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Assessment of the Risk Factors of Hypertension Among Adults in Pakistan

Muhammad Tariq, Muhammad Aleem Ud Din, Zia Ul Mustafa, Shafait Ali Rana*, Ramla Kazmi, Adeel Qamar***, Moiz Ahmed****, Kiran Abbas******

Department of Medicine, Sahara Medical College, Narowal Pakistan, *Department of Medicine, Sialkot Medical College, Sialkot Pakistan, **Department of Dermatology, Sughra Shafi Medical Complex, Narowal Pakistan, ***Department of Gastroenterology, Sahara Medical College, Narowal Pakistan, ****Department of Medicine, Jinnah Postgraduate Medical Center Karachi Pakistan

ABSTRACT

Objective: Toevaluate the distribution of risk factors and determined their association with hypertension in Pakistani population.

Study Design: Prospective longitudinal study.

Place and Duration of the Study: The study was conducted in different hospitals in Punjab and Sindh , Pakistan from Dec 2018 to Jun 2019.

Methodology: Data of subjects between the ages of 18-75 were included in the study using non-probability convenience sampling technique. A questionnaire was used to record socio demographic information and risk assessment was done. Weight and blood pressure measurements were also recorded. Bivariate analysis was used for analysis to identify risk factors associated with hypertension.

Result: A data of 350 subjects was recorded with a mean age±SD of 43.7±10.5 years. The prevalence of hypertension was recorded to be 26%. Prevalence of current smoking, and passive smoking was 57(16%) and 11(3%) respectively. Gender, smoking, level of education, physical inactivity, were each significantly associated with increased risk for hypertension.

Conclusion: Our study demonstrates that in Pakistan, increasing age, marital status, level of education, poor dietary habits, smoking, obesity, and other modifiable factors are contributing to the increased risk and prevalence of hypertension.

Keywords: Cardiovascular diseases, Hypertension, Obesity, Passive smoking, Risk factors, Smoking.

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INTRODUCTION

Hypertension is the mostprominent risk factor for morbidity and mortality worldwide.[1] Historically, it was identified as the disease for the high-income countries however; recent data has revealed that hypertension is a cause for global concern and requires our immediate attention.[2] It has been established that about 75% to 80% of the deaths worldwide as a result of cardiovascular diseasebefall ondeveloping countries.[3] The cumulative prevalence of this disease in developing countries signify a considerable public health issue with accompanyingsocioeconomic effects.[4]

The low-middle income countries are witnessing greater proportion of aged populations, rapid urbanization and globalization of unhealthy lifestyles. In Pakistan the high frequency of urbanization has given rise to many squatter settlements or more commonly known as slums and katchiabadis. The inhabitants of these squatter settlements are deprived of basic necessities of health, water, sanitation, and education.[5,6] The urban poor often adopt less healthy lifestyles. They are more sedentary than rural residents and tend to consume foods high in saturated fat, salt and sugar.[7] The urbanized life style subsequently leads to unhealthy dietary practices with reduced physical activity, resulting in the rise of morbidity and mortality among these urban dwellers.[8] In addition to this, limited access to healthcare and unaffordability of patients places them at a greater risk for complications resulting from untreated hypertension.[9] Underlying socioeconomic constraintsgravely affect the exposure and vulnerability of patients to the risk factors of hypertension.[10]

There are many risk factors associated with hypertension, andupsurges with physical and behavioralcharacteristics but is significantlyswayed by demographic features such assex, age and socioe-conomic status, dietary pattern, obesity, family history, consumption of alcohol, stress and comorbidities.[8,10]

Pakistan is facing an increasing epidemic of hypertension and cardiovascular diseases.[2,5] Hypertension is anexceedinglyrampant disease in our population. However, there is very little data on the risk factors associated with hypertension in Pakistani population;therefore,it was necessary to acquire data on the prevalence of hypertension and associated risk factors in the Pakistanipopulation.

