ORIGINAL ARTICLE

Prevalence of hypertension and determinants of treatment-seeking behavior among the adult population of Nagaon district, Assam

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Abstract

Background: Hypertension is a serious health condition that significantly increases the risk of cardiovascular diseases. Around the world, hypertension is a major cause of premature death. The prevalence of non-communicable diseases, especially hypertension, is continuously increasing among adult Indians. There is an urgent need to raise awareness and conduct screening among the population to prevent any damage caused by this disease. *Aim and Objectives:* The present study attempted to look at the prevalence and awareness of hypertension among the tea tribe community of Nagaon district of Assam. *Material and Methods:* A community-based cross-sectional study was conducted among 384 adult population living in three villages of Kaliabor subdivision of Nagaon district, Assam. *Results:* The prevalence of hypertension in the study area was found to be 25.52%. The prevalence of hypertension was found to be higher in men than in women. The burden of hypertension was found to be common in the elderly age group. High blood pressure was more common in people who consumed alcohol, had excessive salt in meal, and smoked bidis or cigarettes, and all of these risk factors were statistically associated with high blood pressure. There was also a lack of community awareness on the issue as most of the people found to have high blood pressure were not previously aware of their condition. *Conclusion*: The high prevalence of hypertension shows serious health threats in the study population. Therefore, it is recommended that more initiatives should be taken by the health department like organizing health awareness camps, screening programs to detect hypertension and community participation and involvement is also needed for hypertension intervention.

Keywords: Hypertension, tea tribe community, prevalence, awareness, intervention.

Introduction

Hypertension is a severe health risk, although it is often disregarded or misunderstood. Complications caused by high blood pressure mostly manifest as coronary heart disease, heart attacks, congestive heart failure, strokes and kidney failure, all of which contribute to premature death [1]. India still faces significant challenges in detecting and treating hypertension, even though developed countries have made significant progress in lowering the incidence of heart disease and stroke - the two most serious complications of uncontrolled hypertension [2]. Knowledge, attitude, and practice assessment is a critical component of hypertension control, but limited information is available from developing nations where hypertension in recent times has been identified as a serious health problem [3]. Because of the rapid adoption of new lifestyles by individuals in developing nations, there has been a significant increase in morbidity and mortality from Cardiovascular Disease (CVD), particularly those associated with hypertension [4]. The latest National Family Health Survey (NHFS-5) reports indicate that 24.0% and 21.3%, respectively, of Indian adult male and female populations

had elevated blood pressure (Systolic ≥ 140 mm of Hg and/or Diastolic ≥ 90 mm of Hg) or are using blood pressure medication [5]. CVD may have a higher burden of complications and mortality among the rural population as a result of limited access to health care and inadequate health care services. Undiagnosed hypertension, which continues untreated and uncontrolled, increases the risk of CVD and premature death [6]. Some of the issues for late detection of hypertension include poor help-seeking behavior on the part of the populace and a lack of screening for the condition at medical institutions. The incidence of hypertension in India is expected to rise significantly in the coming years [7]. The tribal population in the country faces various burden of diseases. While malnutrition and communicable diseases continue to be rampant, growing urbanization, environmental distress and changing lifestyles have resulted in a rise in the prevalence of Non-communicable Diseases (NCD) such as hypertension, cancer, and diabetes. Several studies have found a higher incidence of hypertension among the tea tribe people in North East India [8-9]. Therefore, the present study attempted to look at the prevalence and awareness of hypertension among the tea tribe community of Nagaon district of Assam. The study also looked at the relationship between various risk factors and hypertension.

Material and Methods

A community based cross-sectional study was carried out among the tea tribe population living in the three neighboring villages of Kaliabor subdivision of Nagaon district, Assam. The sample size for the present study was calculated by assuming the most likely prevalence of hypertension to be 25% with a 97% confidence level. Fixing the confidence limit at 5%, the minimum sample size was calculated as n=353. Considering the nonresponse rate of 8% - 9% the final sample size in study was fixed as 384. Participants who volunteered to take part in the study provided prior verbal consent. A structured and pretested interview schedule was administered to obtain data on socio-demographic parameters from the study participants. The blood pressure of the selected participant was taken three times on the right arm using an automatic electronic equipment (OMRON HEM-7261). The average of three readings was used during analysis. Individual with blood pressure of 140/90 mm Hg or higher considered as hypertension whereas those individual with blood pressure of 120–139/80–89 mm Hg considered as prehypertension. Individuals who were identified as hypertensive were referred to neighboring health facilities for treatment. All the anthropometric measurements were used by following standardized technique. Weight was measured with weighing scale and height with anthropometer. Body Mass Index (BMI) was calculated using the following formula: BMI= weight (kg)/ height $(mt)^2$. Individuals were divided into categories based on their BMI using the World Health Organization's standard for Asian populations [10].

