ORIGINAL ARTICLE

Assessment of the risk factors of hypertension among adult & elderly group in twin cities of Pakistan

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Abstract

Objective: To estimate the prevalence of hypertension and to explore the risk factors associated with it.

Methods: In a cross-sectional study, a population based survey was conducted on inhabitants of Rawalpindi-Islamabad region, 219 individuals; aged 18 years or above were included in the study. Blood pressure was measured along with information about individual's demographic and socio-economic characteristics were obtained using a standard questionnaire.

Results: Overall prevalence of hypertension was 29.22% (males: 21.9% and females: 78.1%) in individuals residing in Rawalpindi-Islamabad. High blood pressure is more associated with obesity (59.4%) and a progressive increase in hypertension was observed with increasing age. Bivariate analysis revealed that hypertension has a significant correlation (p-value<0.05) with age, gender, family status, weight and physical health.

Conclusion: The study concludes that our generation is well aware about the risks and consequences of hypertension, but they still continue to make no or little effort in managing or preventing it. The factors contributing to hypertension are low physical activity, diet and lack of interest to maintain their health.

Keywords: Bivariate analysis, Hypertension, Prevalence, Rawalpindi-Islamabad, Risk factors. (JPMA 67: 1664; 2017)

Introduction

Hypertension with a prevalence of 30% throughout the world is considered a major concern.[1] Hypertension has a direct relationship with many diseases and can cause damage to the heart,[2] kidneys,[3] brain, lungs, and is associated with end organ failure.[4] A study conducted on the adult population in 2000 showed that an estimated 26.4% (972 million) adults suffered from hypertension. The number was predicted to increase by approximately 60% in the year 2025 to a total of 29.3% (1.56 billion).[5] Chronic arterial hypertension is associated with significant morbidity and mortality in the general population. According to WHO report 2002, overall 7.1 million deaths have been reported throughout the year accounting for 13% deaths worldwide.[6] Many studies have been performed on hypertension because of its lethal effects on the general population. Major areas of study are the pathophysiology of hypertension,[7] risk factors, effect of education and ethnicity,[8] and the most important research factor is the prevalence of hypertension in different parts of the world.

Extensive epidemiological studies have been performed worldwide to estimate the potential risk to the population. RB Singh et al.,[9] reported the prevalence of hypertension in Asia, to be 15-35% in urban adult populations, whereas; the rural population is 2-3 times less effected than the urban population. The prevalence of hypertension varies around the world. The lowest prevalence of hypertension is found in rural India (3.4% in men and 6.8% in women) and the highest prevalence in Poland (68.9% in men and 72.5% in women).[5]

The Joint National Commission 8 guidelines for hypertension states that in the general population aged 60 years or older, the major SBP goal is lower than 150mmHg and DBP goal is lower than 90mmHg, whereas in people younger than 60 years, DBP goal is <90mmHg and SBP goal is <140mmHg. In the population aged 18 years or older having chronic kidney disease or diabetes, treatment goal of 140mmHg for SBP and 90mmHg for DBP is suggested.[10] Hypertension is an asymptomatic disease therefore it is known as a 'silent killer'.

Normal blood pressure is maintained by a balance between cardiac output and arterial resistance. In hypertension, workload on the heart is increased in order to deliver blood to the tissues and this exerts strain on the heart and the arteries. Over time, constant strain on the heart leads to cardiovascular dysfunction which contributes to other diseases such

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as congestive heart failure, kidney failure and myocardial dysfunction.

Certain mechanisms in the body are involved in regulating blood pressure. Kidneys play an important role in maintaining the systemic blood pressure by adjusting the sodium excretion rate. This rate is maintained by the renin-angiotensin aldosterone system; this system is responsible for the renal vasoconstriction, which in turn leads to a reduced flow in the glomerulus leading to increase in Na+ retention in tubules.[1]

There are many causes of hypertension, the risk of hypertension increases with physical and behavioural attributes but is greatly influenced by demographic characteristics such as; gender, age and social status, intake of salt, obesity, family history, alcohol, stress and many other diseases.

