Original article

Assessment of risk factors and associated co-morbidities among adult hypertensive patients attending a health care facility in North India

Siraj Ahmad

Associate Professor, Department of Community Medicine, Teerthanker Mahaveer Medical College and Research Centre, Teerthanker Mahaveer University, Moradabad- 244001, India.

Corresponding author: Dr Siraj Ahmad

Abstract:

Background: Hypertension is associated with various risk factors such as, family history, smoking, obesity, and sedentary lifestyle. It has been observed that hypertensive patients also have associated co-morbidities, which make the effective control of hypertension even more important.

Objectives: To study the risk factors and associated co-morbidities among hypertensive patients attending Urban Health and Training Centre (UHTC).

Methodology: An Out Patients Department based, descriptive, observational study was carried out among adult hypertensive patients attending UHTC. Detailed history and physical examination was done to evaluate various risk factors and associated co-morbidities.

Results: Out of 388 hypertensive patients, 57.7% were males, 42.3% were females. Majority (42.8%) of patients were aged 50 – 59 years and 34.5% had a positive family history of hypertension. 44.6% of the patients had associated co-morbidities, amongst which Diabetes Mellitus was the most common (27.1%), followed by Ischemic Heart Disease (IHD) which was found in 14.4% of patients. Addiction was present in 68.04% patients, with tobacco chewing being present in majority of patients (30.15%) followed by smoking (21.39%).

Conclusion: Hypertensive patients have associated co-morbidities, amongst which Diabetes Mellitus is most common. Since, hypertension alone is a silent killer, and when associated with co-morbidities may have more adverse health outcomes, therefore, it is recommended that regular screening of the patients should be done targeting various risk factors in order to provide their early diagnosis and effective management.

Key words: Hypertension, risk factors , co-morbidities.

Introduction

Hypertension (HTN) is one of the major risk factors for cardiovascular mortality, which accounts for 20 – 50 % of all deaths [1]. It is one of the most common cardiovascular diseases with a prevalence ranging from 10 to 20% among adult population [2]. Patients with hypertension possess two fold higher risk of developing coronary artery disease (CAD), four times higher risk of congestive heart failure (CHF) and seven times higher risk of cerebrovascular diseases (CVD), compared to normotensive people [3, 4]. The "Global Burden of Disease study" has projected CAD and CVD as the leading cause of death worldwide by the year 2020 [5]. Many risk factors have been identified for hypertension [6]. It has been observed that hypertensive patients also have associated co-morbidities, which make the effective control of hypertension even more important [7]. Therefore a descriptive epidemiological study was conducted to assess risk factors and associated co-morbidities among hypertensive patients attending Urban Health and Training Centre (UHTC).

Materials and methods

Study Design: This observational, descriptive, Out Patients Department based study was carried out from January to June, 2013, among adult hypertensive patients aged 20 years and above, attending the Urban Health and Training Centre (UHTC) for the assessment of risk factors and associated co-morbidities of hypertension.

Sampling technique: Purposive sampling was done.

Study Material: Adult hypertensive patients reporting to the UHTC during the study period.

Inclusion criteria: Adult hypertensive patients who agreed to participate were included in the study.

Exclusion criteria: Patients who refused to participate and those suffering from acute illness or were seriously ill were excluded.

Study subjects: A total of 388 adult hypertensive patients were included in the study.

Method: Informed consent was obtained and the patients were interviewed followed by a detailed clinical examination. A pre-designed interview schedule was used to collect the necessary information from the patients. Information regarding demographic and anthropometric measurements was collected. Details of major cardiovascular risk factors such as tobacco chewing, smoking, alcohol intake, physical activity, and associated co-morbidities were inquired. Physical examination included measurement of height, weight and Blood pressure (BP). Common weighing machine and measuring tape were used to record weight in kilograms and height in centimetres of all the study subjects. BP was measured using a standard mercury manometer in a seated position. Two readings at 5 minutes intervals as per World Health Organization (WHO) guidelines were recorded. If a high BP (≥140 / 90 mmHg) was noted, a third reading was taken after 30 minutes and the lowest of the three readings was taken as BP reading. Persons with known hypertension on treatment were also included in hypertension category [8]. A person, engaged in 30 minutes of moderate grade physical activity at least three times in a week, was classified as physically active. Using the Joint National Committee (JNC) VII Criteria, hypertension was diagnosed when a subject was a known hypertensive, or systolic BP was ≥ 140mm Hg and /or diastolic BP ≥ 90 mm Hg. Hypertension Stage 1 when systolic BP 140 – 159 mm Hg and diastolic BP of 90 – 99 mm Hg. Hypertension Stage 2 when systolic BP ≥ 160 mm Hg and diastolic BP of ≥ 100 mm Hg [9]. When systolic and diastolic pressure fell into different categories, higher category was recorded. Body mass index (BMI) was calculated as weight in kg / square of height in meters.

