Section: Community Medicine

Original Research Article

HYPERTENSION RISK FACTOR PREVALENCE: A 'FAMILY ADOPTION PROGRAM' BASED CROSS SECTIONAL STUDY IN A RURAL AREA OF SINDHUDURG DISTRICT

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ABSTRACT

Hypertension affects millions of people worldwide predisposing them to serious health problems. The risk factors of the disease can be classified into modifiable and non-modifiable risk factors. Identification of modifiable risk factors early and application of interventions early in life would justify adequate use of healthcare resources. This study was a 'Family Adoption Program' based cross sectional study conducted to determine the prevalence of risk factors of hypertension among rural participants. More than half 186 (54.86 %) of the 339 participants had a family history of hypertension and 6 (1.76%) had a family history of Coronary Artery Disease. 84(24.77%) participants reported occasional use of alcohol. 33 (9.73%) participants were either overweight or obese. 312 participants (92.03%) reported a failure to take the recommended 4-5 servings of fruits and vegetables per day. 285 participants (84.07%) exceeded the recommended daily salt intake. Ultra-processed food was popular among the participants with 294(86.72%) regularly consuming ultra-processed foods. Focus on prevalence of modifiable risk factors in the study emphasises on the opportunity for interventions to mitigate the impact of hypertension on public health.

INTRODUCTION

The 'Family Adoption Program' envisaged and implemented by the 'National Medical Commission' in its competency based medical education in India is an ambitious attempt in liaising medical institutions with the community and nurturing community connect among healthcare personnel in the nascent stage. Budding doctors are acquainted to the real world community problems and sensitised about the prevalent risk factors. The program also facilitates data collection for research.[1]

Hypertension, or high blood pressure, is a serious public health condition that affects millions of people worldwide.[2] It is a predisposing condition that can increase the risk of heart disease, stroke, and kidney failure among other health problems.[3] The silent nature of the disease coupled with failure to seek and adhere to medical and lifestyle interventions accentuates its role in translating the chronic condition to catastrophic health outcomes.[4] There are a number of scientifically documented risk factors for hypertension identified within communities. These factors can be broadly categorized into modifiable and non-modifiable factors. Modifiable risk factors are those that are amenable to change through lifestyle choices and interventions. These include: Unhealthy diet, socioeconomic status, Physical inactivity, Obesity and overweight, Tobacco use, Excessive alcohol consumption and Stress. Non-modifiable risk factors are those that cannot be changed, but may be managed. These include age and family history.[5]

Amidst the epidemiological transition from communicable to non-communicable diseases in India, the rural-urban divide of hypertension and non-communicable diseases is waning with increasing incidence of hypertension in the rural communities.[6] Additionally there is a demographic shift in the epidemiology of hypertension with growing incidence of the disease among younger adults.[7]

Given the absence of a cure for the disease and management with lifelong therapy,[8] primary prevention of the disease emerges as the most rational approach in dealing with the condition. Identification of risk factors early and application of interventions early in life would justify adequate use of healthcare resources.

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The study was conducted in the rural communities of sindhudurg district of Maharashtra with relatively poor access to quality healthcare,[9] to determine the prevalence of risk factors of hypertension. Carefully designed interventions could be based on the understanding of prevalent risk factors.

A study from Uganda reported the following risk factors for hypertension prevalent among a specific sub group of population: physical inactivity (78.7%), overweight (46.8%), obesity (20.6%), addition of extra salt to food (46.8%), current alcohol consumption (33.3%), history of smoking (10.6%), inadequate fruit and vegetable servings per day (100%), family history of hypertension (40.4%) and a family history of diabetes (22.7%).[10]

