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Original article

Prevalence and associated factors of pre-hypertension and hypertension among married women in Bangladesh

Shahara Sultana Shanta[1], Abu Sayed Md. Al Mamun[1], Md. Masud Rana[1], Md. Reazul Karim[1], Md. Nurul Islam[1], Md. Ripter Hossain[1], Md. Abdul Wadood[2], Premananda Bharati[3], Md. Golam Hossain[1*]

ABSTRACT

Hypertension is one of the most important risk factors for cardiovascular disease. The purpose of the study was to detect the prevalence and risk factors of pre-hypertension and hypertension among married women aged 35 to 49 years in Bangladesh. Secondary data was used in this study which extracted from BDHS 2011 dataset. BDHS-2011 collected data from Bangladeshi ever married women by using two-stage stratified sampling. Descriptive statistics, Chi-square test and logistic regression analysis were used in this study.
It is found that the prevalence of pre-hypertension and hypertension were 31.4% and 24.0% among Bangladeshi women aged 35 to 49 years respectively. The Chi-square test exhibited that type of place of residence, currently working, age, educational level, body mass index (BMI), arm circumference; blood pressure ever checked, division, anaemia level, wealth index, number of visits to a doctor were significantly associated with pre-hypertension and hypertension. Multinomial logistic regression model demonstrated that except blood pressure ever checked, women's working status, anaemia level, geographical region, BMI and age group were the significant influencing factors for both pre-hypertension and hypertension. In this study, some modifiable and non-modifiable factors were found as predictors of hypertension among married women in Bangladesh aged 35-49 years. These factors might be considered to reduce the number of pre-hypertension and hypertension patients in Bangladesh. This study suggests that government and non-government health organizations should take policy to control hypertension of Bangladeshi women.

Key words: Hypertension, Multilevel logistic regression, Married women, Bangladesh

[1] Health Research Group, Department of Statistics, University of Rajshahi, Rajshahi, Bangladesh
[2] Rajshahi University Medical Centre, University of Rajshahi, Rajshahi, Bangladesh
[3] Retired Professor, BAU, Indian Statistical Institute, 203 B.T. Road, Kolkata 108, India.
*Corresponding author hossain95@yahoo.com

INTRODUCTION

Globally, hypertension is a major public health problem in both the developed and developing countries. Hypertension, also known as high or raised blood pressure, is a condition in which the blood vessels have persistently raised pressure and it increases the risks of heart, brain, kidney and other diseases (WHO, 2019). It is estimated that arterial hypertension constitutes a significant factor of more than 50% of all-caused deaths (Boutitie et al., 2002) and more than 1.13 billion people worldwide have hypertension, among them two-thirds of the people living in low and middle-income countries (WHO, 2019). The global prevalence of hypertension is projected to increase from 26% in 2000 to 29.2% by 2025 (Lim et al., 2012). Globally, the observed increasing burden of hypertension is a major public health concern.

Hypertension can be classified as abnormally high arterial blood pressure. According to the Joint National Committee 7 (JNC7), normal blood pressure is the condition where systolic BP is < 120 mmHg and diastolic BP < 80 mm Hg. Hypertension is defined as systolic BP level of ≥140 mmHg and/or diastolic BP level ≥ 90 mmHg. The grey area falling between 120–139 mmHg systolic BP and 80–89 mmHg diastolic BP is defined as prehypertension (Kumar et al., 2016; Chobanian et al., 2003). Although prehypertension is not a medical condition in itself, pre-hypertensive people are at more risk of developing hypertension (Erem et al., 2009).

The prevalence of hypertension is increasing, primarily in low-income and middle-income countries and remains steady or decreasing in high-income countries (Lim et al., 2012). In South Asia, the prevalence of hypertension is approximately 33% among people aged 18 years and older with a secular trend documenting that the burden of hypertension is increasing over time (Zhou et al., 2017). South Asia region accounts for 23% (or an estimated 258 million) of global hypertension burden (Zhou et al., 2017).

