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Community Medicine

SOCIO-CULTURAL RISK FACTORS OF HYPERTENSION IN URBAN POPULATION OF RISHIKESH, UTTARAKHAND: A CASE CONTROL STUDY

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ABSTRACT **Introduction:** The major causes of cardiovascular disease are hypertension and Connery artery disease. Cardiovascular disease is a serious societal burden that is extremely detrimental to individuals, socially and economically worldwide. The objective of our study is to determine and compare the socio-cultural risk factors of hypertension and the activities of daily living among hypertensive patients and healthy controls residing in urban population of Rishikesh, Uttarakhand, India. **Methodology:** A case control study was conducted at selected 20 urban wards of Rishikesh, Uttarakhand for a period of one year in which cases and control were matched individually (1:1) based on age (±5years) and gender. A predesigned semi-structured questionnaire was used to assess socio-demographic variables, personal characteristics such as level of physical activity, duration of sleep and early morning tobacco consumption, dietary factors such as skipping breakfast, consumption of oily food and fruits in a week. **Results:** Majority (39%) of participants were from age group of ≥ 60 Years females (65%) by gender. Significant association was observed with duration of sleep and physical activity with cases (hypertension) and control (p value < 0.05). There was statistically significant difference in dietary habits among cases and controls as majority of the cases skips morning breakfast and consumed more oily food and less fruits per week (p value <.05). **Conclusion:** Emphasizing on the modifiable risk factors of hypertension, effective measures are to be taken to combat various practices of daily life such as decreased physical activity, unhealthy dietary habits and inadequate duration of sleep.

KEYWORDS : Hypertension, Physical activity, skipping breakfast, fruits consumption

INTRODUCTION

Raised blood pressure is estimated to be responsible for 7.5 million fatalities worldwide, accounting for around 12.8% of all deaths(1). This equates to 57 million disability adjusted life years (DALYS), or 3.7% of total DALYS(1). Being the major cause of cardiovascular diseases and stroke, hypertension is extremely detrimental socially and economically(2).

Increasing prevalence of hypertension worldwide exclusively at middle income countries has been a huge public health concern for cardiovascular morbidities. In 2010, more than 31 % of adults had hypertension worldwide(3). The overall prevalence of hypertension was 30.75% among Indian adults in 2019 which showed that almost one in every third person was hypertensive (4). In comparison to rural places, disease is more prevalent in metropolitan settings(5).

The changing trend with increase in prevalence of non-communicable diseases can be related to the changing lifestyle and dietary habits. Tobacco use and smoking, as well as job and family stress, are major contributors of heart disease. Lack of regular physical activity in the city, poor nutrition, excessive spending, never having breakfast, and eating excessively fried foods, among other reasons, produce greater disease in the city than in rural areas(6). The objective of our study is to determine and compare the socio-cultural risk factors of hypertension and the activities of daily living among hypertensive patients and healthy controls residing in urban population of Rishikesh, Uttarakhand.

METHODS

Study population, design, and participants

A " Case control" study was conducted at selected urban population of Rishikesh, Uttarakhand for a period of one year from January 2021 to July 2021. Adarshgram, Asutosh Nagar, Chandreswar Nagar, Bhairav Mandir Colony, Mayakund were randomly selected from the 5 urban wards in Rishikesh. Case is defined as a known diagnosed patient of hypertension belonging to the selected area, Controls were the ones who had systolic blood pressure < 140 mm Hg and diastolic blood pressure < 90 mm Hg on examination and not on medication for hypertension. Cases and control were matched individually (1:1) based on age (±5years) and gender. All diagnosed cases of hypertension and their neighborhood controls were included in the study whereas critically ill patients requiring emergency care and those who did not give consent were excluded.

Sample size and sampling technique

Considering two-sided confidence interval 95%, power of 80%, hypothetical proportion of cases and control with exposure as 51.8% and 31.7% respectively(7), and ratio of control to cases 1:1, the sample size was calculated to be 103 in each group (Using Fleiss method with the correction factor). In mid-September 2020, when the first wave of COVID-19 was about to decline, this study was planned. Accordingly, the 274 sample size was calculated without keeping in mind the postulation of the resurgence of the COVID-19 second wave. From January 2021 to May 2021 data collection was started which was the period of reappearance of COVID-19 second wave. Due to resurge in COVID 19 cases and regulations related to it, the total sample size was reduced to 150 (75 in each group) and approval was taken from the institute for the same. Convenience sampling was done for the cases and controls from the selected urban wards.