Classification	**BMI (kg/m^2)**
Underweight	<18.5
Normal	18.5 - 22.9
Overweight	23.0 - 24.9
Obesity Class I	25.0 - 29.9
Obesity Class II	<=30

Descriptive analysis of anthropometric, physiological, socioeconomic, demographic, and lifestyle related variables were made by mean, Standard Deviation (SD) and frequency distribution.

Statistical analyses were done with the help of Statistical Package for Social Sciences 16.0 and Epi Info 7 statistical software. Chi square (χ^2) test was applied in determining the association of the variables with hypertension.

Selection of study participants

Individuals who were aged 25 years and above residing in the study area and consented to participate were included while those who were unable to give response due to serious physical or mental illness were excluded.

Results

A total of 384 individuals were included in the study out of which 46.6% were males and remaining 53.4% were females. The population was further divided into five different age categories where the highest percentage was found in the age group of 25-34 years (27.6%) and the lowest was found in the 65 years and above (7.3%) age category. More than half of the population (63.3%) had an education qualification upto secondary level, but a considerable fraction (31.0%) was illiterate. The majority of the study participants were married (61.5%), and most of them worked in tea garden factories in the private sector (53.4%), which accounted for half of their occupations (Table 1).

The mean values of systolic and diastolic BP according to age and gender is shown in Table 2. The mean systolic and diastolic blood pressures of all study participants were found to be 127.73 ± 12.57 mmHg and 82.92 ± 10.63 mmHg, respectively. In male, 65 years and above age group had the highest mean systolic and diastolic blood pressure while among females, the eldest age group (65 years and above) and the previous eldest age group (55-64 years) had the highest mean systolic and mean diastolic blood pressure, respectively (Table 2).

The overall prevalence rate of hypertension was found to be 25.5% in the study population (Figure 1). The associated factors of pre-hypertension and hypertension are shown in Table 3. Among the study participants, hypertension status was found to be significantly associated with age, occupation, education level, marital status, alcohol consumption, smoking habits, consumption of excessive salt (habit of taking an extra amount of raw salt) in meal and BMI ($p < 0.05$). Males had the highest pre-hypertensive rate (54.7%), while male and female hypertension rates were 26.3% and 24.9%, respectively. Pre-hypertension was found to be more prevalent in the 45-54 years age group (63.6%), while hypertension was found to be more prominent in the 65 years and above age group (64.3%). Hypertension was most frequently found among retired personnel (76.2%), while pre-hypertensive condition was more common among private sector workers (57.6%). Hypertension was found to be more among illiterates (41.2%), while pre-hypertension was more common among individuals educated upto the primary level (75.0%). Most of the participants in the study did not perform physical activities like physical exercise or yoga and half of them (50.2%) were in the pre-hypertensive stage. Alcohol use, smoking habits and consumption of excessive salt in meal were found to be risk factors for being hypertensive in the study subjects. Most of the populations were tobacco users and nearly half of them (49.6%) were found in the pre-hypertensive stage. The risk of hypertension was found to be the highest among the Obesity Class II category (100.0%) as all persons under this category were found to be hypertensive (Table 3).

Overall, 31.6% of participants with hypertension were aware of their condition. Approximately 64.5% of individuals who were informed about their condition received treatment. Whereas more than one third of the hypertension patients who received treatment for their condition had their blood pressure under control (35.0%) (Figure 2).