There are several factors influencing hypertension. These factors vary from country to country and even there is difference between urban and rural places of the same region (Rani et al., 2015). Factors attributed to the increase in prevalence of hypertension include, population growth, ageing of the population, and behavioural risk factors, such as smoking,

poor diet, harmful use of alcohol, low physical activity, and overweight or obesity (WHO, 2013).

Many researches have been studied on women's hypertension worldwide (Rosenthal and Oparil, 2000; Acheampong, 2019; Chen and Chauhan, 2019; Akl et al., 2017; Ghosh et al., 2016; Choi et al., 2017; Nyarko, 2016). Several studies have been also conducted on hypertension in Bangladeshi adult (Chowdhury et al., 2020; Khanam, 2019; Islam et al., 2018; Alam et al., 2014; Choudhury et al., 2014; Zaman, 1999). Hypertension in women has received less attention than hypertension in men, and the major controlled trials of antihypertensive therapy have been carried out in populations made up predominantly of and have emphasized outcomes in men. Recently it has been recognized that women develop high blood pressure, particularly systolic hypertension, at an increased rate as they age, and that this age-related blood pressure increase is exaggerated by the menopause. The age-related rise in blood pressure, particularly systolic blood pressure and pulse pressure, contributes substantially to the age-related increase in risk of heart attack, heart failure, and stroke in middle-aged and elderly women (Rosenthal and Oparil, 2000).

Since woman plays an important role for her family, nation as well as for the globe. Her potential influence and contribution to the nation's workforce and productivity gives her the most important position. Therefore, in this study, women aged 35-49 years was considered because this population is important for their contribution to the family as well as nation. The purpose of this study was to determine the prevalence of hypertension and investigated the effect various socio-economic and demographic factors on hypertension among married women aged 35-49 years in Bangladesh.

MATERIALS AND METHODS

Materials

The data were extracted from Bangladesh Demographic and Health Survey (BDHS-2011). The sample for the 2011 BDHS is nationally representative and covers the entire population. This survey was conducted from July 8, 2011 to December 27, 2011. Bangladesh has seven administrative divisions: Barisal, Chittagong, Dhaka, Khulna, Rajshahi, Rangpur,

and Sylhet. The sampling technique, survey design, survey instruments, measuring system and quality control have been described elsewhere (NIPORT, 2011). It was mentionable that BDHS first time measured blood pressure of their selected married women in 2011, but they did not measure this measurement for their last survey (BDHS-2014).

Sampling

The survey was based on a two-stage stratified sample of households. In the first stage, 600 EAs were selected with probability proportional to the EA size, with 207 clusters in urban areas and 393 in rural areas. In the second stage of sampling, a systematic sample of 30 households was selected from each EA, which covered the whole country. Using this design, 18,000 residential households were selected for interviews of 18,000 ever-married women (NIPORT, 2011). Blood was taken from 5902 ever-married women for measuring their blood pressure. BDHS-2011 collected blood sample from married women aged 35-49 years. Pregnant women were excluded for analyze, and some missing values also were detected by the present authors. After excluding pregnant mothers and deleted missing values, the sample was reduced to 5293.

Outcome variable

Hypertension was the outcome variable in this study. First hypertension was classified into three groups: i) normal systolic blood pressure < 120 (mmHg) and diastolic blood pressure < 80 (mmHg), ii) Pre-hypertension, systolic blood pressure between 120–139 (mmHg) and the diastolic blood pressure between 80–89 (mmHg) and iii) Hypertension, the systolic blood pressure (SBP) >140 (mmHg) and diastolic blood pressure (DBP) > 90 (mmHg) respectively.