Study outcomes and variables

A predesigned semi-structured questionnaire was pilot tested which included socio-demographic variables such as age, gender, type of family, marital and educational status, personal characteristics such as level of physical activity, duration of sleep and early morning tobacco consumption and dietary factors such as skipping breakfast, consumption of oily food and fruits in a week. Perceived stress scale was used to assess the level of stress among study participants. The association of routine sociocultural habits of participants on hypertension was assessed in the terms of outcome variable.

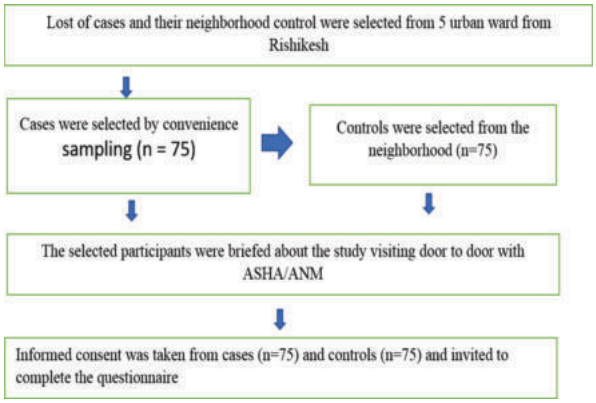

Fig 1 depicts the study flow diagram along with data collection method

ASHA - Accredited Social Health Activist, ANM - Auxiliary Nurse and Midwife

Data management and analysis

SPSS version 25 was used for data analysis and data was compiled in excel sheet. Results of the study are tabulated with appropriate statistical.

Ethical consideration and confidentiality of data

Ethical approval was obtained from Institutional Ethics Committee (AIIMS/IEC/21/379). Confidentiality of the information was maintained and identity of the patient was not revealed

RESULTS

The number total study participants were 152 including 76 cases and 76 healthy controls. Majority (39%) of participants were from age group of ≥ 60 Years (Fig 2). In this study females were the majority (65%) of the participants, and there were 26 males and 50 females in both case and control group.

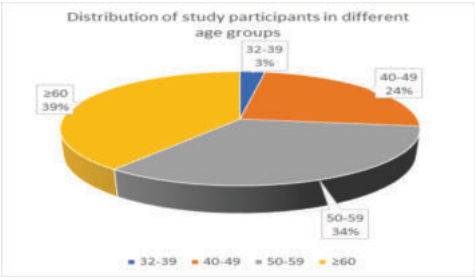

Fig 2: Distribution of total study participants according to different age groups.

Table 1: Association of case and control with the socio demographic characteristics

Characteristics	"Case" (N =76)	"Control" (N = 76)	"P" value
Type of family, n (%)			
Joint Family	41(55.2)	44(57.8)	p=.62
Nuclear Family	35(43.4)	32(42.1)	
Marital Status, n (%)			
Married	61(80.3)	56(73.7)	p=.33
Widow	15(19.7)	20(26.3)	
Education Status, n (%)			
Uneducated	22(28.9)	14(18.4)	p=.42
Primary/ Secondary	15(19.7)	19(25.0)	
Graduate	13(17.1)	17(22.4)	
Post- Graduate	26(34.2)	26(34.2)	
Occupational status, n (%)			
Profession	12(15.8)	15(19.7)	P=.33
Semi - Profession	20(26.3)	12(15.8)	
Skilled Worker	5(6.6)	11(14.5)	
Unskilled Worker	17(22.4)	17(22.4)	
Unemployed	22(28.9)	21(27.6)	

(Values in parenthesis are in percentage, P value <0.05 considered statistically significant)

Table 1 shows sociodemographic characteristics of cases and controls. Chi square test was applied and no significant association of cases and controls was found with type of family, marital status, educational status, and occupation (p value > 0.05). As Hypertension is multifactorial only one factor in socio-demographic profile might not effect this disease.