Statistical analysis: Data from the interview schedule was transferred to a computer. The SPSS Data Editor Software version 19 was used for analysis of the data. Chi-square test and unpaired t-test were performed and p value ≤ 0.05 were considered statistically significant.

Results

Total 388 hypertensive patients were included in the study. 57.7% were males and 42.3% were females. Majority of patients 166 (42.8%) were in the age group of 50 – 59 years. In all age groups males were more as compared to females, and the association between hypertension and sex in all age groups was found to be statistically significant (Table 1).

The mean age of patients was 49.70 (± 11.04) years. Mean duration of diagnosis was 5.04 (± 3.6) years. Mean Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), and Body Mass Index (BMI) of the patients were 150.82 (± 8.92) mm of Hg, 95.65 (± 6.70) mm of Hg, and 26.39 (± 5.21) kg/m^2, respectively (Table 2).

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Family history of hypertension was present in 34.5% of patients. 44.6% of the patients had some kind of associated co-morbidity. Diabetes Mellitus was the most common co-morbidity found in 27.1% of patients, followed by Ischemic Heart Disease (IHD) in 14.4%, visual defects in 7.7% and renal pathology in 5.2% of patients (Figure 1).

Among the patients, 52.6% were having secondary education and graduation. 38.1% of the patients were unemployed, and 18.5% were semi professional and professional. Majority (76.3%) of patients were of higher socio economic status from class I, II, and III (Figure 2).

The association between hypertension and patient's higher education, higher socioeconomic status and skilled professional type of work was found to be statistically significant (Table 3, 4, 5).

Among the patients having BMI of 25 or above, 68.9% had hypertension stage1and 31.1% had hypertension stage 2. Among those performing physical activity for more than 30 minutes daily, 71.2% had hypertension stage 1 and 28.8% had hypertension stage 2 (Table 6).

Addiction of some kind was present in 264 (68.04%) of patients. Tobacco chewing was present in 117 (30.15%) patients, among whom 68.4% were categorized as having hypertension stage 1 and 31.6 % as hypertension stage 2. Among the patients, 83 (21.39%) were smoking and 43 (11.08%) were consuming alcohol (Table 7).

Table-1: Distribution of hypertensive patients according to age and sex.

Age (in years)	Male	Female	Total
20 - 29	18 (75.0%)	6 (25.0%)	24 (100%)
30 - 39	18 (37.5%)	30 (62.5%)	48 (100%)
40 - 49	53 (56.4%)	41 (43.6%)	94 (100%)
50 - 59	103 (62.0%)	63 (38.0%)	166 (100%)
60 - 69	32 (57.1%)	24 (42.9%)	56 (100%)
Total	224 (57.7%)	164 (42.3%)	388 (100%)
$\chi 2 = 12.330$; df = 4; p = 0.015			

$\chi 2$ = Chi-Square test; df = degree of freedom. $p < 0.05$ was considered as statistically significant.

Table-2: Distribution of hypertensive patients according to certain parameters.

Parameters	Mean	Standard Deviation	Minimum	Maximum
Age of patients (years)	49.70	11.04	22	69
Hypertension duration (years)	5.04	3.60	1	15
Systolic BP (mm Hg)	150.82	8.92	128	170
Diastolic BP (mm Hg)	95.65	6.70	78	110
Body Mass Index (Kg/m^2)	26.39	5.21	18.16	36.48

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Table-3: Association of Blood Pressure and Education.						
Blood Pressure	Education	N	Mean	SD	Unpaired t - test	P value
SBP	Secondary & Graduate	204	153.61	9.25	6.84	P < 0.001
	Illiterate & Primary	184	147.74	7.42		
DBP	Secondary & Graduate	204	96.82	7.00	3.69	P < 0.001
	Illiterate & Primary	184	94.35	6.10		

N = Number of patients. SBP = Systolic Blood Pressure. DBP = Diastolic Blood Pressure. SD = Standard Deviation. $p < 0.05$ was considered as statistically significant.