Independent variable

Various socio-economic and demographic factors were used in this study as independent variables, such as: number of visit to a doctor (one time visit, 0; two times visit, 1), type of place of residence (urban, 1; rural, 2), slept last night (no, 0; yes, 1), current marital status (no, 0; yes, 1), currently working (no, 0; yes, 1), age group (35-40, 1; 41-49, 2), educational level (no education, 0; primary education, 1; secondary education, 2; higher education, 3), body mass index (normal, 1; underweight, 2; overweight, 3; obese, 4), arm

circumference (small (<=23 cm), 1; medium (24-35), 2; large(>=36), 3), blood pressure ever checked (no, 0; yes, 1), divisions (Dhaka, 1; Chittagong, 2; Barisal, 3; Khulna, 4; Rajshahi, 5; Rangpur, 6; Sylhet, 7), anaemia level (no, 0; yes, 1) and wealth index (middle, 1; poor, 2; rich, 3). These independent variables were selected based on the previous studies (Chowdhury et al., 2020; Nyarko, 2016; Islam et al., 2018; Zaman, 1999).

Statistical analysis

Descriptive frequency distribution was used to calculate the prevalence of pre-hypertension and hypertension of married women aged 35-49 years. Chi-square was used in the present study to find the association between hypertension and socio-economic, demographic, anthropometric and health related factors. The significantly associated factors that were provided by Chi-square test were used as independent variables in multinomial logistic models. A value of $p<0.05$ was considered as statistically significant in the analysis. All statistical analyses were performed using SPSS (IBM Version 21).

RESULTS

Bangladeshi 5293 married non-pregnant women aged 35-49 years were considered as sample for investigation their hypertension. It was observed that the prevalence of pre-hypertension and hypertension of Bangladeshi non-pregnant women were 31.4% and 24.0% respectively (Figure 1). Since there were three categories of the dependent variable, multinomial logistic regression was used to find the effect of socio-economic and demographic variables on hypertension among Bangladeshi women. In this model, normal pressure was considered as reference category.

Factors associated with pre-hypertension

In this study, significant ($P<0.05$) variation in hypertension among women was observed due to place of residence. It was also observed that 65.71% married women from rural and 34.29% from urban among them 31.2 % married urban women were pre-hypertensive and 31.5% married rural women were pre-hypertensive. In was found that

98.32% married women slept last night. It was noted that among women did not sleep last night, 35.3% married women had pre-hypertension.

