ORIGINAL ARTICLE

Hypertension and its Underlying Socioeconomic Factors among People in Rural Area, Nain Sukh

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ABSTRACT

***Background and Objective*:** Hypertension is a major health concern worldwide and is showing an alarming increase in prevalence. In Pakistan, there is limited community-based research on its prevalence and control. The objective of the study is to determine the prevalence of hypertension and assess the relationship between hypertension and life style of people in the defined population of village of Nain Sukh, Punjab-Pakistan.

Methods: This descriptive cross-sectional study was carried out in the Department of Community Health Sciences, FMH College of Medicine & Dentistry, after an ethical approval. In this study, 190 individuals of both genders, aged 40 and above were examined. The weights and heights of the patients and two readings of blood pressure at 15 minutes interval were recorded in relevant proformas. Information regarding their socioeconomic profile and lifestyle was also obtained through a structured questionnaire.Statistical Package for the Social Sciences (SPSS) version 21 was used to analyze data hence taking P-value ≤ 0.05 as significant.

Result: Among N = 190 individuals, 34.7% were males and 65.3% were females. Prevalence of hypertension was found to be 44.2%. Out of these, 40% were known hypertensive and the disease was controlled in only 34%. The disease is more prevalent in males than females (P = 0.012). A total of 73.8% of housewives had high blood pressure values (P = 0.031). Families having more than 5 family members also showed greater prevalence of hypertension (P = 0.007).

Conclusion: In rural settings, there are more cases of high blood pressure common among males of the community. There is major role of psychosocial factors such as stress of larger family size, sedentary lifestyle of females (housewives) in development of hypertension. These factors should be considered important along with other dietary and lifestyle factors.

KEYWORDS: Hypertension, Gender, Nain Sukh, High blood pressure, Lifestyle, Diabetes, Obesity.

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INTRODUCTION

Heart pumps the blood and velocity of blood creates the blood pressure and constantly increased pressure in blood vessels (arteries) is

defined as hypertension. The higher the pressure in blood vessels the harder the heart has to work in order to pump blood. Hypertension can lead to the complications like aneurysm in major vessels, strokes, hemorrhage, kidney injury, blindness and many other.[1]

According to the National High Blood Pressure Education Program (NHBPEP) in 2004, hypertension is defined as the mean of 2 or more accurately measured seated readings of systolic Blood Pressure (SBP) and/or diastolic Blood Pressure (DBP) above 95th percentile for gender, age and height on three different times of the day and adults with average SBP of 120 – 139 mmHG and DBP of 80 – 89 mmHg are labeled as Pre-hypertensive, SBP in the range of 140-159mmHg or DBP in 90 – 99 mmHg is categorized as stage1 hypertension and stage 2 hypertension is labeled when SBP or DBP is equal to or more than 160mmHg or 100 mmHg respectively.[2,3,4] The increase in Blood Pressure (BP) from normal to high has almost the same chances of cardiovascular events as continuously raised BP, so regularly BP monitoring is very important.[5]

Hypertension is the one of the most important risk factor of cardiovascular disease (CVD) in developing countries.[6,7,8] Only 25% of total hypertensive patients are diagnosed and treated so it is clear that most of the patients remain undiagnosed.[6] Hypertension is primarily of two types: primary or essential hypertension, the cause of which is unknown and is most common in adults (95%) and secondary hypertension is due to some cause that can be investigated like renal cause and is more common in children.[9,10] Hypertension is considered as the third most common cause of disability-adjusted life years and is an important cause of mortality.[3] Over the years, many vital organs are involved depending on the BP levels and variability and that the overall prognosis lies on the involvement of these organs.[7]

In 2000, almost 1 billion people were hypertensive and number is estimated to rise upto 1.56 billion by year 2025.[8] Globally, hypertension is considered to be a significant cause of mortality and is responsible for more than 7 million deaths per year, which is the third most common cause of disability-adjusted life years.[3,8] In developing countries, hypertension is directly proportional to socioeconomic status, inverse can happen in late stages of demographic transition.[8] The developing countries are at a greater risk of having people with cardiovascular disease and hypertension and knowledge and identification of risk factors is derived largely from developed countries.[11] So as a consequence, the effects of these risk factors on hypertension remain unknown in most of the regions of the world.[12] In terms of awareness, China has discouraging awareness, treatment, and control rates than some middle and high-income Asian countries such as Korea, Thailand and Iran.[13]