Correspondence: Dr Kiran Abbas, Department of Medicine, Jinnah Postgraduate Medical Center Karachi Pakistan

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METHODOLOGY

The prospective longitudinal study was conducted at Different Hospitals including the Sahara Medical College and Jinnah Postgraduate Medical Centrefrom December 2018 to May 2019 for a period of six months. After obtaining ethical approval from the institutional review board (Reference # JSMU/IRB/2020/-315) and after taking informed verbal consent from the patient, the data collection was started. The patient's records were initially de-coded by a third party in order to make sure neither the principal investigator nor the other researchers were able to directly or indirectly identify the subject's true identity.

Inclusion Criteria: Subjects between the ages of 18-75 were included in the study.

Eclusion Criteria: Individuals with chronic diseases including diabetes, kidney disease or pregnant women and data with incomplete infor-mation were excluded from the study.

All data from December 2017 to December 2018 was recorded. The sample size was calculated using Select statistics keeping the population proportion of hypertension of 29.22%, with a confidence interval of 95% and a margin of error of 5%. A sample size of 317 was obtained.[11]

A structured questionnaire based on the objectives of the study was designed by the researchers under the supervision of a cardiologist with extensive experience. Socioeconomic and other demographic data including age, gender, marital status, residence, education level, smoking status, physical activity, and family history were retrieved from the de-coded data.

According to the international protocols, a patient was designated as hypertensive when his mean systolic arterial pressure is greater than 140mmHg & mean diastolic arterial pressure is greater than 90 mmHg. Whereas, participants with systolic arterial pressure of more than 120mmHg and diastolic blood pressure of 80mmHg or less were defined as normotensive.[11]

The data analysis was done through statistical package for social sciences (SPSS v.25), where Mean ±SD was obtained for continuous variables while frequency and percentage was obtained for categorical data. Chi squaretest was applied to find the association between hypertension and the independent variables. A *p*-value of less than 0.05 was considered as statistically significant. All data was represented in tabular and graphical forms.

RESULTS

A data of 350 individuals was included in our study with a Mean±SD of 43.7±10.5 yearswith a range of 18 to 75 years. Out of the 350 subjects, 150(42.8%) were male, and 200(57.1%) were female. 252(72%) participants were married, 78(22.28%) were unmarried, 12(3.42%) were widowed, while 8(2.28%) were divorced. Among the subjects, 120(34.22%) had no formal education, while 117(33.41%) were taught up to primary school, 113(32.28%) had either secondary schooling or higher. A prevalence of hypertension was reported to be 26% (Table-I).

Table-I: Socio Demographicscharacteristics of Study Participants (n=350)

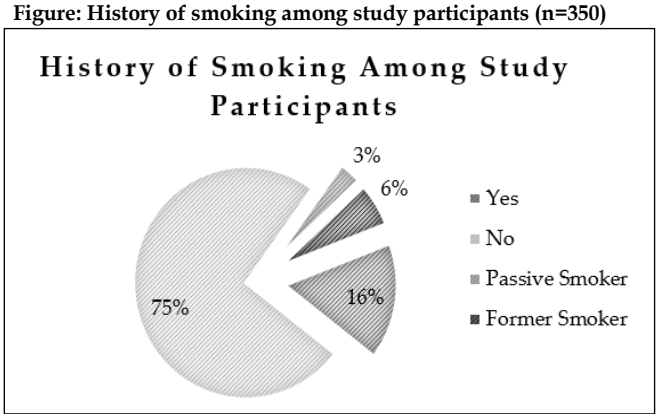
Mean±SD	**43.7±10.5 years (18-75 years)**
Gender	
Male	150 (42.8%)
Female	200 (57.1%)
Marital Status	
Married	252 (72%)
Unmarried	78 (22.28%)
Widowed	12 (3.42%)
Divorced	8 (2.28%)
Ethnicity	
Urdu Speaking	148 (42.2%)
Sindhi	51 (14.5%)
Punjabi	61 (17.4%)
Balochi	32 (9.1%)
Pushtoon	31 (8.8%)
Other	27 (7.7%)
Occupation	
Unemployed	161 (46%)
Formal Employment	108 (30.85%)
Self Employed	81 (23.14%)
Degree of Education	
No formal education	120 (34.22%)
Primary education	117(33.41%)
Higher secondary education or above	113 (32.28%)
Weight	
Underweight	54 (15.4%)
Normal	140 (40%)
Overweight	156 (44.5%)
Prevalence Hypertension among study population (as per JNC VIII criteria) Normal Blood pressure Hypertensive with:	
Systolic>140 mmHg	259 (74%)
Diastolic> 90 mmHg	91 (26%)

We observed that among the study subjects, 57 (16%) were current smokers, while 261(75%) did not smoke cigarettes, 11(3%) were passive smokers, while 21(6%) had quit smoking (Figure-1).