Table 2: Association of sleep, physical activity, addiction and stress with cases and controls

"Characteristics"	"Case"(N =76)	"Control" (N = 76)	"P value"
Duration of sleep, n (%)			
≤ 6 hours	17(22.4)	14(18.4)	p= .62
≤ 7 hours	43(56.6)	13(17.1)	
>7 hours	16(21.1)	49(64.5)	
Stress level, n (%)			
High Stress	8 (10.5)	7(9.2)	P= .96
Moderate Stress	37(48.7)	37(48.7)	
Low Stress	31(40.8)	32(42.1)	
Tobacco consumption, n (%)			
Yes	20(26.3)	13(17.1)	p=.16
No	56(73.7)	63(82.9)	
Alcohol Consumption, n (%)			
Yes	11(14.5)	7(9.2)	p=.31
No	65(85.5)	69(90.8)	
Physical activity, n (%)			
Vigorous Activity	18(23.7)	38(50.0)	p=.003
Moderate	38(50.0)	25(32.9)	
Inactive	20(26.3)	13(17.1)	

(Values in parenthesis are in percentage, P value <0.05 considered statistically significant)

Table 2 depicts the association of duration of sleep, stress and level of physical activity with cases and control. Significant association was observed with duration of sleep and physical activity with cases and control on applying chi-square test (p value < 0.05). Inadequate and incomplete sleep has been scientifically evidenced in association with increased cardiovascular risk. Less than 6- 7 hour of sleep is higher among cases as compare to control.

Table 3: Association dietary and other routine habits with cases and controls

Characteristics	Case, (N =76)	Control, (N = 76)	P value
Early morning tobacco consumption/bidi smoking, n (%)			
Yes	7(9.2)	8(10.5)	p= .78
No	69(91.8)	68(89.5)	
Early morning Tea/coffee intake, n (%)			
Yes	36(47.4)	24(31.6)	P= .046
No	40(52.6)	52(68.4)	
Water intake early morning in empty stomach, n (%)			
Yes	15(19.7)	31(40.8)	P= .004
No	61(82.3)	45(59.2)	
Skipping breakfast, n (%)			
Yes	54(71.1)	40(52.6)	P= .01
No	22(28.9)	36(47.4)	
Type of diet, n (%)			
Vegetarian	42(55.3)	43(56.6)	P= .87
Non- Vegetarian	34(44.7)	33(43.4)	
Consumption of oily food in a week, (n%)			
>3 Days	42(55.3)	23(30.3)	P = .002
<3 days	21(27.6)	22(28.9)	
Never	13(17.1)	31(40.8)	
Consumption of fruits in a week, n (%)			
>5 Days	20(26.3)	35(46.1)	P = .02
3-4 Days	45(59.2)	36(47.4)	
<3 Days	11(14.5)	5(6.6)	

(Values in parenthesis are in percentage, P value <0.05 considered statistically significant)

The association of dietary and other routine habits with case and control is shown in Table 3. Compared to controls, the proportion of those consuming early morning tea/coffee was more (47.4%) in cases where as the proportion of those consuming water in empty stomach early morning was less (19.7%). Majority of the cases skips morning breakfast and the association was establish to be "statistically significant" (p <0.05). Statistically significant association was also observed with consumption of oily food and fruits per week among cases and controls (p value <.05).

DISCUSSION

This case control study to determine and compare the socio-cultural risk factors of hypertension and the activities of daily living among hypertensive patients and healthy controls was conducted among urban population of Uttarakhand and there were 76 cases with hypertension and 76 healthy controls from the neighborhood. Around three forth of the total study participants were above 50 years and 39% were above 60 years in present study. In a study conducted by Shyamal et al Malda district of West Bengal showed that the risk of hypertension is 14 times more among the individuals above 60 years of age. Majority of participants in both groups were females accounting for around 65%

of total study participants.

Higher proportion of cases were married (80%) and living with spouse compared to controls. This result was similar to the findings of other studies in which higher odds of being hypertensive was found among married subjects (8, 9). In contrary to the 2019 study to assess prevalence of overweight, obesity, hypertension and diabetes in India using NFHS 4 analysis, our study does not show any association of Hypertension with educational status or occupation. This might be due to less sample size or similar status of education and occupation among the urban dwellers selected for this study.