Table-4: Association of Blood Pressure and Socio Economic Status.						
Blood Pressure	Socio Economic Status	N	Mean	SD	Unpaired t - test	P value
SBP	Class I, Class II	160	155.30	9.11	9.11	P < 0.001
	Class III, Class IV, Class V	228	147.68	7.31		
DBP	Class I, Class II	160	99.10	5.51	9.40	P < 0.001
	Class III, Class IV, Class V	228	93.23	6.40		

N = Number of patients. SBP = Systolic Blood Pressure. DBP = Diastolic Blood Pressure. SD = Standard Deviation. $p < 0.05$ was considered as statistically significant.

Table-5: Association of Blood Pressure and Occupation.						
Blood Pressure	Occupation	N	Mean	SD	Unpaired t - test	P value
SBP	Skilled, Semi Professional, Professional	128	154.25	8.67	5.50	P < 0.001
	Unemployed, Unskilled, Semi skilled	260	149.14	8.56		
DBP	Skilled, Semi Professional, Professional	128	98.25	4.86	5.56	P < 0.001
	Unemployed, Unskilled, Semi skilled	260	94.37	7.10		

N = Number of patients. SBP = Systolic Blood Pressure. DBP = Diastolic Blood Pressure. SD = Standard Deviation. $p < 0.05$ was considered as statistically significant.

Table-6: Association of hypertension with Body Mass Index and physical activity.				
Parameters		Hypertension Stage 1	Hypertension Stage 2	Total
BMI	BMI < 25	124 (86.1%)	20 (13.9%)	144 (100%)
	BMI ≥ 25	168 (68.9%)	76 (31.1%)	244 (100%)
Total		292 (75.3%)	96 (24.7%)	388 (100%)
$\chi 2 = 14.486$; df = 1; p < 0.001				
Physical activity	< 30 Minutes	171 (78.4%)	47 (21.6%)	218 (100%)
	≥ 30 Minutes	121 (71.2%)	49 (28.8%)	170 (100%)
Total		292 (75.3%)	96 (24.7%)	388 (100%)
$\chi 2 = 2.707$; df = 1; p = 0.100				

BMI = Body Mass Index. $\chi 2$ = Chi-Square test; df = degree of freedom. $p < 0.05$ was considered as statistically significant.

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Table-7: Association of hypertension with addiction.			
Addiction	Hypertension Stage 1	Hypertension Stage 2	Total
None	108 (87.1%)	16 (12.9%)	124 (100%)
Tobacco Chewing	80 (68.4%)	37 (31.6%)	117 (100%)
Smoking Tobacco	61 (70.9%)	25 (29.1%)	86 (100%)
Alcohol	21 (72.4%)	8 (27.6%)	29 (100%)
Both Smoking and Alcohol	22 (68.8%)	10 (31.2%)	32 (100%)
Total	292 (75.3%)	96 (24.7%)	388 (100%)
$\chi 2 = 14.028$; df = 4; p = 0.007			

$\chi 2$ = Chi-Square test; df = degree of freedom. $p < 0.05$ was considered as statistically significant.

Figure 1: Distribution of patients according to co-morbidity.

