



**IDENTIFICATION AND ASSESSMENT OF CONTRIBUTING FACTORS TO SYSTEMIC
HYPERTENSION IN A SOUTH ASIAN COUNTRY**

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ABSTRACT

Hypertension is one of the major global health problem, Pakistan is not an exception for this disease. Various causative and contribute factors for hypertension have been established and research is going on to assess many newer suspected factors. It has been a myth that that hypertension affects mostly elderly individuals and only in cities. Epidemiological studies reveal that hypertension is not confined to adults or urban but children too are sufferers. Rural population is also affected just like their urban counterparts. In order to reduce the health and economic burden of hypertension, early detection of risk factors is essential. For this we need to know what risk factors are prevalent in Pakistan so as to target them at the earliest stage. In this review we have attempted to identify the modifiable and non-modifiable risk factors of hypertension found abundantly in Pakistan.

KEYWORDS: Hypertension, Pakistan, Obesity, Urbanization, Epidemiology.

INTRODUCTION

Hypertension is caused by various mechanisms which involves multiple blood pressure regulatory systems – GFR, autonomic balance, aldosterone mediated sodium reabsorption, cardiac output, hart rate, etc.^[1,3] All these regulatory systems are controlled by specific genes, these genes start functioning from childhood and function till death of the individual but their capability varies depending on the stage of life or other pathologies. Over expression of any of these genes lead to hypertension. The exact etiopathogenesis of essential hypertension is still unknown.^[2,4]

Studies have proved and established that children born to hypertensive parents often develop hypertension in adulthood and these children have higher blood pressure compared to their counterparts born to normotensive parents.^[5,7] It is also established that environmental factors like obesity, sedentary habits, diabetes, smoking, alcohol and excess salt consumption contribute to hypertension.^[8,9]

Considering the rising incidence of hypertension cases, in younger individuals, we reviewed the studies of hypertension prevalence in Pakistan involving children and adults. The aim of doing this study was to identify contributing factors which may be endemic in Pakistan.

METHODOLOGY

Studies done on epidemiology of hypertension in Pakistan over a span of 10 years were collected online from databases such as pubmed and sciencedirect.com.

Hypertension in Pakistani children

Raza et al. had done a study on school children in urban area, where they studied BP of 3661 children. Their study revealed that 6.5% children had BP >13/90 mm of Hg.^[10] In another study done on school 999 children by Zafar et al revealed that 7.6% children had BP > 130/80. However on second visit to same school, the same population had 2.8% children with high BP. Subsequently on third visit, 1.9% children had high BP.^[11] This study proved that repeated measurements are essential to assess the actual prevalence.

During 1990 – 94, Pakistani government had sponsored a study to evaluate hypertension prevalence in school children. This study was carried out by Pakistan National Health Survey (PNHS) and Pakistan Medical Research Council in 5057 children of ages 5 – 17 years. It was reported here 3.4% children had hypertension.^[12,13] In another similar study done in Karachi done during 1998 – 03 in children of ages 2 – 17 years old, known as Metroville Health Study (MHS).^[18] The researchers noted that 14.8% children had high blood pressure on their first visit.

However, the BP recordings decreased in magnitude on repeated visits as also experienced by Zafar et al.^[11,13] the true prevalence was calculated to be around 2 – 4%.^[12]

Literature on research in prevalence of high blood pressure in neonates could not be found. However, certain studies have reported 0.2 – 3% incidence of hypertension in developed countries. Neonatal

hypertension is secondary to cardiac, renal, endocrine or pulmonary diseases.^[14] Data from this study may not be applicable to full extent for Pakistan as it is a developing country where such diseases are not common as in developed nations. Low birth weight (LBW) babies are common in Pakistan as in all other developing nations. Incidence of LBW babies in Pakistan is 15 - 30% whereas it is 5% in developed nations. LBW babies are predisposed to developing hypertension during their adulthood.^[15,16] This factor contributes a lot towards hypertension among Pakistani population and hence needs tremendous exploration.

Hypertension in Pakistani adults

The PNHS had reported that 10% of boys of 18 – 19 years in Pakistan had high blood pressure. While, 60% of men in age group of > 70 years had high blood pressure. Such an increase in prevalence of hypertension was also reported among females. 5% of 18 – 19 year old girls had high blood pressure while 70% of women of 60 – 69 years age had high blood pressure. In both sexes, there was a steep rise of prevalence rate at 20 – 29 years of age.^[12,17] It was also reported by PNHS that urban population had more hypertensive cases than rural population.^[17,18] [Figures 1,2]

IDENTIFIED FACTORS WHICH CONTRIBUTE TO INCREASING PREVALENCE OF HYPERTENSION IN PAKISTAN

Hereditary predisposition

Data from MHS and PNHS shows that diastolic BP in boys and girls of Pakistan is higher compared to same age group in Europe and USA.^[12,17,19,20,21] These findings suggest that genetic predisposition plays greater role in increasing blood pressure during middle and later decades of life.