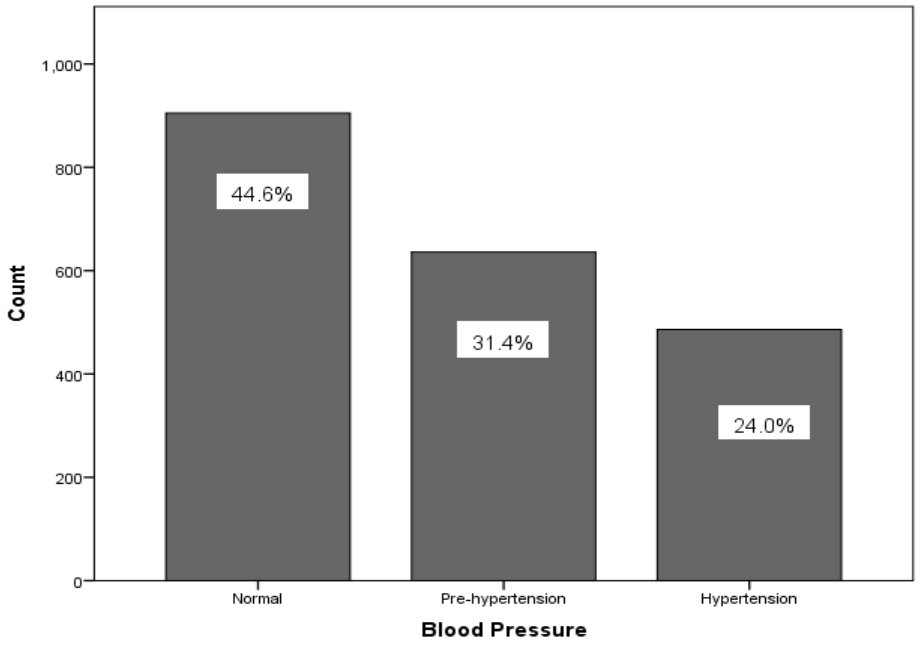

Figure 1: Prevalence of Blood Pressure

It was observed that among married women, 88.21% women were currently married. It was also noted that 31.7% women were pre-hypertensive who were currently married. It was observed that 83.67% married women were not currently working. The study showed that 32.1 % married women had pre-hypertension who were not currently working. It was observed that 54.32% married women were in age group 41 to 49 years. It was noted that among women in age group 41 to 49 years, 31.2% married women who got pre-hypertension. It was found that among secondary educated women, 31.2% women had pre-hypertension. Significant ($p<0.01$) association was also found between hypertension and married women's BMI. This study observed that 54.22 % married women's BMI was normal. The study also exhibited that 25.5% married women had pre-hypertension who were underweight, 31.7% married women had pre-hypertension who were normal weighted, 36.5% married women got pre-hypertension who were overweight and 37.9% married women had pre-hypertension who

were obese. It observed that 81.89% married women's arm circumference was medium and 33.3% married women who were pre-hypertensive had large arm circumference. It was observed that 75.43% married women checked their blood pressure at least once in their life. The study also showed that 31.3% women who had pre-hypertension checked their blood pressure at least once in their life. In this study, it observed that 18.25% ,13.71% , 11.05%, 16.63% , 15.44%, 12.78% and 12.14 % married women were from Barisal, Chittagong, Dhaka, Khulna, Rajshahi, Rangpur and Sylhet division respectively. Among married women from Barisal, Chittagong, Dhaka, Khulna, Rajshahi, Rangpur and Sylhet division, 36.2%, 29.9%, 25.4%, 34.7%, 25.6%, 32.0% and 33.3% women were pre-hypertensive respectively. Again, it was found that 57.23% women were not anaemic. The study also showed that among married women's who were not anaemic, 31.9% had pre-hypertension. There was significant ($p<0.01$) variation observed between married hypertensive women and their wealth index. It was observed that 34.53% married women's wealth index was poor and 45.63% married women's wealth index was rich. Among women whose wealth index was rich, 34.4 % had pre-hypertension. In this study, it observed that 31.4% and 32.1% married women were pre-hypertensive who visited a doctor for hypertension check-up one time and two times respectively.

Logistic regression model described that the married currently working women were less likely to be pre-hypertensive than their counterpart [AOR=1.46; CI: 1.08-1.96; $p<0.05$]. Women with normal weight are more likely to be pre-hypertensive than the underweight women [AOR=0.65; CI: 0.48-0.87; $p<0.05$], similarly women with normal weight were less risky to be pre-hypertensive than the obese [AOR=2.91; CI: 1.23-3.89; $p<0.05$] and overweight [AOR=1.79; CI: 1.32-2.43; $p<0.05$] women. Women who ever checked their blood pressure were less risky for pre-hypertensive than the women who never checked their blood pressure [AOR=1.31; CI: 1.01-1.70; $p<0.05$]. The women from Dhaka division were more likely to be pre-hypertensive than the women from Chittagong [AOR=0.56; CI: 0.39 -0.81; $p<0.05$], Barisal [AOR=0.56; CI: 0.37-0.84; $p<0.05$] and Rajshahi [AOR=0.54; CI: 0.37 -0.78; $p<0.05$]. It was also observed that women aged 41-49 years were more risk for pre-hypertension than the women aged 35-40 years [AOR=0.78; CI: 0.63-0.97; $p<0.05$].

