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HYPERTENSION;

ASSESSMENT OF RISK FACTORS ASSOCIATED WITH HYPERTENSION AND THE KNOWLEDGE OF OUTPATIENTS ABOUT THEIR HEALTH STATUS: A MULTICENTER, CROSS-SECTIONAL STUDY IN MULTAN, PAKISTAN.

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ABSTRACT… Background and Objectives: Asymptomatic nature of hypertension (HTN) has made it a silent killer. The better understanding of the underlying causes or factors can be beneficial in reducing the mortality and morbidity rate. Thus, the present study aims to determine the risk factors associated with HTN among adults and elderly patients visiting outpatient departments (OPDs) and the knowledge of patients about their health status. **Study Design:** Cross-sectional study. **Setting:** Outpatient departments (OPDs) of four tertiary care hospitals (Nishtar hospital, Khawaja Farid Social Security hospital, Railway hospital and Bakhtawar Amin Memorial hospital) of Multan, Pakistan. **Period:** 1st May 2017 and 31st October 2017. **Patients and Methods:** 364 patients (≥18 years−≥60 years of age) in OPDs of four tertiary care hospitals of Multan, Pakistan. Data regarding demographic details, medical history and blood pressure measurements were collected on a structured questionnaire. Data were analyzed by using Statistical Packages for Social Sciences (IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.) and Microsoft Excel (MS Office 2010). **Result:** Overall 38.7% of the participants were suffering from HTN. Most of them were 40-59 years of age and had body mass index (BMI) >23 kg/m^2. Bivariate analysis (p-value <0.005) showed a significant association of age, marital status, gender, weight, and physical activity with HTN. **Conclusion:** The major determinants of HTN include increase in age, obesity, sedentary lifestyle, genetics, diabetes mellitus (DM) and lack of health concerns. Although patients are knowledgeable of their poor health status but make little or no efforts in controlling and preventing HTN.

Key words: Hypertension; Determinants; Age; Obesity; Knowledge.

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INTRODUCTION

The prevalence of Hypertension (HTN) in 30% of the world's population has made it a serious health concern.[1] There are many diseases that can induce HTN and damage vital organs like heart, brain, kidney, and lungs.[2-4] It is considered as a 3rd leading cause of disability-adjusted life-years.[5] A global estimation in 2000 reported that HTN is prevailing in 26.4% of the adults and predicted that this trend will increase up to 60% till 2025.[6] Chronic arterial HTN has raised the rate of morbidity and mortality among local masses. As per an estimation made by WHO in 2002, among 7.1 million deaths HTN associated mortalities account for 13% of the total deaths annually in the global village.[7] There are many previously published studies available that narrate the life threatening outcomes of HTN, its prevalence, pathophysiology and associated risk factors.[8,9]

HTN is also termed as a silent killer because of its asymptomatic nature. So, the Joint National Commission (JNC) VIII guidelines has mentioned various treatment goals for adult and elderly population. According to these guidelines, systolic blood pressure (SBP) must be <150 mmHg and diastolic blood pressure (DBP) must be <90 mmHg for geriatrics, while in patients <60 years of age DBP should not exceed from 90 mmHg and SBP should be <140 mmHg. Also, in adult population or patients suffering from chronic diseases SBP should be 140 mmHg and DBP should be 90 mmHg.[10]

The balance between cardiac output and arterial resistance is the determinant of blood pressure (BP). But in HTN this balance is disturbed with lesser supply of oxygen to cardiac tissues. The strain causes dysfunctioning of cardiovascular system and kidney failure.

Although risk of HTN is associated with various behavioral and physical factors but in various cases demographic characteristics e.g., age, gender, financial status, dietary intake, stress, marital status, and co-morbidities are the major factors responsible for it.

Pakistan, a low middle income country with a total population of 207.7 million, is facing many health crises e.g., cardiovascular diseases induced HTN.[11] According to a study conducted by Jafar et al in 1994 overall 22.7% urban Pakistanis were reported to have HTN versus 18.1% in rural subjects.[12] The number of hypertensive patients is continuously increasing with each passing day but there is no community based data available regarding hypertensive crises and its risk factors due to lack of reporting system. Therefore, the aim of the present study was to estimate the risk factors of HTN and the knowledge of its patients about their health status in Multan.

PATIENTS AND METHODS

Study Design and Settings

A descriptive and cross-sectional study was employed according to the objectives of the study between 1st May, 2017 and 31st October, 2017. The study was conducted in the outpatient departments (OPDs) of four tertiary care hospitals (Nishtar hospital, Khawaja Farid Social Security hospital, Railway hospital and Bakhtawar Amin Memorial hospital) of Multan, Pakistan.