Pakistan; a country with a total population of 191.7 million is facing a growing epidemic of cardiovascular diseases.[11] Hypertension is a highly prevalent disease in Pakistan and is increasing day by day. There is very little community based data on hypertension in Pakistan, therefore information acquired on the occurrence of hypertension in the general population of Rawalpindi-Islamabad is desirable. According to a study conducted by Jafar et al in 1994,[12] overall 22.7% urban Pakistanis were reported to have hypertension versus 18.1% in rural subject's.

Hypertension is a major problem not only in Pakistan but in many other developed and under developed countries. Although a large number of studies have been conducted on hypertension medication; and its risk factor causes, the incidence is rising steadily. In Pakistan, poor diet and hygienic conditions, lack of education and other environmental factors are contributing to the increased risk of hypertension. The aim of the present study was to estimate the prevalence of hypertension in Rawalpindi-Islamabad and to explore the risk factors associated with it.

Subjects and Methods

The present study was conducted from March 2014 to August 2014 in the twin cities Rawalpindi-Islamabad; situated in the northeast part of Punjab province. These, the most populated urban cities of Pakistan with a population of approximately 4.5 million. The study incorporated random screening of the inhabitants of the twin cities for hypertension and its associated risk factors.

The present community based cross sectional study included 219 individuals, 18 years and above. Subjects <18 years or experiencing fever, pregnancy or any other acute illness were excluded. Data was collected through a structured questionnaire and included clinic and in-home visits for patients interviewed either directly or by any other member of the house.[13]

Detailed history of the individual's demographic and socioeconomic characteristics such as; age, gender, education, weight, occupation, family status, salt intake was recorded. Illiteracy was defined as those with incomplete primary education. Weight is categorized as underweight; those with BMI <18.5 kg/m^2 and overweight population suffering from obesity has the BMI >23 kg/m^2, whereas, the normal individuals have the BMI in between 18.5 and 22.9 kg/m^2.[14] Question about the salt restricted diet was put to every participant; those who answered no were considered as taking regular or high salt in their diet and those who answered yes had low salt intake. History regarding smoking, and physical activity was also recorded. Current smokers were defined as those who smoke daily, while non-smokers are those who have stopped smoking in the past or never smoked. Individuals were considered physically active if they participated in any daily exercise programme (such as gym, daily walk etc). Subjects undergoing no physical activity were labeled to have a sedentary lifestyle. Information about the treatment and control of hypertension along with co-morbidities was also collected by a standard questionnaire. The interview also included questions on the awareness of hypertension, family history and lifestyle modification.

Verbal consent was obtained from every participant. Blood pressure was measured with a standardized mercury sphygmomanometer in sitting position after 5 minutes rest, three consecutive readings were recorded and a mean value of the three was obtained. Blood pressure was measured in the morning time and then complete history was obtained. The procedure lasted on average 30 minutes. According to the general guidelines; Hypertension is defined as the mean systolic arterial pressure (SAP) more than 140mmHg and mean diastolic arterial pressure (DAP) more than 90mmHg, while those with systolic arterial pressure more than 120mmHg and diastolic blood pressure less than 80mmHg are labeled as normotensive.[10]

Statistical Methods

Continuous variables are presented as frequency (%). Bivariate analysis was used to determine the statistical significance of the variables. To evaluate the data, blood pressure was graded according to JNC VIII criteria. Data collected was analyzed by using SPSS version 17.0

(statistical package of social sciences) software. We first computed descriptive analysis of individual's demographic and socioeconomic characteristics after that bivariate correlation was conducted. Chi square test was applied and results with p value <0.05 were considered statistically significant.