Environmental factors, Lifestyle and Obesity

Environmental factors play major role in contributing towards hypertension. Addition of even a single environmental factor to genetic etiology increases chances of occurrence of BP by many folds. Addition of more number of factors further increases chances of occurrence of BP.^[1] It is an established fact that modification of environmental factors leads to drastic control of blood pressure. The steep rise in BP during middle ages is well explained by environmental factors as people tend to shift to sedentary lifestyle. Since women have more sedentary life style in Pakistan, females are more predisposed to developing hypertension.

Urbanization

PNHS has reported that risk factors for hypertension are more in urban areas compared to rural areas. It was also reported by PNHS that prevalence of high blood pressure was more in males than females of urban area. This was well noted in later elderly population while it was reverse in younger population. Similar trend was observed in rural population too.^[12,17,18] [Figures 3,4]

PNHS and MHS have reported that cases of obesity, high serum cholesterol, high BMI, diabetes were more in urban areas than rural areas. Incidence of diabetes, hypercholesterolemia, hypertension and abnormal waist-hip ratio were more in females than males. A causal relationship between obesity and hypertension has been established^[18] and since obesity is more prevalent in urban than rural, urban population has high BP compared to rural. This difference is noted in both genders and in all age groups.^[13]

This association of urbanization with hypertension is supported by reports from India, Hong Kong, Indonesia, Taiwan and South Korea where people tend relocate themselves from rural to urban areas for livelihood and more comfortable lifestyle.^[22,23] Consumption of high amounts of oil, salt and refined products which is seen more commonly in urban areas leads to development of hypertension. Industrialization has paved way to environmental factors as fast food diet, sedentary lifestyle and personal transport which are contributing well towards increasing BP. Urban school lacking playgrounds are major contributors towards obesity and hypertension in children.

Food

MHS report on dietary patterns has stated that on an average in one month, one family in Pakistan uses 5.1±5.4 kg ghee, 6.0±4.2 kg of vegetable oil and 280 gm of salt.^[17] Rural Pakistan is dependent on cereals for food as vegetables, meat, fish and chicken are expensive. Effluent population which resides mostly in urban consume more of oily foods and meat which contributes to hypertension and thus we see more hypertensives in urban population.^[18,20,23,24]

Smoking and Tobacco

MHS has reported that 17% of 18 – 19 year old youth and 30 – 43% population of 30 – 59 year olds smoke. This prevalence increased tremendously to 60% in elderly population > 70 years of age. The overall prevalence was coming to 30%. PNHS report has also stated similar trend. Majority of the smokers were males from rural as well as from urban areas. Female smokers were negligible. They were from affluent urban population.^[17] On the other hand tobacco usage in the form of sheesha, sniffing or chewing was found to be equal among males and females. It was established in both studies that the prevalence of smoking and tobacco consumption was increasing with age.^[17]

Alcohol

Alcohol is also a contributor to hypertension just like smoking but because of religious teachings, alcohol usage in Pakistan is very low. Most of the alcohol consumption occurs either in affluent societies or in very poor societies.^[12]

Awareness of hypertension

Pakistan lags behind in awareness of public to hypertension and cardiac diseases when compared to any other developed nation. Lack of awareness also contributes to hypertension as the public has absolutely no idea regarding how to control and how to treat hypertension. It was found that only 15.4% men and 36% women are aware about the disease of hypertension. Of these only 8.7% men and 18.6% women approach for treatment.^[20,25,26]

Sex

Women of Pakistan are mostly sedentary compared to males. Womens' workout is limited to household chores and shopping trips. This sedentary lifestyle leads to obesity which leads to hypertension as explained in previous paragraphs. For this reason, hypertension is seen mostly in females past middle ages compared to men. But this trend is obviated in urban setting as both males and females tend to get sedentary on account of their occupation and environment.^[12,18]

