

# Prevalence of Hypertension and Its Associated Factors in a Rural Population of Southeastern Bangladesh

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## ABSTRACT

**Background:** More than 75% of the population live in rural area in Bangladesh and morbidity and mortality due to Non-Communicable Diseases (NCDs) has increased over the last few decades in this country. Hypertension is a significant risk factor for NCDs, specifically cardiovascular disease. This study aimed to determine hypertension prevalence and associated factors among Bangladeshi adults in rural areas.

**Materials and methods:** This cross-sectional study was conducted in selected rural areas in the Chattogram district of Bangladesh from January 2014 to December 2014. A total of 2500 individuals aged 18 years and above were determined by a multistage sampling method. Self-reported sociodemographic and hypertension-related data were collected using a structured case record form, and blood pressure was measured.

**Results:** The overall prevalence of hypertension was 32.5% (812/2500) [95% confidence interval (CI), 30.7-34.3] (Men: 34.4%, Women: 30.9%). The prevalence of hypertension was 21.1% and 43.6% in the ≤40 and >40 years age group, respectively ( $p < 0.001$ ). Hypertension had no association with the gender, educational level and monthly income of the respondents. Overall, 1268 (50.7%, 95% CI 48.8-52.7%) of the study participants had ever had their blood pressure measured. Among the 812 people with hypertension, 478 (58.9%, CI 55.5-62.2%) were aware of the disease. Of those familiar with the disease, 404 (84.5% CI 81.0-87.5%) were on treatment, and 285 (70.5%, CI 64.2-74.9%) had achieved disease control. Only 315 (38.8%, CI 35.5-42.2) were controlled among all people with hypertension.

**Conclusion:** Hypertension is highly prevalent (One in three) in Bangladeshi rural adults, while awareness, treatment, and control are low. The integrated context specific program must be designed and implemented at scale through a primary healthcare approach.

**Key words:** Hypertension; NCDs; Rural.

## Introduction

The burden of Non-Communicable Diseases (NCDs) is growing swiftly in low resourced countries, resulting in harmful health resembling the NCDs burden in high resourced countries.<sup>1</sup> The economic burden on households of NCDs poses significant challenges to global poverty alleviation efforts. For patients, NCDs are associated with 2–7-fold higher odds of catastrophic levels of out-of-pocket costs.<sup>2</sup>

Hypertension is one of the most common NCDs.<sup>3</sup> Uncontrolled hypertension increases the risks of

cardiovascular disease, strokes, and end-stage renal failure.<sup>4</sup> It accounts for about 45% of deaths due to ischaemic heart disease and 52% of deaths due to stroke.<sup>4</sup> Older age, overweight/obesity, unhealthy diet, lack of physical exercise, smoking tobacco products and family history of hypertension are major risk factors for hypertension.<sup>5,6</sup>

The prevalence of hypertension is increasing, primarily in Low-Income and Middle Income Countries (LMICs) and remains steady or decreasing in high-income countries.<sup>7</sup> Bangladesh, like many other LMICs, is undergoing an epidemiological transition and an increased understanding of the burden and risk factors of hypertension is necessary to combat the increasing burden.<sup>8</sup> Nevertheless, the number of studies and representative data on the prevalence of HTN in Bangladesh needs to be more comprehensive and readily available, especially for rural people. Therefore, considering such things, this study aimed to reveal a clear understanding of the prevalence and associated factors of HTN in Bangladeshi rural people. This study might influence the policymakers to review or change existing policies.

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Date of Submission  :  13th November 2023

Date of Acceptance  :  30th November 2023

**Materials and methods**

This population-based cross-sectional study was conducted from January 2014 to December 2014 after obtaining approval from the Ethical Review Committee of Chittagong Medical College. Consent was obtained from the participants.