Results

Table-1 shows the salient features of the study population. Out of 219 participants, 130 (59.4%) were women and 89 (40.6%) were males. Majority of the patients 22 (34.37%) were in the age range 40-49 years. A total of 93 (42.5%) participants had completed secondary education, 70 (32.0%) were employed and 21 (9.6%) were students. Majority of the participants were married 149 (68.0%) while the others were single (26.0%) or widowed (4.6%), 103 (47.1%) subjects were reported near overweight. This table also included questions regarding lifestyle. In all 56.6% individuals were taking a reduced amount of salt in their diet.

Of 219 individuals, overall prevalence of hypertension was 29.22% (males 21.9% and females 78.1%), Table-1 represent sociodemographic factors of 219 participants. Of all participants studied, 155 were normal with no elevated blood pressure and 64 were hypertensive with SBP more than 140 mmHg and DBP more than 90 mmHg.

Table-1: Salient features of 219 study population.

Gender	Male= 89(40.6%)	Female= 130(59.4%)
Age group, with number and percentage of patients in every group		
18-28 years	110	(50.2%)
29-39 years	25	(11.4%)
40-49 years	42	(19.2%)
50-59 years	19	(8.7%)
>60	23	(10.5%)
Education level		
Illiterate	80	(36.5%)
Complete secondary	93	(42.5%)
Professional	14	(6.4%)
University	23	(10.5%)
Incomplete university	9	(4.1%)
Economical status		
Employed	70	(32.0%)
Unemployed	111	(50.7%)
Retired	17	(7.8%)
Student	21	(9.6%)
Weight		
Underweight	28	(12.8%)
Normal	88	(40.1%)
Overweight	103	(47.1%)
Family status		
Married	149	(68.0%)
Single	57	(26.0%)
Widowed	10	(4.6%)
Separated	3	(1.4%)
General activities		
Are you taking a salt restricted diet?	Yes= 124(56.6%)	No= 95(43.4%)
How often do you do physical activity?		
1-3 times a week	36	(16.4%)
3-5 times a week	38	(17.4%)
Daily	80	(36.5%)
None	65	(29.7%)
Do you smoke cigarettes?	Yes= 27(12.3%)	No= 192(87.7%)
Distribution of Hypertension study population as per JNC VIII criteria		
Normal	155	(70.77%)
Hypertension with SBP >140 mmHg DBP > 90 mmHg	64	(29.22%)

Prevalence of hypertension in study population

Gender:	Total number	Hypertensive	Prevalence
Male	89	14	21.90%
Female	130	50	78.10%
Total	219	64	29.22%

Table-2: Medical characteristics of patient (n=64).

Has your doctor told that you have hypertension?		
Yes	62	96.9%
No	2	3.1%
How often do you see your doctor for blood pressure checkups?		
Monthly	6	9.37%
Weekly	2	3.12%
Daily	16	25%
When needed	40	62.5%
Do you take blood pressure at home?		
Yes	23	35.9%
No	41	64.06%
Does high blood pressure affect the ability to perform daily activities?		
Yes	43	67.2%
No	15	23.4%
Don't know	6	9.4%
Have you ever been in emergency for high blood pressure?		
Yes	31	48.4%
No	33	51.6%
Do you take any medication to control your blood pressure?		
Yes	59	92.2%
No	5	7.8%
Do you have blood relatives with the history of hypertension?		
Yes	27	42.2%
No	15	23.4%
Don't know	22	34.4%
Do you have diabetes? If yes, which type?		
No	41	64.1%
Diabetes type 1	7	10.9%
Diabetes type 2	16	25%
What are your health goals and interest?		
Eating better	7	10.9%
Exercising	3	4.7%
Losing weight	4	6.2%
Reducing stress	10	15.6%
No interest	40	62.5%

Table-3: Bivariate relationship between risk factors and hypertension.