FIGURES

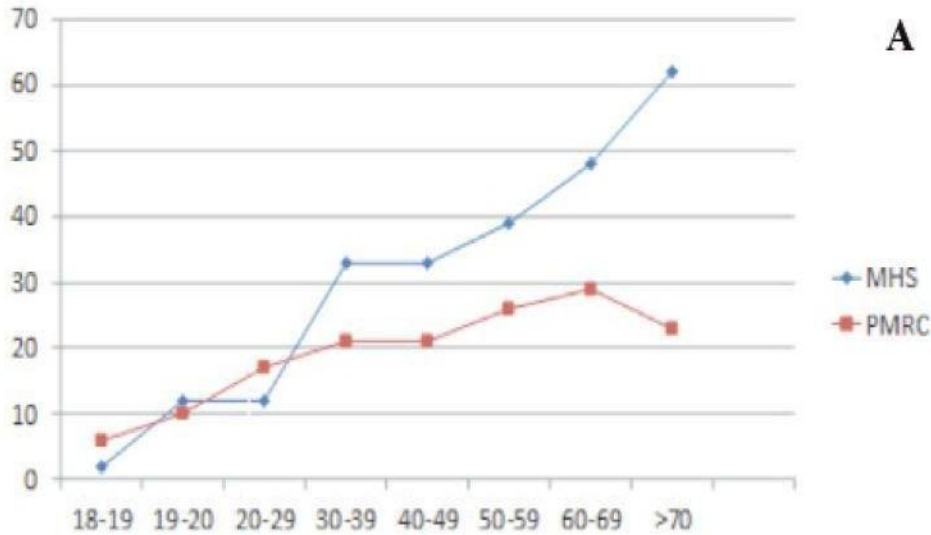


Figure 1: Line diagram showing trend of BP with age in females.

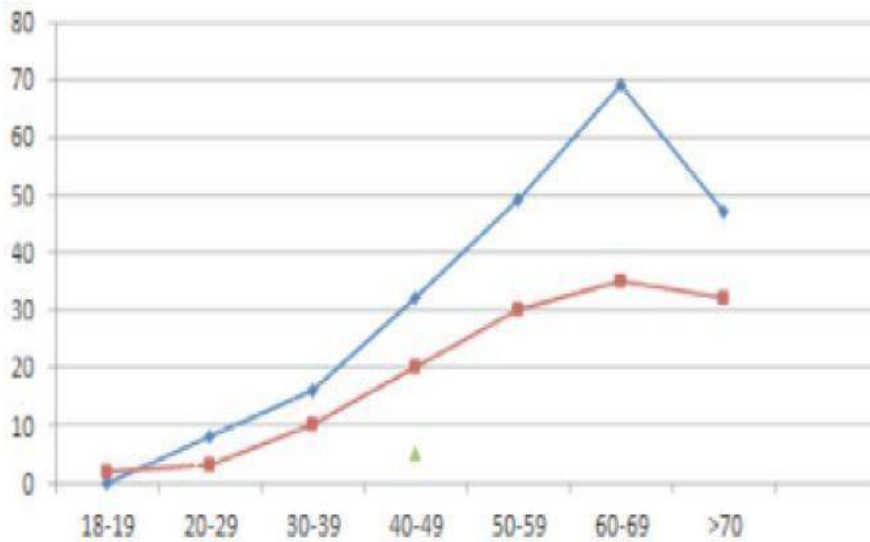


Figure 2: Line diagram showing trend of BP with age in males. Red line represents PNHS/PNRC data and blue line represents MHS data.

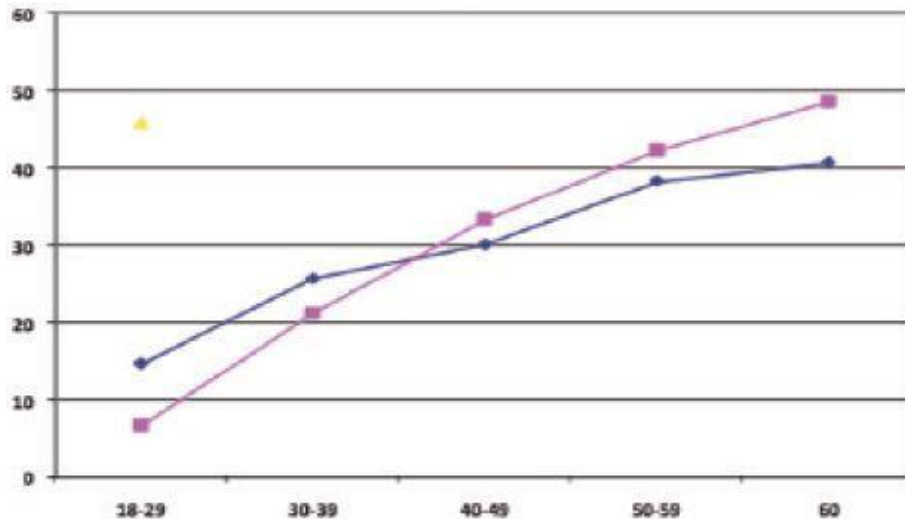


Figure 3: Line diagram showing age vs BP relationship in urban males (blue) and urban females (pink). Based on data from PNHS.

