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Prevalence of hypertension among the Bangladeshi adult population: a meta-analysis

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Abstract

Hypertension has become a significant problem in many developing countries undergoing epidemiological transition. A meta-analysis covering studies up to 1994 reported a prevalence of 11.3% in the adult population of Bangladesh. We conducted a meta-analysis to estimate the current prevalence of hypertension among the adult Bangladeshi population. We searched MEDLINE and included studies published in professional journals between 1995 and 2009 on the prevalence of hypertension among the adult Bangladeshi population. We included population-based studies that had a clear definition of hypertension, and were conducted in adults (≥15 years). We located twelve articles, of which six articles were excluded from the current analysis as they were conducted in specific population subgroups. To obtain the prevalence of hypertension, we conducted a meta-analysis of these studies and recalculated their 95% confidence intervals, if required, to obtain a pooled estimate. Five of the six studies were from rural areas and were heterogeneous in terms of age groups studied and definition of hypertension used. The pooled estimate for the prevalence of hypertension in 6430 adults was 13.5% (12.7%–14.3%). Our meta-analysis clearly demonstrates the high burden of hypertension among the adult population of rural Bangladesh and underscores the importance of instituting screening for asymptomatic individuals, especially in primary health-care settings.

Introduction

Hypertension is recognized as a major contributor to the disease burden globally. Hypertension and its complications account for an estimated 9.4 million deaths every year.[1] It has become a significant problem in many developing countries undergoing epidemiological transition.[2] The higher the blood pressure, the greater the chances of heart attack, heart failure, stroke and kidney disease.[3] The World Health Organization (WHO) attributes hypertension, or high blood pressure, to be the leading cause of cardiovascular mortality.

Bangladesh is passing through a phase of epidemiological transition from communicable diseases to noncommunicable disease (NCDs) and currently has a double burden of disease.[4] This means that the prevalence of hypertension is modest now but will show a rising trend.

There is a lack of representative data on the prevalence of hypertension in the Bangladeshi population. One meta-analysis conducted by Zaman and Rouf in 1999 on the prevalence of

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hypertension in the Bangladeshi adult population included studies from 1976 to 1994, and estimated the prevalence to be 11.3%.[5] Between 1995 and 2009, some more studies with small sample sizes were conducted,[6–16] which showed varying prevalence rates. Individually, these studies cannot provide sufficient information about the prevalence in the country due to the non-representativeness of the study populations as well as the small sample sizes. In order to efficiently utilize the information available from these surveys, we decided to conduct another meta-analysis of all previous population-based studies in Bangladesh for a more accurate estimation of the prevalence of hypertension. We present the results of this exercise in this paper.

Methods

For this meta-analysis, we identified articles published from 1995 to 2009 on the prevalence of hypertension among the Bangladeshi adult population by conducting a MEDLINE search. We included those population-based studies that had a clear diagnostic definition of hypertension and were conducted in the age group ≥15 years. We located 12 articles,[6–16] among which 5 were excluded from the current analysis because they did not fulfil our selection criteria. These were studies done in clinical settings,[13] on diabetic subjects,[8] pregnant women,[14] subjects with arsenicosis,[15] and among the elderly population (>60 years).[10] If there was more than one publication from the same survey, we included only one of the publications and so we did not include the data of one study[17] (Table 1). We then calculated the prevalence of hypertension in these studies and the 95% confidence intervals (CI) for the individual studies using the data presented. Finally, we added the denominators (total number of subjects studied) and numerators (total number of subjects identified with hypertension) from each study to get the pooled prevalence estimate with its 95% CI. This meant that the weight given to each study was proportional to its sample size.

Results

Table 1 summarizes the studies on the prevalence of hypertension in the Bangladeshi adult population from 1995 to 2009, and the calculated prevalence rates and their 95% confidence intervals. Except for one study, which was done in both urban and rural areas, the remaining five studies were done in rural Bangladesh and thus the results can be used as an estimate only for rural Bangladesh. Five studies included adults ≥18 years of age and the sixth one included persons ≥15 years. The prevalence of hypertension in these studies ranged from 7.8% to 18.6%.

All the studies did not use the definition of hypertension proposed by WHO in 1993, which defines hypertension as systolic and/or diastolic blood pressure (≥140/90 mmHg) with or without a history of taking antihypertensive medication.

Table 1 provides the pooled estimate of the prevalence of hypertension as measured from the studies that met the eligibility criteria for this meta-analysis. From a total of 6430 adults included in these studies, we arrived at an estimate of 13.5% (with 95% CIs ranging from 12.7% to 14.2%).

Discussion

Through this meta-analysis, we attempt to provide information on the prevalence of hypertension in the Bangladeshi adult population. For this purpose, we searched articles published in MEDLINE during the years 1995–2009 on the prevalence of hypertension in Bangladeshi adults.

