

# Hypertension Status of Medical Student & its Association with Paternal & Maternal Hypertension

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## ABSTRACT

### Objectives:

To determine prevalence of hypertension in medical students and its association with maternal and paternal hypertensive status

### Materials & Methods:

This cross-sectional study was conducted at Kabir Medical College, Peshawar, from March 2017 to September 2017. A total of 300 medical students were recruited using non-probability sampling technique. Students with any chronic illness were excluded while others were included. A pre-designed questionnaire was used after measuring blood pressure using Mercury Sphygmomanometer. SPSS V 25.0 was used; descriptive statistics were calculated, while chi-square/fisher exact test was applied to measure the association. P-value  $\leq 0.05$  was taken as significant.

### Results:

Mean age of sample was  $21.72 \pm 1.472$  years, among which 58.7% were male and 41.3% females. Among students 87.7% were normotensive, 6% pre-hypertensive and 6.3% hypertensive. All professional years' students participated with the most 24.7% from 1<sup>st</sup> Professional. As we moved towards higher year of professional education the hypertensive status got increased showing 24.49% (maximum frequency) in Final Professional while it was only 8.1% in 1<sup>st</sup> Professional. The same increase was observed for age where it increased to 50% of hypertensive stage at 25 years. Association was insignificant for gender and professional year with the type of hypertension having P-value=0.845 and P-value=0.169 respectively, and significance for family history with P-value=0.000

### Conclusion:

It can be concluded that hypertension is more prevalent in female gender with advance age and professional year of education. The students with both maternal and paternal positive history of hypertension are more prone to this lethal disease with a significant association while for gender and professional year of education the association was insignificant.

**Keywords:** Hypertension, Pre-hypertension, Maternal, Paternal, medical students.

## INTRODUCTION

Hypertension is defined as a mean systolic blood pressure over 140 mm Hg and mean diastolic blood pressure over 90 mm Hg.<sup>1</sup> Being a silent killer, hypertension remains asymptomatic till complications develop. Among adolescent and young adults, pre-hypertension is an important risk factor in developing hypertension in future.<sup>2</sup> According to JNC 7 (The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation,

and Treatment of High Blood Pressure), pre-hypertension range is from 120-139/80-89 mmHg; Stage 1 Hypertension is 140-159/90-99 mmHg and Stage 2 Hypertension is  $\geq 160/100$  mmHg. Hypertension is a major public health issue in both economically developed as well as developing countries.<sup>3-4</sup> It is estimated that death as a result of hypertension would extend to 23.3 million by 2030.<sup>5</sup> Each year, 9.4 million people die as a consequence of complications of hypertension.<sup>6</sup> This high blood pressure is

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a reason for 54% of stroke and 47% of Ischemic Heart Disease worldwide.<sup>7</sup>

Risk factors for hypertension include aging, hereditary, weight gain, obesity, psychological pressure, alcohol intake, low calcium and potassium in diet, surplus salt intake and sedentary life style.<sup>8</sup> WHO considers cardiovascular diseases as a major health burden of non-communicable diseases. Mortality and morbidity of cardiovascular diseases is supposed to be a sequel of hypertension.<sup>9</sup> Assessment of hypertension and family history in cross-sectional studies showed hypertension clusters within families.<sup>10</sup>

Sedentary life style and lack of physical activity are responsible for increase in prevalence of non-communicable diseases such as hypertension, diabetes, IHD and obesity.<sup>11</sup> In Pakistan 3.87 million premature deaths are anticipated by the year 2025 from non-communicable diseases in adults having serious consequences.<sup>12</sup> Mean blood pressure is high in medical students compared to the students of other professions<sup>13</sup> as physical activity of medical students is less because of prolonged study hours and their busy schedule.<sup>3</sup>

Hypertension is considered to be one of the most fatal non-communicable diseases, leading to high morbidity and mortality. The hereditary evidence of hypertension is an established fact vide many studies. However, this particular study is meant to see the prevalence of hypertension in medical students of this region and its association with maternal and paternal factors separately and in combination. The study is first of its kind to see how age and the advancing years of medical education affect the hypertensive status of the students. This will further help the specialists and the community to focus all such groups with higher rates of hypertension where introduction of preventive measures can play important role.