MATERIALS AND METHODS

The study was conducted as a part of the 'Family Adoption program' in the padave village of Kudal taluka in the sindhudurg district of Maharashtra after obtaining an ethics committee approval. A cross sectional approach was undertaken. The sample size was estimated using the formula 4pq/e2. To derive the sample size, the prevalence of hypertension was considered. As reported by Raghupathy A, Nanda K et al, prevalence of hypertension in India was 29.8 % (≈ 30 %).[11] Therefore 4x 0.3 x 0.7/(0.05)2 = 336. Households from the village were identified through simple random sampling by lottery system and utilising panchayat records. Eligible members from these household complying with inclusion criteria were enrolled in the study until a sample size of 339 was reached. In all, participants from 109 households were enrolled in the study. The data was collected by a face to face interview after obtaining an informed consent. Necessary anthropometric measurements vis-à-vis BMI and measurement of blood pressure was done. Known cases of hypertension, newly detected cases of hypertension, household members below 20 years of age and those unwilling to divulge information and participate in the study were excluded. After obtaining demographic details the hypertension risk factors were assessed based on WHO STEPS approach. Socio-economic background of the participant's family's was determined by modified BG Prasad classification.[12] Unhealthy diet was defined as a diet that is high in sodium (salt exceeding 5 grams per day), low in fruits and vegetables (less than 4-5 servings per day) and comprising of ultra-processed foods.[13] Physical inactivity was considered when there was neither 150 minutes of moderate intensity physical activity nor 75 minutes of vigorous physical activity per week.[14] Overweight and obesity were defined as BMI exceeding 24.99 Kg/m2 and 29.99 Kg/m2 respectively.[15] Tobacco use reported as either Smoked form or chewable and alcohol consumption were considered risk factors. Self-reported stress was taken as a subjectively reported risk factor. Among non-modifiable risk factors, presence of family history of hypertension in the first order relatives was assessed.

Data were entered using Microsoft Excel software. All responses were tabulated and graphical representations were prepared wherever necessary. Statistical analysis was undertaken using IBM Statistical Packet for the Social Sciences. Descriptive statistics were carried out using mean and percentages. Inferential statistics were undertaken using Chi-square and Fisher's exact test of significance.

RESULTS

Among the 339 participants enrolled in the study, 144 (42.47 %) were males and 195 (57.52%) were females. Age wise distribution of the participants shows the majority of the participants, that is 141 (41.59 %) from the 41 to 60 age group. [Table 1].

Table 1: Age distribution of the participants

Age distribution	No. of participants n (%)	Mean age (SD)
20 – 40 years old	99 (29.20)	29.85 (±6.25)
41 – 60 years old	141(41.59)	49.67 (±5.31)
Above 60 years old	99(29.20)	63.32 (±2.39)

The socio-economic background of the participants placed majority of the participants in the affluent classes with 84 participants making around a quarter (24.77 %) of the total belonging to the modified BG Prasad class 1.

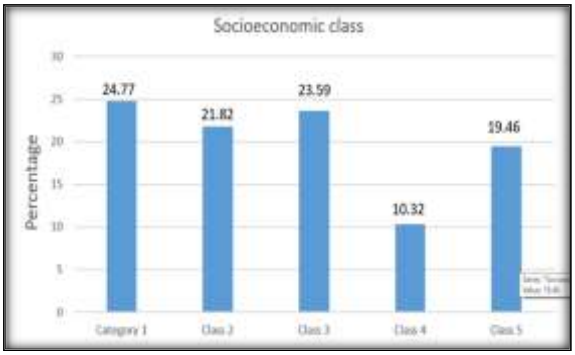

Figure 1: Distribution of participants as per modified BG Prasad Socio-economic classification.

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Majority of the participants, 186 (54.86 %) had a family history of hypertension and 6 (1.76 %) had a family history of Coronary artery disease. Most of the participants, 261 (76.99 %) reported no use of tobacco in any form. [Figure 2]. 84(24.77%) participants reported occasional use of alcohol.

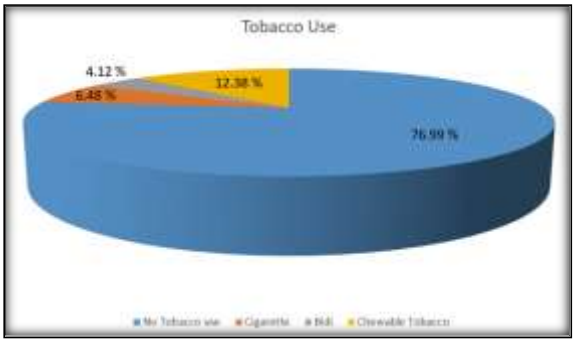

Figure 2: Tobacco use among the participants

Moderate level of physical activity prevailed among a significant proportion of the participants (n= 267, 78.76 %) and vigorous physical activity was the least reported level of physical activity per week. (n= 18, 5.30%) [Figure 3].