Changing lifestyle and rapid urbanization has made remarkable contribution to increasing prevalence of non-communicable diseases in India(8). Modifiable risk factors of Hypertension such as dietary habits, physical activity, level of stress and sleep are a part of daily life activities.

There was significant difference in physical activity among cases and controls as proportion of cases involved in vigorous physical activity was only 23.7 % where as it was 50% among the controls. Our result was concordant with the findings of study by Gamage A U et al which concluded that there is higher risk of hypertension among the individuals who are physically inactive(10) Various studies have given evidence for consistent, temporal and dose dependent relationship between physical activity and hypertension development, along with evidence of favorable effect of exercise on blood pressure through experiments and interventions(11).

In our study 79% of the cases were seen to have a sleep duration less than 7 hours were as majority (64.5%) of controls showed to a have a sleep duration of more than 7 hours. The results were similar to other studies which showed that risk of hypertension is increased among the individuals having lower sleep duration(12,13). As per the recommendation by American National Sleep Foundation, 7-9 hours of sleep is required for adults and short sleep duration is a risk factor for hypertension(12,14). Several biological mechanisms relating the risk of sleep disorders to hypertension by various studies include CNS dysregulation, disturbance in function of ventilation and biological rhythms and pathological alteration in blood pressure(15–19). A study has also showed that decreased level of leptin, increased levels of ghrelin which further increase appetite where as another gives evidence for short sleep promoting the individual's appetite for salt and suppressing salt excretion in the renal fluid(20,21).

Dietary habits of an individual can be an indirect marker of the lifestyle and cultural food practices prevalent in the community. In India settings, consumption of tea is daily life practice and the result of our study shows there was significantly increased consumption of early morning tea or coffee among the hypertensive cases in comparison to controls. It was also observed that among the controls there was significantly increased consumption of water early morning in in empty stomach. Studies have emphasized on importance of water intake and its significance various age groups including healthy aging(22). Consumption of water which is calorie deficient in early morning might be a healthy practice as it can boost the metabolism and aid in protecting from risks of non-communicable diseases such as hypertension.

The results of our study depict that 71.1 percent of cases skipped breakfast, which is significantly higher than controls. This supports the findings in a meta-analysis by Li Z et al which showed skipping breakfast is associated with increased risk of hypertension in adult population(23). Though breakfast is considered as the most important meal of the day traditionally, the changing life style keeping people away from the regular breakfast consumption habits (24–28). Skipping breakfast which leads to increased appetite and over eating during the other time of the day has the potential to lead to overweight, obesity and insulin resistance being the noticeable mechanism behind its cardiometabolic risks along with its association to increased levels of CRP and glycoprotein acetyl suggesting chronic inflammation as a molecular basis for being a risk factor of hypertension(23).

A significant difference was observed in the consumption of oily food and fruits among the cases and controls in our study. Cases on comparison to controls showed to come more oily food and less fruits in a week. These results were in line with the study conducted by Colecraft E et al which identified that the median frequency of consumption of green leafy vegetables, legumes and fruits is significantly associated with reduction in systolic blood pressure(29). Potassium enrich fruits and vegetables has an important role in reducing the blood pressure. Various studies have also identified that by reducing the risk of obesity, weight gain and, increased consumption of fruits and vegetables counter two strong risk factors of hypertension(30).

Limitation of the study

Calculated sample size could not be achieved due to COVID 19 pandemic and the study participants more females compared to males as majority of the male members were not available at home during data collection as occupied with job. As it is a case control study, chances of recall bias cannot be ruled out.

CONCLUSIONS AND RECOMMENDATION

The study has identified numerous risk factors related with hypertension such as decreased levels of physical activity, dietary habits such as increased consumption of oily food items, decreased consumption of fruits, early morning intake tea/coffee, skipping breakfast and decreased duration of sleep. We identify the need of interventions in the primary level of health care such as health education through mass media and health campaigns motivating community members to incorporate healthy lifestyle with adequate sleep, increased levels of physical activity and healthy dietary habits to their daily life to prevent cases of hypertension.

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