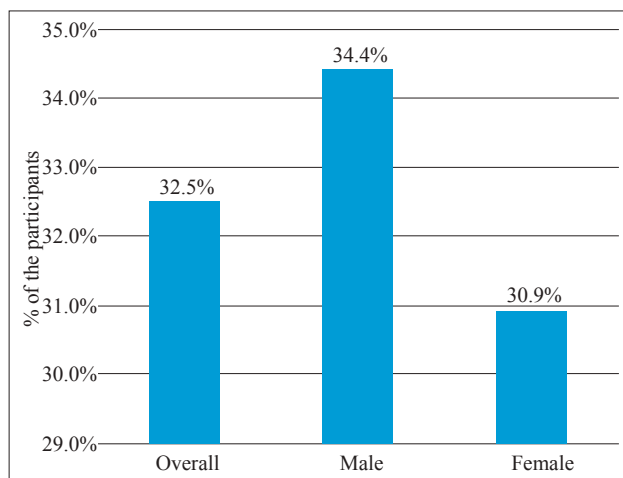
Individuals, either male or female, aged 18 years and older, were eligible to participate in the study. Pregnant women were excluded. Participants were selected through a multistage sampling from five Unions of different Upazilas of Chattogram, Bangladesh. A total of 3196 people were invited to participate in the survey, and 2551 subjects participated, with an overall response rate of 79.44%. Of these participants, there was complete information on 2500 subjects, which were included in the analysis. Trained community health workers collected data with a minimum of 10th-grade education who received one-day study-specific training. After completing the sociodemographic data, participants were asked whether or not they had previously been diagnosed with hypertension. If yes, the subject’s medical records on the diagnosis and treatment were reviewed. Next, the research assistant assessed repeated right-arm seated Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP) levels with a standard mercury sphygmomanometer. The reported BP was the average of two measurements taken after the participant had been sitting quietly for five minutes.

A participant was considered to have hypertension if the SBP was  $\geq 140$ mm Hg, DBP was  $\geq 90$ mm Hg, or the BP was below these cut-offs. Still, the study participant reported taking antihypertensive medication.<sup>9</sup> Controlled hypertension was defined as an SBP  $< 140$ mm Hg and a DBP  $< 90$ mm Hg and reported use of antihypertensive medication during the survey.<sup>9</sup> An SBP of  $\geq 140$ mm Hg or a DBP of  $\geq 90$ mm Hg in a study participant taking antihypertensive medication was considered uncontrolled hypertension. An individual with SBP  $\geq 140$ mm Hg or DBP  $\geq 90$ mm Hg with no history of taking antihypertensive medication was considered as newly identified or unaware of hypertension.<sup>10,11</sup> The participants with high measured BP were referred to the hospital for further evaluation and care.

Statistical analysis was carried out using the SPSS version 15.0. Using WHO-ISH guidelines, the prevalence was calculated and 95% CIs of hypertension, controlled, uncontrolled and unaware or newly identified hypertension.<sup>9</sup> Comparison of different sociodemographic data between participants with and without hypertension was done using the Chi-square test.  $p < 0.05$  was considered to be statistically significant.

**Results**

Out of 2500 participants, 812 had hypertension, indicating the prevalence rate of 32.5% (95% CI: 30.7-34.3%). In male and female group the prevalence rate was 34.4% (95% CI:31.7-37.2%) and 30.9% (95% CI: 28.6-33.4%), respectively (Figure 1).



**Figure 1** Prevalence of hypertension

Table I shows that, prevalence of hypertension was 21.1% and 43.6% in 40 and  $>40$  years age group, respectively. Chi-square test of significance indicate that the difference was highly significant statistically.

**Table I** Association between age group and hypertension (n=2800)

Age group	Hypertension		p value
	Present	Absent	
$\leq 40$ years (n=1234)	260 (21.1)	974 (78.9)	$< 0.001$
$> 40$ years (n=1266)	552 (43.6)	1014 (57.0)	

Data were expressed as frequency (%), p value was obtained from Chi-square test.

Prevalence of hypertension was comparatively higher in male than female (34.4% versus 30.9%), however, the difference failed to reach statistical significance ( $p=0.068$ ).

**Table II** Association between gender and hypertension (n=2500)

Gender	Hypertension		p value
	Present	Absent	
Male (n=1120)	385 (34.4)	735 (65.6)	0.068
Female (n=1380)	427 (30.9)	953 (69.1)	

Data were expressed as frequency (%), p value was obtained from Chi-square test.

Educational level of the participants had no significant association with their hypertension status (Table III).

**Table III** Association between educational status and hypertension (n=2500)

□ Educational level□	Hypertension		p value
	Present□	Absent□	
Illiterate (n=511)□	162 (31.7)□	349 (68.3)	0.868
Literate (n=1989)□	650 (32.7)□	1339 (67.3)□	

Data were expressed as frequency (%), p value was obtained from Chi-square test.

Educational level of the participants had no significant association with their hypertension status (Table III).

**Table IV** Association between monthly income and hypertension (n=2500)

□ Monthly income□	Hypertension		p value
	Present□	Absent□	
<10,000 tk (n=954)□	310 (32.5) □	644 (67.5)□	0.956
≥10,000 tk (n=1546)□	505 (32.7)□	1041 (67.3)	

Data were expressed as frequency (%), p value was obtained from Chi-square test.