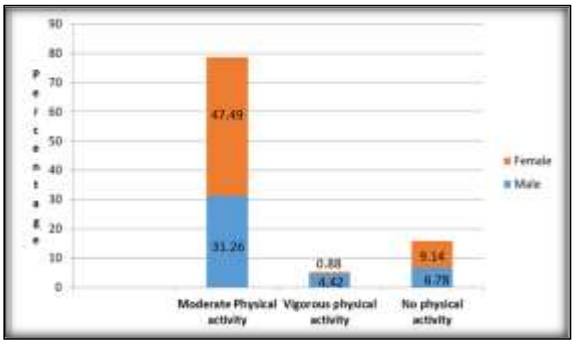

Figure 3: Sex-wise distribution of physical activity levels among the participants

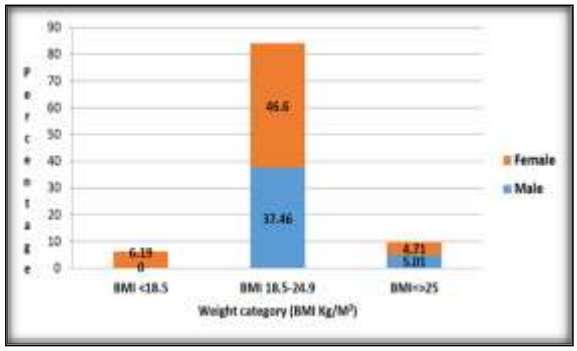

Figure 4. Sex-wise distribution of the weight categories.

The body constitution of the participants showed 285 (84.07%) participants within the normal range of BMI. 33 (9.73%) participants were either overweight or obese. No male participants were underweight [Figure 4]. Mean BMI of underweight, normal weight and overweight participants were 17.8 kg/m2 (SD±0.8), 23.2 kg/m2 (SD±1.1) and 26.01 kg/m2 (SD±0.5) respectively.

Dietary practices of the participants were alarming. Majority of the participants (n=312, 92.03%) reported a failure to take the recommended 4-5 servings of fruits and vegetables per day. Estimated salt intake of the participants was concerning with majority (n=285, 84.07%) exceeding the recommended daily salt intake. The consumption of ultra-processed food was seen to be popular among the participants with 294(86.72%) participants regularly consuming ultra-processed foods [Table 2]. Sex-wise distinction in the prevalence of risk factors showed that females were more likely to consume fruits and vegetables less than 4 servings per day ($P < 0.032$), whereas males were more likely to be regular consumers of ultra-process foods ($P< 0.048$). Also, self-reported stress was more commonly reported by males ($P< 0.01$). [Table 2].

Socio-economic class distribution of the risk factors also indicated disparity across the classes with regular ultra-processed food ($P<0.01$) and higher salt intake (>5 grams/day) ($P<0.01$) being more common among the higher socio-economic classes (Class I, II and III) and lower classes (IV and V) more commonly reporting stress (($P<0.01$). [Table 3]

Table 2: Gender-wise distribution of the risk factors of hypertension

Variable	Category	Male n (%)	Female n (%)	Total n (%)	χ^2 (p-value)
Physical Inactivity	Present	23 (6.78%)	31 (9.14%)	54 (15.92%)	0.492
	Absent	121 (35.69%)	164 (48.37%)	285 (84.07%)	
Fruits & Vegetables (servings/day)	< 4 servings/day	128 (37.75%)	184 (54.27%)	312 (92.03%)	0.032
	4–5 servings/day	16 (4.71%)	11 (3.24%)	27 (7.96%)	
Daily Ultra-processed Food Consumption	Yes	130 (38.34%)	164 (48.37%)	294 (86.72%)	0.048
	No	14 (4.12%)	31 (9.14%)	45 (13.27%)	
Salt Intake (>5 g/day)	Yes	124 (36.57%)	161 (47.49%)	285 (84.07%)	0.188
	No	20 (5.89%)	34 (10.02%)	54 (15.92%)	
Weight Status	Overweight	17 (5.01%)	16 (4.71%)	33 (9.73%)	0.135
	Normal & Underweight	127 (37.46%)	179 (52.80%)	306 (90.26%)	
Self-Reported Stress	Yes	29 (8.55%)	7 (2.06%)	36 (10.6%)	<0.0001
	No	115 (33.92%)	188 (55.45%)	303 (89.4%)	

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Table 3: Distribution of the risk factors of hypertension as per socio-economic classes