Table 1: Socio-demographic characteristics of the study population (n=384)

Variable	N (%)
Age group (in yrs.)	
25-34	106 (27.6)
35-44	92 (24.0)
45-54	88 (22.9)
55-64	70 (18.2)
65+	28 (7.3)
Sex	
Male	179 (46.6)
Female	205 (53.4)
Education	
Illiterate	119 (31.0)
Primary	8 (2.1)
Secondary	243 (63.3)
Graduate & above	14 (3.6)
Marital status	
Unmarried	132 (34.4)
Married	236 (61.5)
Others (Widow & widower)	16 (4.17)

Variable	N (%)
Occupation	
Student	46 (12.0)
Private employee	205 (53.4)
Unemployed	75 (19.5)
Self employed	22 (5.7)
Retired	21 (5.5)
Unskilled wage labour	15 (3.9)
Body Mass Index (kg/m^2)	
Underweight	87 (22.7)
Normal	188 (49.0)
Overweight	57 (14.8)
Obesity Class I	48 (12.5)
Obesity Class II	4 (1.0)
Knowledge of risk factor	
Knows	318 (82.8)
Does not know	66 (17.2)

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Table 2: Mean systolic and diastolic blood pressure (mm hg) by age and gender

Age group (Years)	No.	Systolic (Mean ± SD)			Diastolic (Mean ± SD)		
		Male	Female	Total	Male	Female	Total
25-34	106	121.64 ± 9.23	120.91 ± 11.51	121.27 ± 10.39	76.66 ± 8.06	78.08 ± 8.62	77.37 ± 8.33
35-44	92	125.78 ± 7.14	127.10 ± 12.40	126.50 ± 10.30	84.29 ± 7.73	83.74 ± 9.54	83.98 ± 8.71
45-54	88	130.88 ± 7.63	127.29 ± 14.74	128.68 ± 12.55	84.94 ± 9.41	82.48 ± 13.48	83.43 ± 12.08
55-64	70	134.35 ± 12.59	133.86 ± 12.60	134.10 ± 12.51	87.82 ± 10.38	87.55 ± 11.37	87.69 ± 10.83
65+	28	137.43 ± 15.05	137.17 ± 11.86	137.32 ± 13.53	91.37 ± 11.66	81.08 ± 3.05	86.96 ± 10.30
Total	384	128.20 ± 11.24	127.33 ± 13.64	127.73 ± 12.57	83.46 ± 10.21	82.46±10.99	82.92±10.63

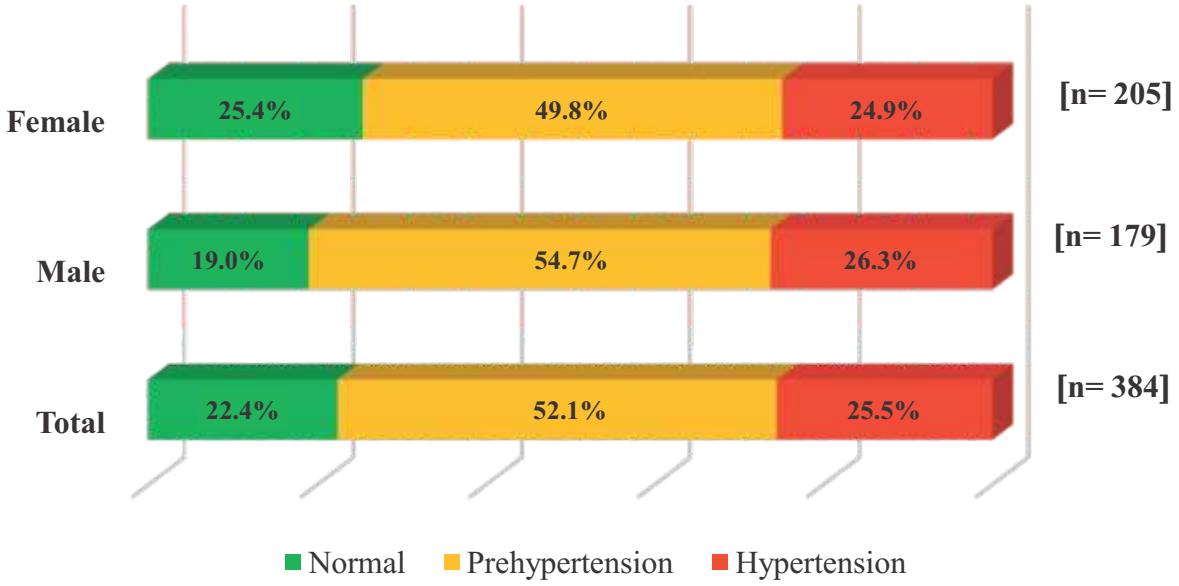

Figure 1: Prevalence of hypertension among the population

Table 3: Prevalence of pre-hypertension and hypertension according to socio-demographic and behavioral risk factor

