severe	4(23.5)	5(45.5)	4(22.2)	5(50.0)
P		0.212*		0.139*	
Chest Pain	Yes	19(26.8)	11(37.9)	21(27.3)	9(39.1)
	No	52(73.2)	18(62.1)	56(72.7)	14(60.9)
P		0.269		0.276	
Vision Problems	Yes	35(49.3)	19(65.5)	40(51.9)	14(60.9)
	No	36(50.7)	10(34.5)	37(48.1)	9(39.1)
P		0.14		0.451	
Dyspnea	Yes	31(43.7)	20(69.0)	37(48.1)	14(60.9)
	No	40(56.3)	9(31.0)	40(51.9)	9(39.1)
P		0.022		0.281	
Severity of Dyspnea	Mild/Moderate	19(61.3)	14(70.0)	23(62.2)	10(71.4)
	Severe	12(38.7)	6(30.0)	14(37.8)	4(28.6)
P		0.525		0.392*	
Nausea	Yes	12(16.9)	7(24.1)	13(16.9)	6(26.1)
	No	59(83.1)	22(75.9)	64(83.1)	17(73.9)
P		0.403		0.241*	
Sleep Apnea	Yes	33(46.5)	19(65.5)	37(48.1)	15(65.2)
	No	38(53.5)	10(34.5)	40(51.9)	8(34.8)
P		0.084		0.148	
Irregular Heartbeat/ Palpitation	Yes	27(38.0)	16(55.2)	31(40.3)	12(52.2)
	No	44(62.0)	13(44.8)	46(59.7)	11(47.8)
P		0.116		0.311	

Fatigue	Yes	45(63.4)	27(93.1)	51(66.2)	21(91.3)
	No	26(36.6)	2(6.9)	26(33.8)	2(8.7)
P		0.003		0.019	
Confusion	Yes	38(53.5)	24(82.8)	45(58.4)	17(73.9)
	No	33(46.5)	5(17.2)	32(41.6)	6(26.1)
P		0.006		0.18	
*Fisher's Exact Test					

Discussion

The study findings revealed that a higher percentage of the patients in the >40 years age group had severe systolic and diastolic hypertension than patients in the ≤40years age group. Furthermore, and expectedly, the hypertension associated sign and symptom such as smoking, clinical history of headache, vertigo, edema, chest pain, vision problems, dyspnea, sleep apnea, irregular heartbeat/palpitation, fatigue and confusion were found to be more prevalent in the older than in the younger age group.

The study findings further showed that in the younger age group only fatigue was found to be significantly associated with systolic blood pressure and none of the other variables were significantly associated with diastolic blood pressure whereas, as expected, in the older age group a number of signs and symptoms were found to be significantly associated with systolic hypertension, such as severity of headache, dyspnea, fatigue and confusion, as well as with diastolic hypertension, such as edema and fatigue.

As expected, the study results showed that the older patients had higher prevalence of severe systolic and diastolic hypertension than the younger patients, a finding well in line with the published literature. An earlier study also reported the prevalence of hypertension to increase with increasing age with 8% in patients aged 30-39 years to 38% in patients aged ≥60 years.[13] Another study found hypertension prevalence to show an increasing trend with age with 9.5% in patients aged 15-18 years to 42% in patients aged >60 years.[14] Another study showed the prevalence of hypertension to increase with increasing age of the study participants.[15] Yet another study reported age to be significantly associated with hypertension. [16]

The study results further showed that the signs and symptoms associated with hypertension increased with the increasing age of the study participants. At younger age, only fatigue was found to have a significant relationship with systolic blood pressure whereas at older age, severity of headache, edema, dyspnea, fatigue and confusion all were found to be significantly associated with either systolic or diastolic hypertension or both. An earlier study reported headache to be significantly more prevalent in hypertensive than in normotensive subjects ($p<0.05$) but contrary findings have been reported as well as another study did not report headache to be significantly associated with hypertension (OR 1.02, 95% CI 0.79 to 1.30).[17,18] This difference in findings could be due to different methods of blood pressure measurement in both studies i.e. Direct versus indirect auscultatory method. Similarly, an earlier study also reported dyspnea to be associated with elevated blood pressure though irrespective of age of the study participants.[19] Unlike this study, an earlier study did not report any significant difference in prevalence of weakness among hypertensive and normotensive subjects though this difference in findings could be due to the use of different operational definitions of the terminology involved i.e. Fatigue versus weakness.[17] With regard to the study findings regarding association of edema, fatigue and confusion with hypertension, due to lack of relevant data, a comparison could not be made with the published literature.

Limitation

The use of convenient sampling method, because of financial and time restraints, was the only limitation of the study.

Conclusion

The symptoms significantly associated with systolic or diastolic hypertension increased with the increasing age of the patients. These findings give us local evidence emphasizing the need to focus more on the management of older hypertensive patients.

Recommendation

In the light of the study findings it is recommended that during hypertension screening and management, health care professionals need to specially focus on the patients aged >40 years as these patients are more likely to have higher number of hypertension associated sign and symptoms which may require more intensive management and counseling on part of treating physicians.

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