Study Population and Sample Size

Multan is a populous city of Pakistan with an approximate population of 1,871,843.[13] The minimum sample size was 312, as calculated by using the Raosoft sample size calculator,[14] with 99% confidence interval (CI) and 5% margin of error [Equation 1].

$$n = N\,x/((N-1)E2 + x)$$ .....Equation 1

Where N is the population size, x is the CI and E is the margin of error. With an added contingency of 20% for non-response and inappropriate responses, the final sample was calculated to be 364 patients. In selection of participants of the study, willing adult patients (18 years or older), suffering from Diabetes Mellitus (DM) and OPDs of the healthcare settings were included. Participants were excluded from the study if they were inpatients, <18 years of age, experiencing disease induced HTN (fever, gestational HTN, Renovascular HTN, Glomerular disease, Aldosteronism, Thyroid problems, Cushing syndrome or any other acute illness). A systematic random sampling technique was used to select the study participants.

Data Collection Procedure

A structured questionnaire was designed and interviews were conducted either directly from the patients or by the head of their family. The data collection tool comprised of two parts: 1) demographic characteristics and risk factors (gender, age, weight, educational level, marital status, employment status, smoking, physical activity and salt intake), 2) awareness of HTN among participants, family history and lifestyle.

The investigational team consisted of a medical practitioner and a trained nurse. This team recruited the patients and collected data. A standardized mercury sphygmomanometer was used for measuring BP in order to evaluate that either patient is hypertensive or normotensive. Three consecutive readings were obtained in the morning when patient was at rest and in sitting position. Each time the procedure of collecting history and BP measurements took approximately 30 minutes for completion. The data was collected only once and no patient was approached twice.

Data Analysis

Descriptive statistics such as frequency and percentages were used to present the continuous variables. While Bivariate analysis and Chi square test (p-value <0.05) were used to test the significance of the data. Data were analyzed by using Statistical Packages for Social Sciences (IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.)

and Microsoft Excel (MS Office 2010).

Definitions

- Illiterate: If the person has not obtained any education.
- Primary education level: Education from Class 1 to Class 5 was considered as primary education level.
- Secondary education level: Secondary education was considered to begins from grade 6 and lasts for eight years (up to grade 13).
- Tertiary education level: Education equals to or above grade 14 was considered as tertiary education level.
- Underweight: If the person have body mass index (BMI) <18.5 kg/m^2.
- Obese: If the person has BMI >23 kg/m^2.
- Normal weight: If the person has BMI in between 18.5 and 22.9 kg/m2.
- Restricted salt intake: If the person takes <1500 mg of sodium per.
- Current smoker: The person who smokes ≥ 5 cigarettes on daily basis.
- Non-smoker: One who never smoked or have stopped smoking ≥ 3 months.
- Physical activity: It encompasses regular exercise and walk.
- Sedentary lifestyle: Lifestyle without any physical activity.
- Hypertension: According to the JNC VIII guidelines, if the mean systolic arterial pressure (SAP) is >140mmHg and mean diastolic arterial pressure (DAP) is > 90mmHg then patient is said to be hypertensive.[10]
- Normotensive: According to the JNC VIII guidelines, if the mean SAP is >120mmHg and DAP is <80mmHg then the person is termed as normotensive.[10]

Ethical Approval

Ethical approval was obtained from the Medical Research Ethics Committee (MREC) of Nishtar Medical College, Multan (Reference: 03-2017/ REC, dated March 16, 2017). The permission to conduct this study was also obtained from the administrators of each healthcare settings. The purpose and protocols of this study were thoroughly explained to every participant and their verbal consents were obtained. Written consent was not possible for most of the respondents either because they were illiterate or they had problems in reading and/or signing the consent document.

RESULTS

Overall, 364 patients were investigated in the study. Among them, 62.6% (n=228) were 18-39 years of age, 45.1% (n=164) had secondary level of education, 32.1% (n=117) were employed, 67.6% (n=246) were married, 47.5% (n=173) were obese and 55.8% (n=203) took reduced amount of salt in diet. Also, 38.7% (n=141) participants were hypertensive (Table-I).

Among all the hypertensive patients (n=141), 86.5% (n=122) were aware of their health status. In 64.5% (n=91) of the cases HTN affected the patient's ability to perform their daily routine, 90.8% (n=128) were taking hypertensive medicines regularly, 41.8% (n=59) patients had family history of HTN and 66.7% (n=94) patients had no interest in their health (Table-II).

Bivariate analysis showed the association between HTN and several risk factors (Table-III). It was found that age, gender, marital status, financial status, weight, educational background and lifestyle had significant association with HTN.