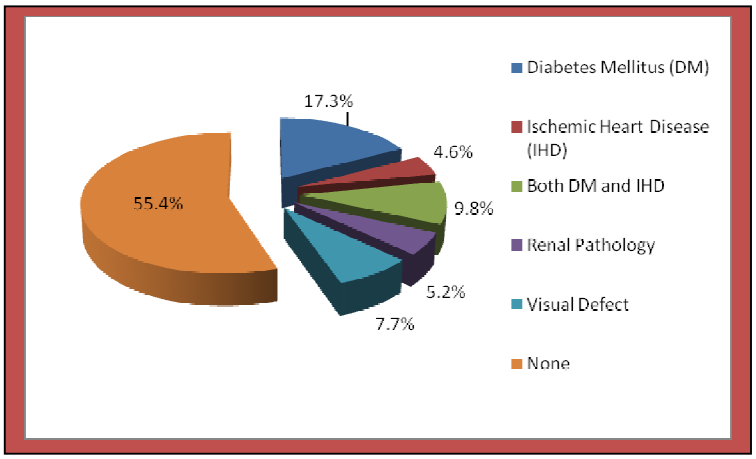
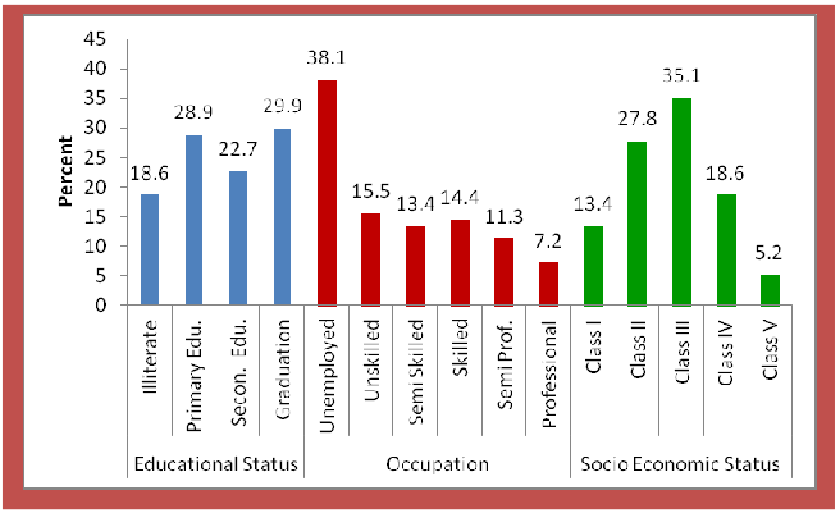


Figure 2: Distribution of patients according to educational status, occupation and socioeconomic status.



Discussion

In our study, out of 388 hypertensive patients, 57.7% were males and 42.3% were females. Majority of patients 42.8% were in the age group of 50 – 59 years. Family history of hypertension was present in 34.5% of patients. A family history of elevated BP is one of the strongest risk factors for future development of HTN in individuals. The BP of first-order adults relatives (parents, siblings), corrected for age and sex, have been shown to aggregate at all levels of BP [10]**.** Epidemiological studies suggest that 20-60% of essential HTN is inherited and remaining is acquired or environmental. In a National study of epidemiology of HTN, the incidence of family history of hypertension, stroke and coronary heart disease was at least 1.5 times more in hypertensive patients. Stroke, as a cause of death in parents and close relatives was 3 to 5 times more in hypertensive patients than in controls [11].

In our study 44.6% of the patients had some kind of associated co-morbidities. Diabetes Mellitus was the most common co-morbidity found in 27.1% of patients. 14.4% of the patients had Ischemic Heart Disease (IHD). 7.7% had visual defects and 5.2% had renal pathology. A Nigerian study found 17.91% diabetics in hypertensive patients [12]**.** In a study done at Riyadh, the most common co-morbidity in hypertension was diabetes mellitus present in 38.4% cases [7].

In our study participants having higher education, higher socioeconomic status, and professional type of work had higher level of blood pressure. A study from Jaipur reported a higher prevalence of hypertension amongst low education or illiterate groups [13]. In India, most of the studies have indicated a higher prevalence of HTN in higher socio-economic groups [14]. In studies done at Lucknow and Shimla reported higher prevalence of hypertension among professionals, executives and traders [11, 15].

In our study, Body Mass Index (BMI) had a significant association with hypertension. For every 10% increase in weight a rise of 6.5 mm Hg in systolic pressure was observed in the Framingham study [16]. Various studies in India have also reported higher BMI among hypertensive patients [17-20].

In our study some kind of addiction was present in 68.04% of patients. Tobacco chewing was present in 30.15% patients, whereas, 21.39% were smokers. It has been reported that tobacco smoking causes acute rise of BP [11]. Many studies from India have shown significant correlation of smoking or tobacco use with HTN [21]. A case control study showed that smoking was an independent risk factor for hypertension [22]. In one of the experimental study, use of pan-masala (mixture of lime, arecnut, catechu, etc.) had shown to significantly increase BP [23].

Conclusion and recommendations

Severity and prevalence of hypertension with increasing age can be considered as a slow and silent epidemic. Large numbers of hypertensive have family history of hypertension which shows a genetic predisposition to this disease. Other predisposing factors noted are obesity, sedentary lifestyle, and addiction in the form of tobacco chewing and smoking in urban areas. Therefore, in order to effectively control it, these patients should be encouraged for regular health checkups, dietary modifications, life style changes and regular physical exercise. Also, strengthening of health services should be done in the form of health education camps and educating people through mass media on hypertension and its risk factors.

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