Table 1: Association between socio-economic, demographic and anthropometric factors and women's hypertension

Variables	Group, N (%)	Hypertension			χ^2-value	p-value
		Normal, N (%)	Prehypertension, N (%)	Hypertension, N (%)		
Type of place of residence	Urban,695 (34.29)	282(40.6)	217(31.2)	196(28.2)	11.80	0.003
	Rural,1332 (65.71)	623(46.8)	419(31.5)	290(21.8)		
Slept last night	No,34 (1.68)	12(35.3)	12(35.3)	10(29.4)	1.27	0.529
	Yes,1993 (98.32)	893(44.8)	624(31.3)	476(23.9)		
Current marital status	Currently married, 1788 (88.21)	794(44.4)	566(31.7)	428(23.9)	0.58	0.748
	Others,239 (11.79)	111(46.4)	70(29.3)	58(24.3)		
Currently working	No,1696 (83.67)	731(43.1)	545(32.1)	420(24.8)	10.15	0.006
	Yes,331 (16.33)	174(52.6)	91(27.5)	66(19.9)		
Age groups	35-40 years, 926(45.68)	462(49.9)	293(31.6)	171(18.5)	32.12	0.001
	41-49 years,1101 (54.32)	443(40.2)	343(31.2)	315(28.6)		
Educational level	No education, 885(43.66)	401(45.3)	269(30.4)	215(24.3)	13.61	0.034
	Primary, 635(31.33)	304(47.9)	199(31.3)	132(20.8)		
	Secondary,391(19.29)	159(40.7)	122(31.2)	110(28.1)		
	Higher, 116(5.72)	41(35.3)	46(39.7)	29(25.0)		
BMI	Underweight,471 (23.24)	287(60.9)	120(25.5)	64(13.6)	128.97	0.001
	Normal, 1099 (54.22)	499(45.4)	348(31.7)	252(22.9)		
	Overweight, 362 (17.86)	98(27.1)	132(36.5)	132(36.5)		
	Obese, 95 (4.69)	21(22.1)	36(37.9)	38(40.0)		
Arm circumference	Small ,349(17.22)	198(56.7)	91(26.1)	60(17.2)	30.04	0.001
	Medium 1660,(81.89)	703(42.3)	539(32.5)	418(25.2)		
	Large, 18(0.89)	4(22.2)	6(33.3)	8(44.4)		
BP Ever checked	No, 498 (24.57)	251(50.4)	157(31.5)	90(18.1)	14.49	0.001
	Yes, 1529 (75.43)	654(42.8)	479(31.3)	396(25.9)		
Division	Barisal,370 (18.25)	142(38.4)	134(36.2)	94(25.4)	58.72	0.001
	Chittagong, 278,(13.71)	152(54.7)	83(29.9)	43(15.5)		
	Dhaka, 224 (11.05)	113(50.4)	57(25.4)	54(24.1)		
	Khulna, 337 (16.63)	134(39.8)	117(34.7)	86(25.5)		
	Rajshahi, 313(15.44)	162(51.8)	80(25.6)	71(22.7)		
	Rangpur, 259(12.78)	86(33.2)	83(32.0)	90(34.7)		
	Sylhet,246 (12.14)	116(47.2)	82(33.3)	48(19.5)		
Anaemia level	No,1160 (57.23)	475(40.9)	370(31.9)	315(27.2)	19.97	0.001
	Yes,867(42.78)	430(49.6)	266(30.7)	171(19.7)		
Wealth index	Poor, 700 (34.53)	368(52.6)	188(26.9)	144(20.6)	40.45	0.001
	Middle,402(19.83)	190(47.3)	130(32.3)	82(20.4)		
	Rich,925 (45.63)	347(37.5)	318(34.4)	260(28.1)		
Number of visit to a doctor	One time , 1974 (97.39)	885(44.8)	619(31.4)	470(23.8)	1.46	0.480
	More than one time, 53 (2.61)	20(37.7)	17(32.1)	16(30.2)		