The subjects between the ages of 31-49 years had the highest prevalence of 64(70.3%) while the age

group between 18-29 years had a prevalence of 7.6% (p=0.002). The female gender had a hypertension prevalence of 68 (74.7%) while the male gender had a lower prevalence of 23(25.2%) (<0.001). Out of the 252 married individuals, 69 (75.8%) had hypertension with a p value of 0.003. Among the participants with no formal education, 36(39.5%) were hypertensive, while those with education till secondary or higher had a lower prevalence of 21(23.0%). Weight, smoking, and physical activity were all significantly associated with hypertension (p<0.05) See Table-II.

Figure: History of smoking among study participants (n=350)



DISCUSSION

Hypertension is the foremost cause of mortality worldwide, causing seven million deaths all over the world. Many past researchers were aimed to evaluate the incidence of hypertension and the risk factors associated with it. Hypertension is one of the most lethal health problems which has been rising in developing countries like Pakistan.[11, 12]

In the present study, we evaluated the frequency of hypertension and the associated risk factors in our study population. We revealed that the frequency of hypertension was 26% with 143(40.8%) subjects-between the age group 31-49. Our findings are in line with Saba Ishtiaq's study from the Islamabad. She reported a prevalence of hypertension to be 29.22%.[12] Similarly, Haralambos G. reported a worldwide prevalence of 30%.[13] Furthermore, Seter *et al*. also reported similar statistics among the population of Zambia.[14] Our findings are in slight contradiction to a study by Mahesar *et al*., who reported a much lower prevalence of 18.5% among population of Hyderabad.[15]

A similar study conducted to evaluate the global occurrence by Patricia *et al*.[16] revealed the lowest incidence of hypertension in rural India (3.4% in males and 6.8% in females) while highest prevalence was found in the Poland with 68.9% in males and 72.5% in females. In the present study the predominance of hypertension was observed in females (34%) which was much higher than males (15.3%).

Table-II: Association of hypertension with risk factors among study participants (n=350)

Risk factor	Total (n=350)	Hypertensive Patients (n=91)	*p*-value
Age (in years)			
18-29	80(22.8%)	7(7.6%)	0.002
31-49	143(40.8%)	64(70.3%)	
50-69	52(14.8%)	18(19.7%)	
>70	75(21.4%)	1(1.1%)	
Gender			
Male	150(42.8%)	23(25.2%)	<0.001
Female	200(57.1%)	68(74.7%)	
Marital Status			
Married	252(72%)	69(75.8%)	0.003
Unmarried	78(22.28%)	14(15.3%)	
Widowed	12(3.42%)	3(3.2%)	
Divorced	8(2.28%)	4(4.4%)	
Ethnicity			
Urdu Speaking	148(42.2%)	36(39.5%)	0.06
Sindhi	51(14.5%)	12(13.1%)	
Punjabi	61(17.4%)	18(19.7%)	
Balochi	32(9.1%)	14(15.3%)	
Pushtoon	31(8.8%)	4(4.3%)	
Other	27(7.7%)	6(6.5%)	
Occupation			
Unemployed	161(46%)	42(46.2%)	0.09
Formal Employment	108(30.85%)	33(36.2%)	
Self Employed	81(23.14%)	16(17.6%)	
Degree of Education			
No formal education	120(34.22%)	36(39.5%)	<0.001
Primary education	117(33.41%)	34(37.3%)	
Higher secondary education or above	113(32.28%)	21(23.0%)	
Weight			
Underweight	54(15.4%)	2(2.2%)	0.001
Normal	140(40%)	32(35.2%)	
Overweight	156(44.5%)	57(62.6%)	
Smoking			
Yes	57(16%)	50(54.9%)	<0.001
No	261(75%)	20(21.9%)	
Passive smoking	11(3%)	10(10.9%)	
Former smoker	21(6%)	11(12.1%)	
Physical Activity			
Daily	65(18.5%)	21(23%)	0.006
1-3 times a week	189(54%)	15(16.4%)	
Only occasionally	75(21.4%)	39(42.8%)	
Never	21(6%)	16(17.6%)	