Variable	Category	Class I–III n (%)	Class IV–V n (%)	Total n (%)	χ^2 (p-value)
Physical Inactivity	Present	39 (11.50%)	15 (4.42%)	54 (15.92%)	0.362
	Absent	199 (58.70%)	86 (25.36%)	285 (84.07%)	
Fruits & Vegetables (servings/day)	< 4 servings/day	221 (65.19%)	91 (26.84%)	312 (92.03%)	0.195
	4–5 servings/day	17 (5.01%)	10 (2.94%)	27 (7.96%)	
Daily Ultra-processed Food Consumption	Yes	229 (67.55%)	65 (19.01%)	294 (86.72%)	<0.01
	No	9 (2.65%)	36 (10.61%)	45 (13.27%)	
Salt Intake (>5 g/day)	Yes	210 (61.94%)	75 (22.12%)	285 (84.07%)	<0.01
	No	28 (8.25%)	26 (7.66%)	54 (15.92%)	
Weight Category	Overweight	21 (6.19%)	12 (3.53%)	33 (9.73%)	0.192
	Normal & Underweight	217 (64.01%)	89 (26.25%)	306 (90.26%)	
Self-Reported Stress	Yes	14 (4.12%)	22 (6.48%)	36 (10.60%)	<0.01
	No	224 (66.07%)	79 (23.30%)	303 (89.40%)	

DISCUSSION

The study was conducted in the Sindhudurg district of Maharashtra with a sex ratio of 1037 females per 1000 males.[16] In conformity with this demographic trend, in this study too, the female participants outnumbered their male counterparts. This skewing however could also be attributed to the exclusion criteria of rejecting participants with a pre-existing hypertensive state as male members of the community below 50 years are more likely to have hypertension.[17] Majority of the participants were from the 41 -60 years age group with a mean age of 49.67 (SD± 5.31). A study conducted among the faculty members at Makerere University in Uganda to assess the risk factors of hypertension by Alinaitwe B, Amanya C et al reported a similar mean age group of participants of 43.29 years (SD± 8.5).[10]

More than half (54.86 %) of the participant from this study reported family history of hypertension. This is higher than the 40.4 % from the Uganda study reporting family history of hypertension. History of tobacco (23.01%) and alcohol (24.77%) use in this study was comparable to the Uganda study reporting smoking and alcohol use among 10.6 % and 33.3 % of the participants respectively.

In this study, 15.92 % of the participants lacked the recommended physical activity as opposed to the alarming number of participants (78.7 %) with physical inactivity reported by the Uganda study. This low numbers among the current study participants perhaps could be attributed to the agrarian lifestyle of the participants. The level of physical inactivity among the participants of the current study is reflective in the body constitution of the participants with merely 9.73% participants having an overweight or obese BMI. In contrast, 67.4 % of the participants from the Uganda study were either overweight or obese reflective of their sedentary lifestyle.

Dietary practices of the participants from the current study were more associated with risk for hypertension. 92.03 % participants failed to consume the recommended daily fruits and vegetable intake. This is comparable with the Uganda study, also reporting a failure among 100% of the participants to comply with the fruits and vegetables guidelines. As seen with the staple Indian diet,[18] salt intake exceeded the higher threshold among 84.07 % of the participants. Less than half of the participants (46.8 %) from the Uganda study had higher salt intake. In line with the lifestyle transitions of rural communities catching up with their urban counterparts,[19] the consumption of ultra-processed food was seen to be increasingly popular among the participants with 86.72% of the participants regularly consuming ultra-processed foods.

Hypertension is seen to be transcending the socio-economic boundaries,[20] and has transformed into a major cause of morbidity and mortality in both sexes.[17] This study reports a diverse distribution of the risk factors across the socio-economic classes and both sexes.

CONCLUSION

As alarming is the epidemiological transition of disease profile from communicable to non-communicable in India, this study demonstrates the daunting high prevalence of risk factors for hypertension, a major non communicable disease and risk factor for other diseases and death. (3) The rural settings of the study depicts the high prevalence in the hinterlands of the country. Focus on prevalence of modifiable risk factors in the study emphasises on the opportunity for interventions to mitigate the impact of hypertension on public health.

Dietary factors distinctly stand out as prominent risk factors for hypertension among the studied community. In view of these findings, more importantly, efforts should be directed at addressing the diet among other risk factors. Cultural, social and economic aspects of diet could be targeted through health education.

The interview based, subjective nature of the study based on self-reported information by the participants could be a limitation of the study. It does not make any comparison with urban communities.

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