DISCUSSION

Globally, HTN is the leading cause of 7.1 million mortalities.[15] Majority of the previously published literature is based on the findings of prevalence and HTN associated risk factors. This problem has worsen the health status of individuals living in under developed countries. In this study, 38.7% patients were suffering from HTN. In contrast to other studies, the number of hypertensive patients are quite high. A study in Hyderabad revealed that 18.5% of the participants were hypertensive,[16] while another study revealed that 18.1% of backs and 23.8% of whites in Cuba were suffering from HTN.[9] Similar to our findings a study reported prevalence of HTN among 30% of the population worldwide.[17] Also another study reported 32.3% of hypertensive cases among the study population in Zambia.[18]

Variables		N (%)
Gender	Male	151 (41.5)
	Female	213 (58.5)
Age (years)	18-39	228 (62.6)
	40-59	104 (28.6)
	≥ 60	32 (8.8)
Education	Illiterate	133 (36.5)
	Primary	41 (11.3)
	Secondary	164 (45.1)
	Tertiary	26 (7.1)
Financial status	Employed	117 (32.1)
	Unemployed	189 (51.9)
	Student	28 (7.7)
	Retired	30 (8.2)
Weight	Normal	144 (39.6)
	Underweight	47 (12.9)
	Obese	173 (47.5)
Marital status	Single	95 (26.1)
	Married	246 (67.6)
	Widowed	18 (4.9)
	Divorced	5 (1.4)
Intake of salt in diet	Yes	203 (55.8)
	No	161 (44.2)
How often do you do physical activity?	1-3 times a week for ≥30 minutes	59 (16.2)
	3-5 times a week for ≥30 minutes	63 (17.3)
	Daily	133 (36.5)
	None	109 (29.9)
Do you smoke cigarettes?	Yes	45 (12.4)
	No	319 (87.6)
Distribution of Hypertension study population as per JNC VIII criteria	Normotensive	223 (61.3)
	Hypertensive	141 (38.7)

Table-I. Characteristics of the respondents (n=364)

Variables		N (%)
Has your doctor told that you have hypertension?	Yes	122 (86.5)
	No	19 (13.5)
How often do you see your doctor for blood pressure checkups?	Once in a month	14 (9.9)
	Four times a month	6 (4.3)
	Regularly	37 (26.2)
	When needed	84 (59.6)
Do you take blood pressure at home?	Yes	53 (37.6)
	No	88 (62.4)
Does high blood pressure affect the ability to perform daily activities?	Yes	91 (64.5)
	No	32 (22.7)
	Not known	18 (12.8)
Have you ever been in emergency for high blood pressure?	Yes	64 (45.4)
	No	77 (54.6)
Do you take any medication to control your blood pressure?	Yes	128 (90.8)
	No	13 (9.2)
Do you have blood relatives with the history of hypertension?	Yes	59 (41.8)
	No	33 (23.4)
	Don't Know	49 (34.8)
Do you have diabetes? If yes, which type?	Type 1	16 (11.4)
	Type 2	33 (23.4)
	None	92 (65.2)
What are your health goals and interest?	Eating better	13 (9.2)
	Exercising	7 (4.9)
	Losing weight	8 (5.7)
	Reducing stress	19 (13.5)
	No interest	94 (66.7)

Table-II. Knowledge of hypertensive patients about their health status (n=141)

Variables		Total N (%)	Hypertensive patients N (%)	p-value
Gender	Male	151 (41.5)	32 (22.7)	0.000
	Female	213 (58.5)	109 (77.3)	
Age (years)	18-39	228 (62.6)	34 (24.1)	0.000
	40-59	104 (28.6)	86 (60.9)	
	≥60	32 (8.8)	21 (14.9)	
Education	Illiterate	133 (36.5)	49 (34.8)	0.002
	Primary	41 (11.3)	22 (15.6)	
	Secondary	164 (45.1)	61 (43.3)	
	Tertiary	26 (7.1)	9 (6.4)	
Weight	Normal	144 (39.6)	52 (36.9)	0.007
	Under weight	47 (12.9)	4 (2.8)	
	Over weight	173 (47.5)	85 (60.3)	
Marital status	Single	95 (26.1)	12 (8.5)	0.000
	Married	246 (67.6)	111 (78.7)	
	Widowed	18 (4.9)	15 (10.6)	
	Divorced	5 (1.4)	3 (2.1)	
Financial status	Employed	117 (32.1)	27 (19.1)	0.001
	Unemployed	189 (51.9)	99 (70.2)	
	Student	28 (7.7)	11 (7.8)	
	Retired	30 (8.2)	4 (2.8)	
Physical activity	1-3 times a week	59 (16.2)	9 (6.4)	0.000
	3-5 times a week	63 (17.3)	4 (2.8)	
	Daily	133 (36.5)	39 (27.7)	
	None	109 (29.9)	89 (63.1)	
Smoking	Yes	45 (12.4)	5 (3.6)	0.081
	No	319 (87.6)	136 (96.5)	
Salt restricted diet	Yes	203 (55.8)	114 (80.9)	0.000
	No	161 (44.2)	27 (19.1)	