Hypertension is not periodically screened at community level.[14] Pakistan faces a massive challenge of non-communicable diseases like hypertension due to demographic transition and is rather unprepared for it.[15] Information regarding social distribution and related risk factors of hypertension help us in controlling this disease in the community.[8] Many factors like eating habits, lack of physical activity, other modifiable risk factors and inefficient health system leads to an increase in burden in developing countries.[16] Pakistan should reduce the deaths due to cardiovascular diseases, cancers and respiratory diseases to 20% by the year 2025 in a cost-effective way.[15] Therefore, in any community identification of prevalence and major risk factors associated with hypertension is a pre-requisite towards making efficient preventive and health care policies concerning a community. According to the study carried out by World Health Organization (WHO), cardiovascular disease is responsible for approximately 17 million deaths a year, worldwide. This is nearly one third of the total deaths in a year.[17]Many epidemiological studies reveal that there is an association of hypertension incidence and prevalence with several clinical, demographic, socioeconomic and lifestyle factors.

This study is centered on finding these risk factors in village Nain Sukh and finding a co-relation between these existing risk factors and the rising frequency and thus the prevalence of hypertension and to make recommendation for defining appropriate policies in assessing and controlling the hypertension by modifications in the risk factors associated.

METHODS

A descriptive cross-sectional study was carried out

in the Department of Community Health Sciences, FMH College of Medicine & Dentistry, after an ethical approval from Institutional Review Board of FMH vide Letter No.FMH-01-2019-IRB-557-M. Informed written consent from head person and participants were obtained. A representative sample of 190 subjects out of 800 willing residents having age ≥ 40 years and of both genders were included in the study through systematic random sampling. All those having essential hypertension and co-morbidity other than type – II diabetes mellitus were excluded. Predictor variables were age, gender, family history, obesity, smoking, salt intake, alcohol intake, saturated fats, lack of physical activity, stress, body mass index, education, income/capita/month and occupation. In case of females, history of use of contraceptive pills, preeclampsia and toxemia of pregnancy was taken. The outcome variable was blood pressure. A person having systolic BP $\geq$ 140 and diastolic BP $\geq$ 90 is said to be hypertensive operationally for the present study.

Tools of measurement used were questionnaire (open ended/close ended), measurement of blood pressure (two readings from right arm using mercury sphygmomanometer while client is relaxing on chair), measurement of height in meters and weight in kg.

STATISTICAL ANALYSIS

As the outcome variable is quantitative and continuous, mean and standard deviation were calculated. The analysis was done by t-test to assess the significance of results. For qualitative variables the Chi-square or Fisher Exact tests were applied. The data was analyzed by using Statistical Package for the Social Sciences (SPSS) version 21 hence taking *P-value* $\leq$ *0.05* as significant.

RESULTS

This study was carried out on 190 subjects of the Nain Sukh village, Punjab. In the sample population, 34.7% people were male and 65.3% were female with a M:F ratio of 1:1.9. The mean age of male participants was 52.89 ± 10.55 years and that of female participants was 49.16± 9.5 years. The demographic variables among all the participants as well as status hypertension is shown in **Table-1**.

Table-1: Frequency of distribution of demographic variables among participants.

Variables		Number of Participants	Percentage Among Population (%)
Age	40 – 60	158	83.2
	61 – 81	32	16.8
Gender of	Male	66	34.7
Respondent	Female	124	65.3
Educational status	Uneducated	40	60.6
Male	Educated	26	39.4
	Uneducated	97	78.2
Female	Educated	27	21.8
Occupation	Laborer/Nomina	54	81.8
Male	l work	12	18.2
	Office work	119	96.0
Female	Housewife	5	4.0
	Working		
Body Mass Index	<18.5	8	4.2
(BMI)	18.5-24.9	62	32.6
	25-29.9	69	36.3
	≥30	51	26.8
Known hypertensive Participants	Yes	76	40.0
Controlled hypertensive	Yes	32	16.84
Known diabetic participants	Yes	36	18.9
Controlled diabetic participants	Yes	30	15.78

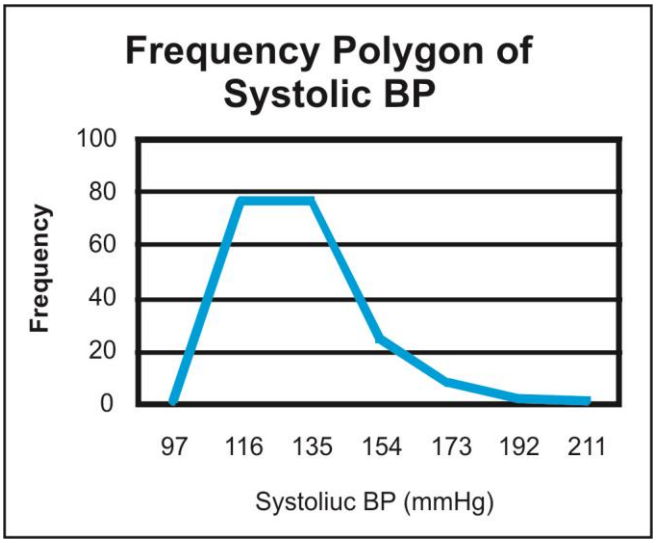

Fig.1: Frequency Polygon of Systolic BP.