Variable	Total (%)	Hypertensive patients (%)	p-value
Age (years)			
18-28	110 (50.2)	6 (9.37)	
29-39	25 (11.4)	9 (14.06)	
40-49	42 (19.2)	22 (34.3)	0.000
50-59	19 (8.7)	13 (20.3)	
>60	23 (10.5)	14 (21.8)	
Gender			
Male	89 (40.6)	14 (21.8)	0.000
Female	130 (59.4)	50 (78.12)	
Family status			
Married	149 (68.0)	50 (78.12)	
Single	57 (26.0)	5 (7.81)	
Widowed	10 (4.6)	7 (10.9)	0.000
Separated	3(1.4)	2 (3.12)	
Weight			
Underweight	28 (12.8)	2 (3.1)	
Normal	88 (40.1)	24 (37.5)	0.008
Overweight	103 (47.1)	38 (59.4)	
Education level			
Illiterate	80 (36.5)	39 (60.9)	
Complete secondary	93 (42.5)	14 (21.8)	0.002
Professional	14 (6.4)	6 (9.37)	
University	23 (10.5)	3 (4.68)	
Incomplete university	9 (4.1)	2 (3.12)	
Economical status			
Employed	70 (32.0)	12 (18.75)	
Unemployed	111 (50.7)	45 (70.31)	0.001
Retired	17 (7.8)	5 (7.81)	
Student	21 (9.6)	2 (3.12)	
Physical activity			
1-3 times a week	36 (16.4)	4 (6.25)	
3-5 times a week	38 (17.4)	2 (3.12)	0.000
Daily	80 (36.5)	18 (28.12)	
None	65 (29.7)	40 (62.5)	
Smoking			
Yes	27 (12.3)	3 (4.68)	0.076
No	192 (87.7)	61 (95.3)	
Salt restricted diet			
Yes	124 (56.6)	52 (81.25)	0.000
No	95 (43.4)	12 (18.75)	

Table-2 has health check questions that were only asked from hypertensive individuals. The basic purpose was to evaluate if the population was aware of their hypertensive state. The population who responded yes was 96.9%, while only 3.1% were unaware of their hypertension. A total of 43 (67.2%) patients reported that high blood pressure affects their ability to continue with everyday routine, 59 (92.2%) patients were taking medication to control their high blood pressure. Twenty seven (42.2%) patient's revealed family history of high blood pressure, 40 (62.5%) of the patients were not interested in their health but many tried to focus on relieving stress.

Bivariate analysis of hypertension with various associated risk factors (Table-3) shows an increase in the prevalence of hypertension with age, gender, family status, weight, economic status, education level and physical activity ($p< 0.05$) whereas, smoking is not associated with hypertension.

Discussion

Hypertension is one of the leading causes of death around the world, killing 7.1 million people globally.[6] Many studies have been performed on hypertension to know the prevalence and its associated risk factors. It is one of the most important health problems in developing countries. In the current survey; 219 participants aged 18 years or above, were interviewed and the results revealed that the prevalence of hypertension in our twin cities is 29.22%. The results of the current study is much higher than other surveys such as; the prevalence found by Mahesar et al.,[15] was 18.5% in urban population of Hyderabad; Pedro et al.,[8] found prevalence to be 18.1% for blacks and 23.8% for whites in a non industrialized country, Cuba. This prevalence is in accordance with the study conducted by Haralambos G.[1] who states figures of 30% around the world. Furthermore, Seter et al.,[16] found the prevalence of hypertension to be 32.3% among the adults of Kitwe, Zambia. Another study conducted on hypertension to estimate the prevalence worldwide by Patricia et al.[5] found the figures to be lower in rural India (3.4% in men and 6.8% in women) and highest in the Poland (68.9% in men and 72.5% in women). In our study the prevalence of hypertension calculated in males (21.9%) is lower than in the females (78.1%).