Variable	Total (n=384)	Normal	Pre-hypertension	Hypertension	Test of Significance
Sex					
Male	179	34 (19.0)	98 (54.7)	47 (26.3)	$\chi^2 = 2.261$ $p = 0.323$
Female	205	52 (25.4)	102 (49.8)	51 (24.9)	
Age group (in years) *					
25-34	106	38 (35.8)	52 (49.1)	16 (15.1)	$\chi^2 = 44.85$ $p = 0.000$
35-44	92	17 (18.5)	53 (57.6)	22 (23.9)	
45-54	88	18 (20.5)	56 (63.6)	14 (15.9)	
55-64	70	8 (11.4)	34 (48.6)	28 (40.0)	
65+	28	5 (17.9)	5 (17.9)	18 (64.3)	
Occupation*					
Student	46	20 (43.5)	26 (56.5)	0 (0.0)	$\chi^2 = 63.79$ $p = 0.000$
Private employee	205	30(14.6)	118 (57.6)	57 (27.8)	
Unemployed	75	24 (32.0)	37 (49.3)	14 (18.7)	
Self employed	22	6 (27.3)	11 (50.0)	5 (22.7)	
Retired	21	3 (14.3)	2 (9.5)	16 (76.2)	
Unskilled wage labour	15	3 (20.0)	6 (40.0)	6 (40.0)	
Education*					
Illiterate	119	20 (16.8)	50 (42.0)	49 (41.2)	$\chi^2 = 26.11$ $p = 0.001$
Primary	8	0 (0.0)	6 (75.0)	2 (25.0)	
Secondary	243	63 (25.9)	137 (56.4)	43 (17.7)	
Graduate & above	14	3 (21.4)	7 (50.0)	4 (28.6)	

Continued...

Variable	Total (n=384)	Normal	Pre-hypertension	Hypertension	Test of Significance
Marital status*					
Unmarried	132	42 (31.8)	70(53.0)	20 (15.2)	$\chi^2 = 45.71$ $p = 0.000$
Married	236	44 (18.6)	128 (54.2)	64 (27.1)	
Others (Widow & widower)	16	0 (0.0)	2 (12.5)	14(85.7)	
Exercise and Yoga					
No	247	54 (21.9)	124 (50.2)	69 (27.9)	$\chi^2 = 2.140$ $p = 0.343$
Yes	137	32 (23.4)	76 (55.5)	29 (21.2)	
Alcohol Consumption*					
Consumer	131	9 (6.9)	71 (54.2)	51 (38.9)	$\chi^2 = 35.58$ $p = 0.000$
Non-Consumer	253	77 (30.4)	129 (51.0)	47 (18.6)	
Smoking Habit*					
Smoker	97	12 (12.4)	57 (58.8)	28 (28.9)	$\chi^2 = 7.505$ $p = 0.023$
Non smoker	287	74 (25.8)	143 (49.8)	70 (24.4)	
Consumption of extra salt*					
Yes	285	40 (14.0)	157 (55.1)	88 (30.9)	$\chi^2 = 48.84$ $p = 0.000$
No	99	46 (46.5)	43 (43.4)	10 (10.1)	
Tobacco Use					
Yes	262	56 (21.4)	130 (49.6)	76 (29.0)	$\chi^2 = 5.275$ $p = 0.072$
No	122	30 (24.6)	70 (57.4)	22 (18.0)	
Body Mass Index*					
Underweight	87	28 (32.2)	36 (41.4)	23 (26.4)	$\chi^2 = 27.14$ $p = 0.001$
Normal	188	45 (23.9)	101 (53.7)	42 (22.3)	
Overweight	57	10 (17.5)	34 (59.6)	13 (22.8)	
Obesity Class I	48	3 (6.3)	29 (60.4)	16 (33.3)	
Obesity Class II	4	0 (0.0)	0 (0.0)	4 (100)	