## METHODOLOGY

This cross-sectional study was done in Kabir Medical College Peshawar from March to September, 2017. Total 300 students were enrolled in the study based on non-probability convenient sampling. After informed consent, a Mercury Sphygmomanometer & Stethoscope were used to measure the blood pressure. A pre-designed questionnaire was introduced consisting of demographic data and close ended questions regarding maternal and paternal hypertension. Students with chronic or congenital diseases were excluded from the study while others were included. Students with blood pressure of  $\leq 120$  mmHg Systolic and  $\leq 80$  mmHg Diastolic were taken as normal, while 120-139/80-89mmHg were taken as pre-hypertensive and  $\geq 140$

and  $\geq 90$  mmHg were taken as hypertensive.<sup>14</sup> SPSS V25.0 was used to analyze the recorded data. Categorical variables were presented as frequencies and percentages while numerical variables were presented as mean  $\pm$  SD. Chi-Square and Fisher Exact (where needed) were used to associate variables among themselves. P-value  $\leq 0.05$  was taken significant.

## RESULTS

The result of 300 students from different classes had a mean age of  $21.72 \pm 1.472$  years with 176 (58.7%) males and 124 (41.3%) females. The result shows that out of total 263 (87.7%) students were normal while 18 (6.0%) were pre-hypertensive and 19 (6.3%) were hypertensive. Students from different professional years participated in the study with maximum from 1<sup>st</sup> Year MBBS 74(24.7%) students, followed by 4<sup>th</sup> Year MBBS 68(22.7%), 59 (19.7%) 3<sup>rd</sup> Year MBBS, 50 (16.7%) 2<sup>nd</sup> Year MBBS and 49 (16.3%) from Final Year MBBS. The family history for hypertension of these students was positive in 26 (8.7%) cases, which was further grouped as paternal history being positive in 11(3.7%) cases, maternal in 8 (2.7%), and 7 (2.3%) students having both maternal and paternal positive history for hypertension, while the rest 274 (91.3%) had no paternal or maternal history.

The results demonstrated that with the increase in age, percentage of students suffering from pre-hypertensive and hypertensive illness increased as shown in Table-1.

The hypertensive status of these students was stratified with gender, professional year and family history and Chi-Square and Fisher Exact (where needed) was applied for significant association, the results of which are presented in Table-2, Table-3 and Table-4, respectively.

Variables		Age (Years)								Total n (%)
		18 n (%)	19 n (%)	20 n (%)	21 n (%)	22 n (%)	23 n (%)	24 n (%)	25 n (%)	
Hypertension Type	Normal	5 (100)	17 (94.4)	32 (97.0)	73 (91.2)	54 (85.7)	58 (84.1)	22 (78.6)	2 (50)	263 (87.7)
	Pre -hypertensive	0	1 (5.6)	1 (3.0)	1 (1.3)	4 (6.4)	6 (8.7)	5 (17.7)	0	18 (6.0)
	Hypertensive	0	0	0	6 (7.5)	5 (7.9)	5 (7.2)	1 (3.7)	2 (50)	19 (6.3)
Total		5	18	33	80	63	69	28	4	300

Table-1 HYPERTENSIVE STATUS WITH INCREASING AGE

Variables		Gender		x <sup>2</sup>	df	Sign* (P-value)
		Male	Female			
Hypertension Type	Normal	155	108	.338	2	0.845
	Pre-Hypertensive	11	7			
	Hypertensive	10	9			

\*Chi-Square applied

Table-2 STRATIFICATION OF HYPERTENSIVE STATUS WITH GENDER

Variables		Class					Test Value	Sign* (P-value)
		1 <sup>st</sup> Year MBBS	2 <sup>nd</sup> Year MBBS	3 <sup>rd</sup> Year MBBS	4 <sup>th</sup> Year MBBS	Final year MBBS		
Hypertension Type	Normal	68	43	54	61	37	10.84	0.182
	Pre -hypertensive	2	4	4	3	5		
	Hypertensive	4	3	1	4	7		

\*Fisher Exact test applied.

Table-3 STRATIFICATION OF HYPERTENSIVE STATUS WITH PROFESSIONAL YEAR

Variables		Family History				Test Value	Sign* (P-value)
		Maternal	Paternal	Both	Negative		
Hypertension Type	Normal	0	0	0	263	135.2	0.000
	Pre -Hypertensive	4	3	3	8		
	Hypertensive	4	4	8	3		

\*Fisher Exact test applied.