Out of 219 individuals, 93 (42.5%) participants had completed their secondary education, whereas 80 (36.5%) participants were illiterate or had only completed their primary education, however; only 70 (32.0%) individuals were employed. A large fraction of hypertensive (n=64) is illiterate (60.9%) and unemployed (70.3%) which depicts a poor control on their hypertensive state. This actuality is supported by Astagneau et al.,[17] who pointed out that in the urban African population; illiteracy is one of the major risk markers for hypertension. Being illiterate, still greater part of the populace is aware of their hypertensive status (96.9%). Due to the lack of literacy; most of them are unaware of the management of hypertension.

Majority of the patients were not living a healthy lifestyle, with only 18 out of 64 were involved in physical activity

while 40 patients were leading a sedentary life. Three patients still smoked. According to a research conducted by Lisa et al.,[18] moderate amount of physical work out daily lowers blood pressure and it is an advantageous non-pharmacological therapy.

Our Study illustrates that 78.12% hypertensive residents were married or had a family life which itself is a foremost risk factor for hypertension. Family stress or any form of stress deviates blood pressure from normal to higher levels. This is evident from the work of Gasperin et al.,[19] showing that increased chronic stress has a direct relationship with hypertension.

Age distribution of the participants showed majority 22 (34.37%) belonging to 40-49 years, ($p<0.05$) showing a significant correlation with age. It is evident from the results that level of blood pressure increases with the age. In the US; survey report (1993) the prevalence rate was lower (4%) in the age group 18-24 years but much higher (60%) in the age group 65-74 years.[20] In older age, the increase in stress and less physical activity can lead to high blood pressure. According to a research conducted in Peshawar by Anjum et al.,[21] it was concluded that hypertension is directly associated with age. In males, the prevalence was high in all age groups but in females above 59 years, there was a steep rise in the prevalence.

In our research, out of 64 hypertensive, 37.5% subjects were normal while majority were obese (59.4%), showing positive correlation between obesity and hypertension. Our results are supported by study conducted by Mahesar et al.[15], who reported that hypertension was more prevalent in obese (65%) than in non-obese (6.3%) subjects. Obesity is a major risk factor for hypertension.[22] A research conducted in Peshawar by Anjum et al.,[21] found that hypertension exhibits a strong relationship with age and body mass index (BMI). With a shift from normal BMI; the incidence of hypertension increases, making obesity a significant modifiable risk factor for hypertension. This is similar to a study conducted in North India by Yadav et al;[23] who concluded that prevalence of hypertension (32.2%) was high with increasing age, body mass index and obesity (86.7%).

In our study, out of 64 hypertensives, 27 (42.2%) patients had family history of hypertension, which may be considered as a danger to their children. Parents suffering from hypertension are most likely to have hypertensive children, this fact is supported by Jasmine et al,[24] from Chennai who found 41.86% hypertensive adolescents to have hypertensive parents.

However; 59 (92.2%) patients are taking medications on a daily basis to control their blood pressure in our study. This percentage is much higher than reported in the survey carried out by Vicky et al,[25] in which only 53% population was taking the prescribed medication. This demonstrates that in our twin cities people are more concerned about their hypertensive state.

A study conducted by Olusegun et al,[26] determined that out of 240 people; 43 hypertensive patients had coexisting diabetes mellitus. In our study, this risk was high as out of 64 hypertensive patients, 23 patients had diabetes mellitus.

Thirty one (48.4%) patients were brought to the emergency department due to an acute rise in their blood pressure. Furthermore, 43 (67.2%) patients reported that following high blood pressure levels, they were incapable of performing their daily activities. Whereas 40 (62.5%) patients showed lack of interest in improving their health condition.

Conclusion

Our study showed that the incidence of hypertension is increasing in Pakistan. Our study confirmed a high prevalence of 29.22% in the twin cities of Pakistan; about 62.5% individuals were not interested in maintaining their health status, and 7.8% patients were not currently taking medication to control their blood pressure, which may lead to severe health hazards in the future. There is an urgent need to counsel patients in order to maintain their health status so that the risk of hypertension can be minimized.

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