The study involved the measurement of blood pressure of each respondent. The mean systolic BP

in males is 127.80 ± 14.14 mmHg and that in females is 134.09 ± 17.62 mmHg. The mean diastolic BP in males is 84.12 ± 11.08 mmHg and in females is 87.05 ± 12.32 mmHg. Among these, 44.2% participants were found to be hypertensive (**Fig.1&2**).

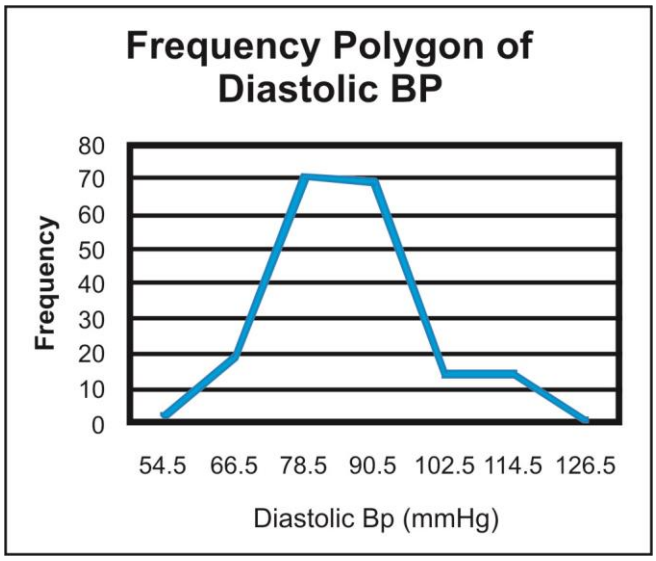

Fig.2: Frequency Polygon of Diastolic BP.

According to the data collected on lifestyle variables, physical activity, exercise, duration of sleep, smoking and other health related variables like diet are shown in **Table-2**. In the sample population, 46.3% participants had stress. Moreover, 28.9% of the sample population was found to have family history of diabetes, 32.1% had a family history of hypertension and 13.2% had obesity running in their families.

A total of 25% of male population showed hypertensive blood pressure levels. Among the females, those who were house wives had a significant relation with hypertension with 62% having blood pressure values of more than 140/90 mmHg. Also, for gender comparison, value of t-test was 0.147 for systolic BP and 0.290 for diastolic BP and P-value was significant for both the systolic and diastolic BP and found to be 0.008 and 0.009

Table-2: Frequency distribution of health-related variables among participants.

Variables		No. of Participants	Percentage Among Population (%)
Participants BP levels	≥140/90	84	44.2
Physical activity	≥ 30 Min.	117	61.6
Participants doing daily exercise	Yes	44	23.2
Number of prayers performed daily	≥3	83	43.7
Daily sleep duration	≥7 Hours	137	72.1
Participants who smoke	Yes	36	18.9
Participants taking alcohol	Yes	1	0.5
Added salt intake	Yes	167	87.9
Participants with any stress	Yes	88	46.3
History of diabetes in the family	Yes	55	28.9
History of hypertension in the family	Yes	61	32.1
History of obesity in the family	Yes	25	13.2
Number of meals taken per day	≥3	73	38.4
Intake of eggs per week	≥3	29	15.3
Intake of tea per week	≥3	110	57.9
Meat or chicken intake per week	≥3	20	10.5
Intake of oily foods	Yes	80	42.1

respectively. Increased number of members per family; each having more than 5 members also showed a significant relation with 19% families having members with high blood pressure levels. Hypertension was controlled in 34.4% of the hypertensive and 67.9% of the hypertensive participants had no family history of hypertension (**Table-3**).

There was a significant correlation of hypertension with male gender, housewives, families having more than 5 family members, members having less than 3 meals per day and members with negative history of hypertension in their families with *P-value* of 0.012, 0.031, 0.007, 0.020 and 0.012 respectively (**Table -3**).

Table-3: Association of socio-demographic factors and BP levels.