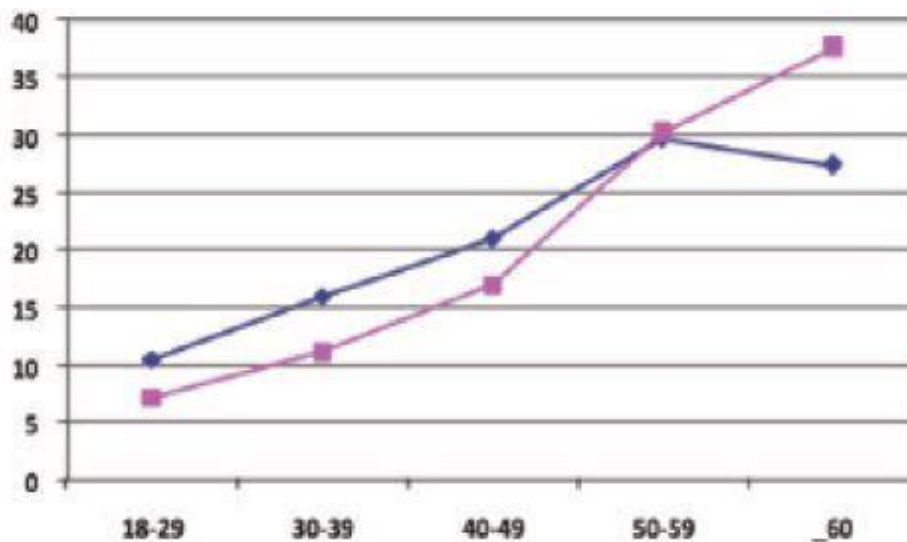


Figure 4: Line diagram showing age vs BP relationship in rural males (blue) and rural females (pink). Based on data from PNHS.

DISCUSSION

Hypertension is one of the major health and economic burden for a developing country like Pakistan. It is surprising for the masses to know that children are also sufferers of hypertension. Various etiologies for hypertension has been listed in literature. It is important to identify the causative and contributing factors in order to reduce the prevalence of hypertension.

Sedentary lifestyle is prevalent throughout the country, be it rural or urban areas. MHS has stated that sports or any kind of exercise was not of interest to either men or women. Only the younger population played sports but that too occasionally. Climbing stairs and walking to work or market are the only exercise adults are doing. This exercise is performed more by men compared to females.^[23] It is now established that these environmental factors – sedentary lifestyle, obesity, diabetes, etc. cumulate during middle ages especially in females and

that explains the drastic rise of BP in this age group.^[27,28,29]

All the causative and contributive factors of hypertension are classified as modifiable and non modifiable. Genetic factors are non modifiable, environmental factors are modifiable.

Hence, emphasis should be laid on modifying the environmental factors since childhood of every individual in order to prevent occurrence of hypertension.^[30] Diet modification is a crucial step in management of hypertension at community level. People generally take interest in diet modification but are not consistent in maintaining their diet chart.^[24]

Awareness about hypertension, its causes and complication needs to be spread among the masses at every household level. This can be done via media as

they have the deepest penetration. Pediatricians and physicians are responsible for creating awareness after media.

Pediatricians can warn the parents about ill effects of malnutrition, lack of exercise and hypertension so as to create awareness at the earliest stage. For this purpose, doctors should also have appropriate training in public health.^[24,30]

Urbanization is also a greatly responsible for hypertension. As people in urban areas get exposed to junk foods, transport facility, less walking, lack of sports and exercise due to their busy schedules. Planning of cities and villages should be given importance in order to reduce urbanization. Rural areas should be provided with proper facilities of food, clothing, transport, jobs, healthcare and all other daily needs. So that villagers can work and live in their hometown instead of moving to urban areas.^[17]

CONCLUSION

In our review, we have identified few important contributory factors for hypertension found in Pakistan namely – hereditary, urbanization, obesity, sedentary lifestyle, smoking, lack of awareness and female sex. Most of these factors are cumulating in middle ages. This trend of accumulation is common in men and women but women are developing hypertension earlier than men. Rural and urban populations are exposed to developing hypertension equally there is no major difference in them.

It is recommended that awareness regarding hypertension should be spread among the masses to identify the risk factors and to deal with at the earliest stage. This would be the best way to lower hypertension prevalence in Pakistan. Further studies may be carried out to identify which areas have which risk factors and possibly new risk factors may be unveiled in such studies.

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