Table-4 STRATIFICATION OF HYPERTENSIVE STATUS WITH FAMILY HISTORY

## DISCUSSION

Early diagnosis of Hypertension is quite crucial and important because of the reason that it may cause potentially harmful complications when untreated. As this disease remains silent until late in its course, so its early diagnosis can help the patient avoid developing major CVS and end organ damage which all can be avoided with preventive measures. The results of our study showed that 87.7% of the students were normal while remaining 12.3% were either in pre-hypertensive and hypertensive stage with maximum cases 2.3% in Final Year MBBS. The result of our study contradicts with a study conducted at Lahore where only 42% were normotensive, 55% pre-hypertensive and 3% hypertensive.<sup>13</sup> In another study conducted on female students the results showed 4.88% of hypertension among students which is almost in similarity with the results of this study.<sup>11</sup> Results of our study are inconsistent with few international literature, the reason may be different ethnic group and different environment.<sup>14,15</sup>

The results of this study showed that with increasing age of the students the status of hypertension increased from normotensive to hypertensive stage as shown in Table-1. At the age of 25 years 50% (2/4) of cases were hypertensive and 21.4% (6/24) either pre-hypertensive or hypertensive at the age of 24 years while in comparison at age of 18 years zero percent (0/5) of students had hypertensive status and 5.6% (1/16) had pre-hypertensive status at age of 19 years. The results are in accordance with a study conducted at India where hypertensive status was increased to 33% with age.<sup>3</sup> The results are consistent with an international study by *Gyamfi et al.*<sup>16</sup> clearly demonstrating the hypertensive status with advanced age.

The study demonstrated female predominance for pre-hypertension and hypertension with 12.90% (16/124) and 11.93% (26/176) for males among medical students of different years as shown in Table-2. The results are inconsistent with few national studies like in a study conducted at Lahore, the results showed 58.14% (25/43) males having hypertensive or pre-hypertensive status in comparison with 57.89% (33/57) of females.<sup>13</sup> In another study by *Shams et al.*<sup>11</sup> conducted on only female medical students recorded only 5% of hypertension among them which is quite less than this study.<sup>13</sup> Associating the type of hypertension with gender shows insignificant findings ( $p$ -value = 0.845) which is in similarity with an international study at Ghana.<sup>16</sup>

The results of this unique study show the increase in presentation cases from 1st Year MBBS to Final Year MBBS, as shown in Table-3. The increase in stress may be due to increase in study burden which increases with each passing year. A study in Lahore clearly demonstrated the phenomena of increased presentation of hypertensive cases with advanced professional year which is in similarity with this study.<sup>13</sup> A study in India also demonstrated increase in systolic and diastolic pressure with advancement of professional education in medicine where systolic mean increased from  $112.92 \pm 8.49$  mmHg to  $117.60 \pm 7.75$  mmHg and diastolic mean increased from  $75.25 \pm 6.80$  mmHg to  $77.05 \pm 7.52$  mmHg.<sup>3</sup> The association of the type of hypertension with each advancing year of medical education was insignificant, which is same as a study done on students with sample size of 540.<sup>16</sup>

The results of the study showed that 263 normotensive students had no positive maternal and paternal family history for any type of hypertension, while out of 19 hypertensive students 8 had both maternal and paternal positive family history, 4 each for maternal and paternal and 3 were negative for having any family history component. The study also associated hypertensive status with family history of the students and a significant association was recorded having  $p$ -value of  $\leq 0.05$  which is in contradiction with the study done at Ghana.<sup>16</sup>

This particular study was conducted on Medical students; however literature has shown that studies conducted on students belonging to other fields also reported a high prevalence of hypertension. In a study conducted on different faculty undergraduate students recorded 30.10% of hypertension among students with higher odds of family history as risk factors, the results of which are quite higher than this study.<sup>17</sup> In another study being conducted on university students the results revealed 10% of students having high blood pressure which is more as compared to students having hypertension in this study.<sup>18</sup>

The study is unique for the reason that very rare literature is available where hypertensive status of a medical student was being compared with maternal and paternal history, however the sample size was quite small. It is recommended that such a study should be conducted on a big sample size to get more appropriate results and then further introduce primordial and primary preventive measures in students having both maternal and paternal history of hypertension.

## CONCLUSION

It can be concluded that hypertension is more predominant in female gender with advanced age and professional year of education. The students with both maternal and paternal positive history of hypertension are more prone to this lethal disease with a significant association, while gender and professional year of education had an insignificant relationship.

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