	Hypertensive BP Levels		Total	Chi Sq.	P-value
	<140/90 (n = 106)	≥140/90 (n = 84)			
Gender:					
Male	45 (42.5%)	21 (25.0%)	66 (34.7%)	6.297	0.012
Female	61 (57.5%)	63 (75%)	124 (65.3%)		
Occupation:					
Office work male	7(6.6%)	5 (6.0%)	12 (6.3%)	8.878	0.031

Nominal work male	38 (35.8%)	16 (19%)	54 (28.4%)		
Housewife	57 (53.8%)	62 (73.8%)	119 (62.6%)		
Working woman	4 (3.8%)	1 (1.2%)	5 (2.6%)		
Family Members					
≤ 5	39 (36.8%)	16 (19.0%)	55 (28.9%)	7.174	0.007
> 5	67 (63.2%)	68 (81.0%)	135 (71.1%)		
Family history of HTN:					
Yes	26 (24.5%)	35 (41.7%)	61 (32.1%)	6.315	0.012
No	80 (75.5%)	49 (58.3%)	129 (67.9%)		
Controlled HTN					
Yes	21 (80.8%)	11 (16.4%)	32 (34.4%)	34.369	<0.001
No	5 (19.2%)	56 (83.6%)	61 (65.6%)		
Number of meals/day:					
< 3 times	73 (68.9%)	44 (52.4%)	117 (61.6%)	5.384	0.020
≥3 times	33 (31.1%)	40 (47.6%)	73 (38.4%)		

DISCUSSION

The study was carried out in a village community and it showed a total prevalence of hypertension to be 44.2% as compared to 26.34% of hypertension prevalence in Pakistani adolescents.[22] Hypertension was found to be more among male gender of the community. Comparing the results in present study to other studies, the current study showed a higher frequency of hypertension among the rural community than the urban. Among the female participants who were hypertensive, house wives were more hypertensive. The results also displayed an association between family size and hypertension. This brings into notice major psychosocial risk factors that lead to stress and precipitate hypertension. Of the old risk factors such as diet, these psychosocial factors such as related to the domestic stress also plays an important role in development of hypertension.[23] This could be due to lack of proper dietary distribution among the families or the increased stress of supporting a large family. The dietary habits including salt intake, alcohol, eggs, oily foods etc. did not show any significant statistical association to hypertension. Although, many studies have found added salt intake and other dietary habits being a major risk factor for hypertension, present study results did not show any relation.[24] This could be either due to recall bias of the participants, interviewer bias or maybe due to the small sample size. Body mass index of the participants also was not found to be significant in relation to hypertension though it is considered an important factor in development of hypertension.[25]

The results also displayed the fact that hypertension was more common in families with no previous history of HTN in their families.[18] Present study showed a new generation of hypertensive members of the community. This could show a major role of environmental, psychosocial and other factors effecting blood pressure more than the genetic role. In this study, diabetes, smoking and obesity did not show any significant association to hypertension. This could be due to the bias or sample size restrictions. But the above-mentioned factors do pose an increased risk of developing hypertension.[19, 20,21,26,27]

CONCLUSION

With the results of the study, it has been concluded that hypertension was found to more prevalent in rural setting as compared to the overall hypertension in Pakistan. It was more in males and house wives having social stress such as pressure of increased family members per household are important factors towards development of hypertension. Other lifestyle factors such as dietary habits and past family history of hypertension do not play as much of an important role according to present study. These results need to be compared and re-evaluated. More comprehensive studies with larger sample size are needed to find other variables such as lifestyle factors that affect hypertension.

LIMITATIONS OF STUDY

Limitations of the study were a small sample size due to lack of human resource for data collection. It is single center study and so the results cannot be

generalized to all rural population.Recall bias may confound the results.

RECOMMENDATIONS

- Health education seminars and door to door campaign about Hypertension and its risk factors should be done. Increasing the local populations understanding of the disease and risk factors with seminars or pamphlets may encourage people to improve their lifestyle habits that contribute to the disease e.g. salt intake, activity level.
- Screening services should be provided for early diagnosis of the disease as it being an Ice-berg disease and a silent killer.
- Prevalence of hypertension could be reduced with regular check-ups and follow up of patients to ensure that medication is being taken.
- Patients could record their blood pressure levels regularly, so control of the disease can be monitored.
- Record maintenance of the cases should be done, and government should improve health facilities so that these diseases can be better taken care of.

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CONFLICT OF INTEREST

None to declare.

FINANCIAL DISCLOSURE

None to disclose.

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Author's Contribution

FAS: Conception, collection, analysis of data and article drafting.

FI: Design, collection, analysis of data and article drafting.

AS: Collection, analysis of data and article drafting.

MM, BG: Conception, collection and analysis of data, article drafting and critical revision.

NHS: Conception and analysis of data. Critical revision.

ALL AUHTORS: Final approval of the version to be published.