** p value significance <0.05*

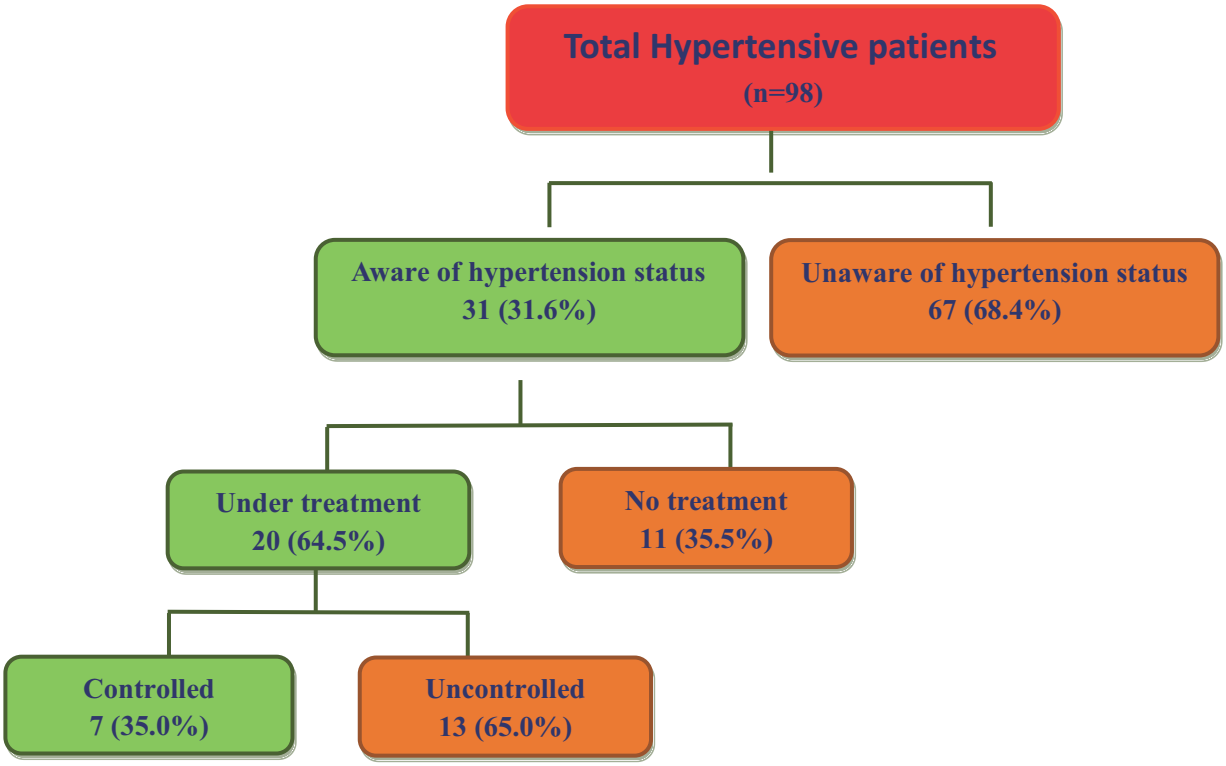

Figure 2: Flow diagram showing awareness, treatment and adequacy of control of hypertension among the population

Discussion

India is undergoing a phase of epidemiological transition with rising burden of NCD. Major risk factors for NCD include raised blood pressure, cholesterol, tobacco use, unhealthy diet, physical inactivity, alcohol consumption and obesity. NCD account for over 63% of total deaths in India, with 27% associated with CVD, which affects 45% of those aged 40 to 69 years. High blood pressure is one of the most significant risk factors for CVD. Additionally, it continues to be poorly controlled as a result of inadequate awareness of hypertension, a lack of proper primary care, and insufficient follow-up. India has set a target of 25% relative decrease in hypertension prevalence by 2025.

To accomplish this, the Government of India developed the Indian Hypertension Control Initiative to expedite access to treatment services for approximately 220 million hypertensive persons in India [11].

In the present study, the prevalence and associated risk factors of hypertension was studied among the adult population of Nagaon district Assam. The eldest age group (65 years and above) had the highest mean systolic and diastolic blood pressure in males. Among females, the eldest age group (65 years and above) and the previous eldest age group (54-64 years) had the highest mean systolic and diastolic blood pressure. Singh *et al.,* (2017) found a similar type of result, with mean systolic and diastolic blood pressure being higher in older age groups in both genders [12].

The prevalence of hypertension in the study area was found to be 25.5%, which was lower than the other studies conducted in the rural and tea garden areas of Assam [9, 13]. The prevalence of hypertension in males and females was found to be 26.3% and 24.9%, respectively. Another study among the tribal population of Kerala found hypertension prevalence rates of 45% and 36%, respectively, for adult males and women [14].