Factors associated with hypertension

In this study, significant ($p<0.05$) variation in hypertension among women was observed due to place of residence. Among the rural and urban women, 28.2 % and 21.8 % married urban and rural women were hypertensive. In was found that 98.32% married women slept last night. It was noted that, 29.4% married women had hypertension among women who did not sleep last night. It was also found that 23.9% women were hypertensive who was currently married. The study showed that among women who were not currently working, 24.8% were hypertensive. There was a significant ($p<0.01$) variation observed among hypertensive women due to currently working status. This study found that among women in age group 41 to 49 years, 28.6 % married women were hypertensive. Significant ($p<0.01$) variation was observed in hypertensive women due to age group. There was a significant ($p<0.05$) association was also found between hypertensive women and education level. It was found that among secondary educated women, 28.1% women were hypertensive. Significant ($p<0.01$) association was also found between hypertension and married women's BMI. This study observed that 54.22 % married women's BMI was normal. The study also exhibited that 13.6% married women had hypertension who were underweight, 22.9% married women had hypertension who were normal weighted, 36.5% married women got hypertension who were overweight and 40.0% married women had hypertension who were obese. There was a significant ($p<0.01$) variation observed in hypertensive women due to women's arm circumference. It observed that 44.4% married women who were hypertensive had large arm circumference. Significant variation was found in hypertensive women due to checking their blood pressure. The study also showed that 25.9% women who were hypertensive checked their blood pressure at least once in their life. Among married women from Barisal, Chittagong, Dhaka, Khulna, Rajshahi, Rangpur and Sylhet division, 25.4%, 15.5%, 24.1%, 25.5%, 22.7%, 34.7% and 19.5% women were hypertensive respectively. Significant ($p<0.05$) variations were also found in married hypertensive women due to division. The study also showed that among married women's who were not anaemic, 27.2% was hypertensive. Significant variation ($p<0.01$) was also observed in married hypertensive women due to the level of anaemia. There was significant ($p<0.01$) variation observed between married hypertensive women and their wealth index. Among women whose wealth

index was rich, 28.1% had hypertension. In this study, it observed that 23.8% and 30.2% married women were hypertensive who visited a doctor for hypertension check-up one time and two times respectively.

The logistic regression model demonstrated that the currently no working women were more likely to get hypertension than their counterpart [AOR=1.49; CI: 1.05-2.11; p<0.05]. Women with normal weight were more risk for hypertension than the underweight women [AOR=0.45; CI: 0.31-0.64; p<0.05]. Similarly, women with normal weight were less risky for hypertension than the obese [AOR=3.34; CI: 1.87 -5.97; p<0.05] and overweight [AOR=2.60; CI: 1.89-3.57; p<0.05] women. The married women from Dhaka were more likely to be hypertensive than the women from Chittagong [AOR=0.42; CI: 0.27-0.65; p<0.05], similarly married women from Dhaka were less risky to be hypertensive than the married women from Rangpur [AOR=1.92; CI: 1.27-2.91; p<0.05]. Anaemic mother were less risky for hypertension than non-anaemic mothers [AOR=1.68; CI: 1.30-2.17; p<0.01]. Finally, women aged 41-49 years were more vulnerable for hypertension than the women aged 35-40 [AOR=0.53; CI: 0.41-0.68; p<0.05].

Table 2: Results for finding the effect of socio-economic and demographic factors on blood pressure

Blood Pressure	Variables	Groups	B	SE	p-value	AOR	95% CI for AOR	
							Lower	Upper
Pre-hypertension	Place of residence	Urban Vs. Rural	-0.25	0.13	0.065	0.77	0.59	1.01
	Currently working	No Vs. Yes	0.37	0.15	0.012	1.46	1.08	1.96
	Education level	Uneducated Vs. Higher education	-0.13	0.27	0.631	0.87	0.50	1.50
		Primary Vs. Higher education	-0.25	0.27	0.343	0.77	0.45	1.31
		Secondary Vs. Higher education	-0.36	0.26	0.174	0.69	0.41	1.17
	BMI	Underweight Vs. Normal	-0.42	0.15	0.005	0.65	0.48	0.87
		Obese Vs. Normal	0.78	0.29	0.007	2.91	1.23	3.89
		Overweight Vs. Normal	0.58	0.15	0.001	1.79	1.32	2.43