Table-III. Bivariate analysis of risk factors with hypertension

The results of present study revealed that most of the participants had poor educational background but many of them were employed. Majority of the hypertensive patients were illiterate and unemployed. These financial crises can cause hindrance towards the better control on their hypertensive state. Similar to our findings, a study found that illiteracy is one of the major determinants for HTN.[19] Besides this factor, many patients were well aware of their hypertensive status but ignorant about its management.

Healthy and active lifestyle can be beneficial for hypertensive patients. But in this study most of the patients were living a sedentary lifestyle because they were not involved in any physical activity. Thus modification in lifestyle can be attributed as a non-pharmacological therapy for HTN.[20]

HTN can be induced by stress. In this study most of the hypertensive patients were married and the family stress caused their BP to deviate from normal to higher level. This fact is evident from a previously published study where increased chronic stress has showed a direct relationship with HTN.[21]

We also found that HTN is significantly associated with age. It means that risk of HTN increases with the advancement in age. This fact is evident from the study conducted on US population wherein most of the hypertensive agents were elderly (60%) people as compared to adults (4%).[22] This is because of the reason factors like higher level of stress and lesser involvement in physical activities are associated with elderly patients. Similar to our findings a study conducted in Peshawar, Pakistan demonstrated age as a determinant of HTN.[23]

BMI is also associated with HTN. Our findings revealed a positive correlation with HTN because most of the hypertensive patients were obese. Similarly a study reported that HTN was more prevalent among obese individuals as compared to those who had normal BMI.[16] Another study also showed a significant association of age and higher BMI with HTN.[23] If the BMI of obese patient is shifted towards normal then risk of HTN can be lessened.[24] A study also revealed age and BMI as the major determinants of HTN.[25]

HTN is an inheritable characteristic. This is the reason that most of hypertensive patients in this study had a family history of HTN. This factor is also evident from a previously published study conducted in Chennai wherein most of the hypertensive adults patients had hypertensive parents.[26]

In this study majority of the hypertensive patients took their medications regularly. This demonstrates a concern of patients towards their health status and good patient compliance with the medication. But a survey based study reported lower number of patients who were concerned about their medication and health status.[27]

HTN can be induced from other chronic diseases like DM. In this study a small number of hypertensive patients are also suffering from DM. Similar to our findings, a study reported that 17.9% of the hypertensive patients were suffering from DM.[28] Findings also suggest that nearly half of the hypertensive patients were brought to the emergency department because of the sudden rise in their BP. Moreover more than half of these patients were unable to perform their routine activities and majority of them showed less interest in their health conditions.

Hence, it is recommended that proper counseling of hypertensive patients about weight, diet and lifestyle modification is mandatory. Such system must be introduced which ensure the self-management of HTN by the patients. The better understanding of HTN associated risk factors is also crucial for attaining patient adherence and good therapeutic outcomes. Also various strategies should be adopted by the healthcare professionals through which interest of the patients about their health status can be provoked.

Strength and Limitations

- Previously published literature in Pakistan is restricted to evaluate prevalence or risk factors among patients of a single healthcare setting. To our best knowledge this is the first multicenter study that demonstrates the HTN associated risk factors along with knowledge of hypertensive patients about their health status.
- The findings of present study cannot be generalized to entire country because of the small sample size and shortened length of study period.
- Also the outcomes of the HTN associated risk factors can't be evaluated. Therefore, longitudinal studies must be conducted on this topic in the settings of low middle income countries (LMICs).

CONCLUSION

It is concluded that HTN is associated with several risk factors including age, marital status, gender, weight, and physical activity. While smoking didn't show a significant association with HTN. Although, hypertensive patients were knowledgeable about their health status but were not interested in maintaining good health. Also some of the patients were not taking antihypertensive agents. Thus, proper counseling can be beneficial in reducing the risk factors and disease burden of HTN.

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ABILITY MAY GET YOU TO THE TOP,
BUT IT TAKES **CHARACTER** TO KEEP YOU THERE.

"John Wooden"

AUTHORSHIP AND CONTRIBUTION DECLARATION

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1	Hafiz M. Bilal	Conceptualize, designed and review.	
2	Neelam Iqbal	Data collection, analysis and write up.	
3	M. Kamran Raza	Data collection, write up and reivew.	