Out of 350 subjects, 120(34.22%) had no formal education, whereas 117(33.41%) had attained education till primary while only 113(32.28%) subjectshad completed their secondary education. A total of 108 (30.85%) individuals had formal employment while

81(23.14%) were self-employed, the rest were unemployed or had retired. These findings are in concordance with a study byAstagneau *et al*., who reported that in the African population; low level of educationis one of the major risk factors for hypertension. Due to the lack of education, many individuals were unaware about the preventive methods and of the accurate management of hypertension.[17] Another study by Young *et al.,* reported that Asians who were more educated had a lower prevalence of hypertension as compared to Whites.[18]

In our study, we reported that majority of the subjectswere physically active with 65(18.5%) claiming to exercise daily, 189(54%) reported that they exercised at least 1-3 times a week while 75(21.4%) said they occasionally exercised whereas, only 21(6%) were leading a sedentary life. Evidence suggest that those involved in modest to intense physical activity, specifically aerobics and yoga fitness exercises tends to reduce blood pressure (BP) levels and lower hypertension incidence among individuals.[19] According to a study conducted by Gambardella *et al*., moderate physical activity maintains the blood pressure to its optimum levels and acts as an effective non-medicated therapy.[20]

In our study, 57(16%) subjectswere current smokers, 11(3%) were passive, 21(6%) were former smoker, while 261(75%) never smoked a cigarette. Smoking was significantly associated with hypertension with a prevalence of 87.7% among smokers while only 7.6% among non-smokers (p=0.000). Among passive smokers, the prevalence of hypertension was 90.9%. This finding is in accordance with a recent study by Lei *et al*., who recognized passive smoking as a serious risk factor for hypertension. The study revealed that prevalence of hypertension was significantly higher in passive smokers about 71.9% as compared to non-passive smokers 66.1% among Chinese population.[21]

Our Study demonstrates that 75.8% subjectswith hypertension were married which wasobserved to be a notable risk factor for hypertension. Any form of stress causes increasein theblood pressure level. This is supported by Gasperin *et al*., in the study revealing that increased chronic stress has a direct relationship with hypertension.[22]

In the present study, majority of the hypertensive subjectsi.e. 70.3% belonged to the age group 31-49 years, (p=0.002) showing a significant association with this age group. It is evident from our results that blood pressure increases with the age. According to a study conducted in Peshawar by Anjum *et al.,* it was reported that hypertension was significantlycorrelated with aging.[23]

In our study, among the hypertensive participants, 2.2% were underweight, 35.2% were normal weight, while 62.6% participants were overweight, illustrating a significant positive association between weight and hypertension (p<0.05). The present study is reinforced by aresearchlead by Mahesar *et al*.[15] who stated that hypertension was greatly dominant in overweight patients (65% as compared to the normal weight (6.3%) participants, making obesity a major modifiable risk factor for hypertension. Similar associations were reported by Anjum *et al*., where a strong correlation was observed between hypertension and body mass index (BMI).[23]

CONCLUSION

Our study demonstrates that in Pakistan, marital status, level of education, poor dietary habits, smoking,obesity, and other modifiable factors contributes to the increased risk and prevalence of hypertension.

Conflict of Interest: None.

Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

MT: & MAUD: Data acquisition, data analysis, drafting the manuscript, critical review, approval of the final version to be published.

ZUM: & SAR: Study design, drafting the manuscript, data interpretation, critical review, approval of the final version to be published.

RK:, & AQ: Conception, drafting the manuscript, approval of the final version to be published.

MA: & KA: Critical review, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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