The proportions of hypertension and pre-hypertension in the present study were also found to be higher than the national average at 14.9% and 43.2%, respectively [15]. Pre-hypertension was found to be more common in those aged 45 to 54 years (63.6%), while hypertension was found to be more frequent among 65 years and above (64.3%) age group individuals. The prevalence of hypertension increases with age and becomes more prevalent in the elderly population as observed by Kerketta *et al.,* (2009) [16]. Other studies also indicate that hypertension and pre-hypertension are prevalent in the productive mid-life population, which may have an adverse effect on worker productivity and economic development in South Asian nations such as Bangladesh, India, and Nepal [17-18].

The present study showed a high burden of hypertension in the elderly age group. The prevalence of hypertension in our study was very similar to a study conducted in rural Assam [19]. Furthermore, a study conducted among the elderly in metropolitan areas in Kolkata, Eastern India found a prevalence of hypertension of 53.5% [20]. The disparity in prevalence levels could be attributed to regional variances as well as differences in their lifestyle behaviour.

Males were shown to have a higher prevalence of hypertension than females. Several studies showed a higher prevalence of hypertension in men than women while other studies demonstrated the opposite [21-23].

Occupation was found to be significantly associated with hypertension. In this study, pre-hypertensive conditions were more common in private employees (57.6%), while more than three-fourth of the retired population (76.2%) had elevated blood pressure. A cross-sectional study in Urban Varanasi found that both pre-hypertension and hypertension were prevalent in 52.8% and 26.7% of private sector and retired employees, respectively [12].

Present study also showed a significant association between hypertension and education. Individuals who read up to the primary level were typically pre-hypertensive (75.0%), whereas 41.2% of the illiterates were found to be hypertensive. A significant association between a high prevalence of hypertension and low levels of education was found in several other studies [24, 25].

This study found that most of the individuals were not involved in any physical activity like exercise or yoga, and half of them (50.2%) were in the pre-hypertensive stage while 27.9% were hypertensive. Research has continuously demonstrated that physical activity and exercise are beneficial for controlling blood pressure and preventing hypertension [26]. There are still numerous questions about the nature of the relationship between physical activity and hypertension prevention in terms of the type, intensity, and duration of physical activity required, particularly in high-risk individuals [27].

Hypertension was also found to be more prevalent among those who consumed alcohol, had excessive salt in meal, and smoked bidi or cigarettes, and all of these risk factors were statistically associated with hypertension. Demographic findings revealed that the habits of extra salt intake, smoking and alcohol consumption are quite common in the tribal population. Numerous studies already revealed that people who smoke, drink alcohol, and consume extra salt in their diet regularly have a higher prevalence of hypertension [10, 13].

BMI was also used to determine the prevalence of hypertension. All individuals who had Obesity Class II (100%) BMI were found to have hypertension, whereas the prevalence was reported to be 33.3% and 22.8% respectively in the Obese I and overweight categories. The present study showed a significant statistical association between hypertension and BMI of the population. Obesity and overweight status, which reflect higher body fat mass, were shown to be independent risk factors for hypertension, which was consistent with prior research studies indicating an association between high body fat levels and hypertension [28].

Hypertension detection and screening were not observed to be extremely widespread in this study population. Additionally, there was also a lack of community awareness on the issue. Nearly one-third of hypertensive individuals were found to be aware of their conditions; however, 64.5% of them were taking medication to treat their condition. Similarly other studies have also demonstrated poor management of hypertensive conditions among the population due to ignorance, inadequate medical care in health facilities and lack of proper follow-up [29,30].

Conclusion

Untreated high blood pressure is a major risk factor for developing future ailments in addition to heart and kidney issues. The high prevalence of hypertension shows serious health threats in the study population. Therefore, it is recommended that more initiatives should be taken by the health department and other agencies for hypertension intervention. Emphasis should also be given on screening activities for hypertension detection at the health center and health awareness programmes at the village level, which encompass the entire adult population in the area, in order to achieve early diagnosis and effective treatment. Through this initiative, the community will also be more aware about the various risk factors associated with hypertension. Moreover, for high blood pressure control, it is recommended that everyone should adopt health checkup on a regular basis. Proper follow up of hypertensive patients is also required to prevent any further causalities due to this disease.

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