	Arm circumference	Small Vs. Large	-0.31	0.70	0.662	0.73	0.18	2.93
		Medium Vs. Large	-0.24	0.68	0.725	0.78	0.20	3.02
	BP ever checked	No Vs. Yes	0.27	0.13	0.038	1.31	1.01	1.70
	Division	Sylhet Vs. Dhaka	-.021	0.19	0.268	0.80	0.55	1.17
		Chittagong Vs. Dhaka	-0.56	0.18	0.002	0.56	0.39	0.81
		Barisal Vs. Dhaka	-0.57	0.20	0.005	0.56	0.37	0.84
		Khulna Vs. Dhaka	-0.11	0.17	0.511	0.88	0.62	1.26
		Rajshahi Vs. Dhaka	-0.60	0.18	0.001	0.54	0.37	0.78
		Rangpur Vs. Dhaka	0.15	0.20	0.438	1.16	0.78	1.73
	Anaemia level	No Vs. Yes	0.15	0.11	0.156	1.16	0.94	1.45
	Wealth index	Poor Vs. Rich	-0.22	0.22	0.327	0.80	0.51	1.24
		Middle Vs. Rich	-0.10	0.17	0.555	0.90	0.63	1.27
	Age group	35-40 Vs. 41-49 years	-0.24	0.11	0.028	0.78	0.63	0.97
Hypertension	Place of residence	Urban Vs. Rural	-0.13	0.15	0.383	0.87	0.64	1.18
	Currently working	No Vs. Yes	0.40	0.17	0.024	1.49	1.05	2.11
	Education level	Uneducated Vs. Higher education	0.36	0.33	0.269	1.44	0.75	2.77
		Primary Vs. Higher education	0.02	0.32	0.939	1.02	0.53	1.95
		Secondary Vs. Higher education	0.05	0.31	0.859	1.05	0.56	1.97
	BMI	Underweight Vs. Normal	-0.79	0.18	0.001	0.45	0.31	0.64
		Obese Vs. Normal	1.20	0.29	0.001	3.34	1.87	5.97
		Overweight Vs. Normal	0.95	0.16	0.001	2.60	1.89	3.57
	Arm circumference	Small Vs. Large	-0.44	0.73	0.540	0.63	0.15	2.68
		medium Vs. Large	-0.59	0.70	0.401	0.55	0.13	2.20
	BP ever checked	No Vs. Yes	0.26	0.16	0.099	1.30	0.95	1.79
	Division	Sylhet Vs. Dhaka	-0.36	0.22	0.106	0.69	0.44	1.08
		Chittagong Vs. Dhaka	-0.86	0.22	0.001	0.42	0.27	0.65
		Barisal Vs. Dhaka	-0.24	0.22	0.270	0.78	0.50	1.21
		Khulna Vs. Dhaka	-0.06	0.19	0.756	0.94	0.63	1.38
		Rajshahi Vs. Dhaka	-0.33	0.20	0.104	0.71	0.48	1.07
		Rangpur Vs. Dhaka	0.65	0.21	0.002	1.92	1.27	2.91
	Anaemia level	No Vs. Yes	0.52	0.13	0.001	1.68	1.30	2.17
	Wealth index	Poor Vs. Rich	0.24	0.27	0.369	1.27	0.74	2.17
		Middle Vs. Rich	-0.10	0.21	0.621	0.90	0.59	1.36
	Age group	35-40 Vs. 41-49 years	-0.62	0.13	0.001	0.53	0.41	0.68