Table 1. Articles on hypertension published from 1995 to 2009 identified by MEDLINE search

First author Year of publication (ref)	Place of study Year of study	Subjects	Sampling procedure	Response rate (%)	Number of readings taken	Criteria for diagnosis of hypertension	Age group (years)	Sample size (*N*)	Prevalence (%)	Meta-analysis			
										Age (years)	No. (*N*)	*P* (%)	95% CI
Sayeed A 1995[6]	Dohar Not mentioned	Rural community of Dohar	Cluster sampling	70	Mean of three readings	SBP ≥140 mmHg DBP > 90 mmHg	≥15	1005	SBP 10.5 and DBP 9.0	**≥15**	**1005**	**10.5**	**8.6–12.4**
Sayeed MA 1998[7]	Bangladeshi Not mentioned	NIDDM and IGT subjects	Random samlpling	Not reported	Not reported	SBP ≥ 140 mmHg DBP ≥ 90 mmHg	30–60	693	SBP 23.2 and DBP 13.6	**Not included**			
Rahamn M 1999[8]	4 villages:Samta, Tepakhola, Rajarampur and Sonakhandi Not mentioned	Rural inhabitants	Multistage cluster sampling	100	Three readings; lowest was taken	SBP ≥ 140 mmHg combined with DBP ≥ 90 mmHg	≥30	114	7.80	**≥30**	**114**	**7.80**	**2.9–12.7**
Zaman MM 2001[9]	Rural area, Savar, Dhaka 1996	Rural population of Bangladesh	Simple randon sampling	63	Mean of two readings	SBP ≥140 mmHg and/or DBP≥ 90 mmHg or medication	≥18	510	12.8	**≥18**	**510**	**12.8%**	**9.9–15.7**
Quasem I 2001[10]	Mymensingh municipal and Muktagasa Thana, Mymensingh 1999–2000	Elderly population	Multistage cluster sampling	Not reported	Mean of two readings but three readings taken if >10 mmHg variation found	WHO International Society for Hypertension criteria	>60	480	Urban 75 and Rural 53	**Not included**			
Sayeed MA 2002[11]	Rural and urban community Not mentioned	Rural and urban community	Simple random sampling in rural and cluster sampling in urban	Rural 83.6 and urban 77.8	Mean of two readings	Not mentioned	>20	2361	SBP 14.4 and DBP 9.1	**>20**	**2361**	**14.4**	**8.4–20.4**
Zaman MM 2004[12]	Rural community, Matlab, Chadpur district 1999–2001	Clinic- based rural population	All	100	One reading	SBP≥ 140 mmHg DBP > 90 mmHg	>20	1271	17.80	**Not included**			
Sayeed MA 2005[13]	Ramdomly selected 10 villages of Nandail subdistrict, Mymensingh 2001–2002	Pregnant women	Not reported	Not reported	Not reported	WHO criteria was used	18–44	147	SBP 6.8 and DBP 5.4	**Not included**			
Chen Y 2006[14]	Araihazar 2000–2002	Rural Bangladeshis with exposure to arsenic	Not mentioned	97.50	Three readings; the lowest one was taken	SBP ≥140 mmHg or DBP ≥90 mmHg or antihypertensive drugs	≥18	11 116	13.30	**Not included**			
Zaman MM 2007[15]	Ekhlusur village, Chandpur district 2001	Rural Bangladeshis	Simple random sampling	64	One	Blood pressure ≥ 140/80 mmHg or antihypertensive drugs	≥20, mean age 40	700, actual 447	18.60	**≥20,**	**440**	**18.6**	**15.0–22.2**
Van Minh H 2009[16]	Matlab, Mirsarai, Abhoynagar and WATCH area 2005	Rural Bangladeshis	Multistage cluster sampling	98	Mean of three readings	WHO criteria were used	25–64	2000	13.40	**25–64**	**2000**	**13.4**	**11.9–14.9**
Pooled estimate of hypertension											**6430**	**13.5**	**12.7–14.2**

NIDDM non-insulin dependent diabetes mellitus
IGT impaired glucose tolerance
SBP systolic blood pressure
DBP diastolic blood pressure

On analysis, we found a prevalence of hypertension of 13.5% in the adult population of Bangldesh, which was higher than the 11.3% prevalence reported by Zaman and Rouf in 1999.[5] The meta-analysis by Zaman and Rouf included studies conducted from 1976 to 1994 and the higher estimate reported in our study could represent a temporal trend. However, the previous meta-analysis included studies conducted in Dhaka only and mostly urban areas, where the prevalence of hypertension has been found to be higher, while our meta-analysis included studies conducted mainly among the rural community, which report a lower prevalence and would, therefore, probably have underestimated the increase in the prevalence of hypertension.

In the NCD risk factor survey conducted in Bangladesh in 2010, the overall prevalence of hypertension was estimated to be 17.9% for the whole country (19.9% in urban and 15.9% in rural areas) among the population aged 25 years and above.[18] This compares well with the estimate derived from our meta-analysis. With the conduct of such large nationally representative surveys, the role and relevance of meta-analyses of this nature would diminish.

This meta-analysis has certain limitations. The studies included were heterogeneous in terms of the age groups studied and classification of hypertension. Interestingly, the maximum number of studies was conducted among rural populations and thus we were unable to generate an estimate for urban Bangladesh. With increasing urbanization, this segment of the population is of great relevance to NCD prevention and control.

Our meta-analysis demonstrated that 13.5% of the adult rural population suffers from hypertension and is at risk for developing cardiovascular and kidney diseases. The study thus underscores the importance of screening asymptomatic individuals. Every adult's blood pressure should be checked. Primary health-care centres, community clinics and all health-care facilities should implement this strategy for the prevention and control of hypertension.

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