Overall 1268 (50.7%, 95% CI 48.8-52.7%) of the study participants had ever had their blood pressure measured. Females were more likely to have ever had their blood pressure measured compared to males [Women 58.3% versus men 42.0%]. Among the 812 people that had hypertension 478 (58.9%, CI 55.5-62.2%) were aware that they have the disease. Of those aware of the disease 404 (84.5% CI 81.0-87.5%) were on treatment and 285 (70.5%, CI 64.2-74.9%) had achieved control of the disease. Among all people with hypertension only 315 (38.8%, CI 35.5-42.2) were controlled.

**Table V** Awareness and control of hypertension among the participants

□	Frequency□	%□	95% CI
Ever measured BP (n=2500)□	1268□	50.7□	48.8-52.7
Aware of hypertension (n=812)□	478□	58.9□	55.5-62.2
On treatment (n=478)□	404□	84.5□	81.0-87.5
Control among hypertensive (n=812)□	315□	38.8□	35.5-42.2
Control among on treatment (n=404)□	285□	70.5□	64.2-74.9

CI: Confidence Interval.

## Discussion

In this population-based cross-sectional study in rural Bangladesh, the prevalence of hypertension was high among both males (34.4%) and females (30.9%). Among those who had hypertension, 41.1% were not aware of it. Additionally, a significant number of the hypertensive participants had uncontrolled hypertension.

The data on the prevalence of and risk factors for hypertension in Bangladesh are limited. The BDHS2011 measured BP in a nationally representative sample of adult males and females.<sup>12</sup> The BDHS estimates of hypertension prevalence for the Chattogram division were lower than this research finding (26.3%). However, BDHS documented substantial urban versus rural and regional variations. The urban sample had a much higher prevalence than the rural sample (40.2% vs 29.4%).<sup>12</sup>

Recent findings suggest that the pooled prevalence of hypertension varied widely between 1.10% and 75.0% and an overall pooled prevalence of hypertension was estimated to be 20% in Bangladesh.<sup>13</sup> Overall, an increasing trend of hypertension was also observed.<sup>13</sup> The findings of the overall prevalence of hypertension (32.5%) in rural Bangladeshi in Chattogram are higher than the global prevalence of hypertension, which was observed at 22% in 2015 among adults aged 18 years and older.<sup>14</sup> This higher prevalence may be due to urbanization, modern technological advances, changes in food habits, less physical activities, more stressful conditions and single-time measurement of BP.

Despite the high prevalence of hypertension, awareness of the problem was low at 58.9 percent. This study findings could explain the low awareness that only 50.7% of the population had their blood pressure measured. Awareness of hypertension largely depends on the capacity of the health system to provide diagnostic services for hypertension to the general population.<sup>15,16</sup> Infectious diseases primarily constrain the healthcare system in Bangladesh and NCDs have yet to receive the attention they deserve.<sup>17</sup> Hypertension is mainly asymptomatic and to increase awareness, there is a need to screen all adults at an appropriate opportunity when they contact the health system.

Among the people with hypertension, 38.8% were controlled. The reason for this low level of control is that the majority of people with hypertension are not aware, and even among those aware, all were receiving treatment. However, even among those receiving treatment, 70% had achieved control. A worrying global trend is that deficient levels for control of hypertension are widespread in both low and high-income countries.<sup>15,18,19</sup> In a recent systematic review regarding control among all hypertensive, 10.8% of the men had adequate control in high-income countries compared to 9.8% in low-income countries. Among women, only 17.3% of all people with hypertension achieve control, compared to 16.2% in low-income countries.<sup>15</sup> These data suggest that adequate control at a population level is complicated in practice. Indeed, in Bangladesh,

where health care could be more robust with low levels of health staffing and a chronic under-supply of medicines, it is almost an uphill task to achieve control of emerging NCDs such as hypertension.

### Limitations

The limitation of this study was due to a cross-sectional design that could not explain causal relationships. Another limitation was the failure to collect a representative sample from all the segments of the southern part of Chattogram.

### Conclusions

Despite these limitations, the study reveals that hypertension was common in rural Chattogram, but awareness and control could have been more optimal.

### Recommendations

Measures for increasing awareness, such as screening all adults who contact the health system and at outreach community programs, are needed. Because control through treatment is challenging to achieve at the population level, optimizing primary preventive approaches should be the focus of the national policy.

### Disclosure

All the author declared no competing interest.

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