DISCUSSION

The study was conducted to assess the prevalence and associated risk factors of hypertension among the women of Bangladesh. A total number of 2,027 women with their socio-demographic, health and lifestyle information were taken for BDHS-2011 data. Prevalence of pre-hypertension and hypertension were 31.4% and 24.0% respectively among Bangladeshi women were found in this study. Similar prevalence of pre-hypertension (27.6%) was also observed in China among women (Hu et al., 2017). Several studies have shown the prevalence of hypertension among women to be between 20-40%. In India, prevalence of hypertension among women was found in many studies such as 32.2% (Yadav et al., 2008), 28%.16 (Bharati et al., 2012) and 23.5% (Singh and Rahman, 2017). In this study, it is found that currently working women were less likely to get pre-hypertension and hypertension than their counterpart. Similar results were also found in another study in Ghana (Nyarko, 2016; Laxmaiah et al., 2015). They also found that working women were found to be less likely to have hypertension history compared to their counterparts who were not working. It may be fair to presume that higher risk of hypertension history among nonworking women may be due to "inactivity" or "sedentary life" (Laxmaiah et al., 2015) and its concomitant social and economic pressures. There was no difference in the prevalence of pre-hypertension and hypertension among women with respect to education. Our result was in line with an Indian study (Singh and Rahman, 2017). But hypertension was more among literates as compared to illiterates found in another study (Sidhu et al., 2015). Women with normal weight are more likely to be pre-hypertensive than the underweight women, similarly women with normal weight were less risky to be pre-hypertensive than the obese and overweight women. Our results were consistent with other studies in China (Hu et al., 2017) and Israel (Grotto et al., 2006). Again, women with normal weight were more risk for hypertension than the underweight women, similarly, women with normal weight were less risky for hypertension than the obese and overweight women. Similar findings were found in a study in India and Bangladesh conducted by the WHO (Hypertension Study, 2001). Our findings confirm that there is important geographic variation in pre-hypertension and hypertension among women's in Bangladesh. Some factors such as more intakes of raw salt, poverty, malnutrition, and dietary habits might influence this geographic variation (Haseen,

2007). Anaemic mother were less risky for hypertension than non-anaemic mothers. In this study, it was found that anaemic mother were less risky for prehypertension and hypertension than non-anaemic mothers. Our results supported by another study (Ali et al., 2011). They found that women with severe anaemia had higher risk of preeclampsia (hypertension during pregnancy) than women with no anaemia. It was found that women aged 41-49 years were more vulnerable for prehypertension and hypertension than the women aged 35-40. Recently, it was found that the women's age groups increased, the proportions with hypertension also increased (Oyekale, 2019). Similar findings have been reported among some women in the USA (Ahmad and Oparil, 2017). The reason for the high risk of hypertension among women in advanced age groups may not have the physical energy, the cardiovascular resistance, or the zeal needed to perform regular aerobic exercises which may help maintain optimum blood pressure level.

LIMITATIONS

The main limitation of the present study was cross-sectional survey and failed to establish a cause-and-effect relationship between risk factors and the development of prehypertension and hypertension.

CONCLUSION

This cross-sectional study conducted with the adult women was taken from the BDHS-2011 data. The aim was to determine the prevalence of hypertension among women in Bangladesh and also to identify the risk factors of hypertension. Chi-square test exhibited that type of place of residence, currently working, age, educational level, BMI, arm circumference; blood pressure ever checked, division, anaemia level, wealth index, number of visits to a doctor were significantly associated with prehypertension and hypertension. Multinomial logistic regression model demonstrated that women's working status, blood pressure check-up, level of anaemia, geographical region and BMI were significant predictor for women's pre-hypertension and hypertension. The findings of this study have recommendations that would be helpful for the health authorities and policy makers to

achieve substantial improvement in the area of hypertension among women. Therefore, efforts should be geared towards improving the levels of awareness of the women regarding hypertension and the risk factors.

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