

Prevalence of Hypertension among the Bangladeshi Adult Population: A meta-analysis of Studies between 2004 and 2014

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Abstract:

Key Words :
Hypertension,
Smoking,
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activities.

Background: Hypertension has become a significant problem in many developing countries undergoing epidemiological transition from communicable to non-communicable chronic diseases. Previous studies covering up to 1999 reported a prevalence of 11.3% in the adult population of Bangladesh.

Methods: We have searched National Institute of Cardiovascular Diseases (NICVD) Library and PubMed@ Resources Guide for published Hypertension prevalence studies between 2004 and 2014. A meta-analysis was conducted to estimate the prevalence of hypertension among the adult Bangladeshi population. We have considered population-based studies that had a clear definition of hypertension, and were conducted in adults (>18 years). We have marked seventeen articles, of which only six articles fulfill the selection criteria were included for the current analysis. Then the prevalence of hypertension and their 95% CIs for the individual studies were calculated by using the data presented. Finally a pooled estimate was obtained from six studies.

Results: The pooled estimate for the prevalence of hypertension in 2972 adults was 20.88% (18.75% - 22.87%) which almost double than the previous estimated value.

Conclusion: The 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 with potentially harmful hypertensive disorder, especially in primary health-care settings to combat the growing epidemic of Noncommunicable Diseases. Large scale studies can be done including all the high risk population to represent the actual scenario of hypertension in Bangladeshi adult population.

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Introduction:

An epidemiological shift in the prevalence of hypertension in developing countries as compared to developed countries has been observed. Studies from India and Bangladesh are shown upward trend in the prevalence of hypertension. The prevalence of hypertension has increased by 30 times among the urban population over period of 55 years and about 10 times among the rural population over a period of 36 years.

Various hypotheses have been put forward to explain this rising trend and among these, consequence of urbanization such as change in life style pattern, diet and stress have been implicated.

Dramatic changes in life style from traditional to modern have lead to physical inactivity due to technological advances. Rising affluences has modified the dietary pattern characterized by increased consumption of diet rich in fat, sugar and calories.

Furthermore, increasing population growth and technological advances have shrunken the employment opportunities particularly among the young generation-leading to stress and hypertension in young person's including students and laborers.

Developing counties are increasingly faced with the double burden of hypertension and other

cardiovascular diseases along with infection and malnutrition. Hypertension places an excessive financial burden on population and health systems, consuming scarce resources. Population based preventive approaches are thus central for the management of hypertension in developing countries, where clinic-based care for complication is not feasible option.

There is a lack of representative data on the prevalence of hypertension in the Bangladeshi population. One meta-analysis conducted in 1999 on the prevalence of hypertension in the Bangladeshi adult population included studies from 1976 to 1994 and estimated the prevalence to be 11.3%. Between 1995 and 2009, some more studies with small sample sizes were conducted, 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 previous population-based studies from 2004 to 2014 in Bangladesh for a more accurate estimation of the prevalence of hypertension.

Methods:

For this meta-analysis, articles published from 2004 to 2014 on the prevalence of hypertension among the Bangladeshi adult population by conducting a search in NICVD Library and PubMed@ Resources were identified. The population-based studies that had a clear diagnostic definition of hypertension and were conducted in the age group >18 years, were included in the meta analysis. Only 6 articles for the current analysis were identified because they fulfill the selection criteria. These were studies done in clinical settings like diabetic subjects, pregnant women, with arsenicosis among the elderly population (>60 years). The prevalence of hypertension in these studies and the 95% confidence intervals (CI) for the individual studies using the data presented was calculated. Finally, 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 were added.

Results:

Table I summarizes the studies on the prevalence of hypertension in the Bangladeshi adult population from 2004 to 2014, and the calculated prevalence rates and their 95% of confidence intervals. All studies were done in rural Bangladesh and thus the results can be used as an estimate only for rural Bangladesh. All studies included adults >18 years of age. The prevalence of hypertension in these studies ranged from 13.3% to 30.64%.

All studies used the definition of hypertension proposed by WHO in 1993, which defines hypertension as systolic and/or diastolic blood pressure (>140/90mmHg) with or without a history of taking antihypertensive medication.

Table I 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 2972 adults included in these studies, we arrived at an estimate of 20.88% (with 95% CIs ranging from 18.75% to 22.87%).

Observation:

On analysis, the prevalence of hypertension (20.88%) observed in this study was higher than the previous study. This meta-analysis included studies conducted mainly among the rural community, which report a much lower prevalence and therefore, probably have reflected the increase in the prevalence of hypertension in urban areas. Even prevalence of hypertension showed a moderate increase in rural population which is higher than the previous study. Being female, older, obese, diabetic, having a higher education, or from a higher socioeconomic status were significantly associated with a higher prevalence of hypertension. High prevalence of hypertension was observed in patients with positive family history, smoking and less physical activity.

Table-I
Studies on hypertension in Bangladesh from 2004 to 2014 identified in NICVD library and Pubmed search

Year of publication	Place and year of study	Subjects	Sampling procedure	Response rate (%)	Number of readings taken	Criteria for diagnosis of HTN	Age group (years)	Sample size	Prevalence	Meta analysis			
										Age	No	P(%)	95% CI
Zaman MM 2004	Rural community, matlab, Chandpur district 1999-2002	Clinic based rural population	All	100	One	WHO criteria	>20	1271	17.8	Not included			
Sayeed MA 2005	Randomly selected 10 villages of nandail subdistrict, Mymensingh 2001-2002	Pregnant women	Not reported	Not reported	Not reported	WHO criteria	18-44	147	SBP 6.8 and DBP 5.4	Not included			
Chen Y 2006	Araihazar 2000-2002	Rural Bangladeshis with exposure to Arsenic	Not reported	97.5	Three recordings, lowest one was taken	WHO criteria	18	11116	13.3	Not included			
Zaman MM 2007	Ekhlusur village, Chandpur district 2001	Rural Bangladeshis	Simple random sampling	64	One	WHO criteria	20, mean 40	700, actual 447	18.6	20	440	18.6	15.0-22.2
Van Minh H 2009	Matlab, Mirsarai, Abhoynagar and WATCH area 2005	Rural Bangladeshis	Multistage cluster sampling	98	Mean of three recordings	WHO criteria	25-64	2000	13.4	25-64	2000	13.4	11.9-14.9
Rahim MA 2012	Jhaldhaka, Nilphamari 2008	Rural Bangladeshis	Simple random sampling	satisfactory	One	WHO criteria	20-70	532	30.64	20-70	532	30.64	29.36-31.53
Pooled estimate of hypertension										2972	20.88	18.75-22.87	

Discussion:

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

It was found that a prevalence of hypertension of 20.88% in the adult population of Bangladesh, which was higher than the 11.3% prevalence reported by Zaman and Rouf in 1999. 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. With increasing urbanization, this segment of the population is of great relevance to non communicable disease (NCD) prevention and

control. On a similar note, using a single or a group of villages in a certain geographic location may not capture the disease prevalence for a country with approximately 68 thousand villages.

A general difficulty was to gather all the published data on hypertension for the review period, since not all Bangladeshi journals are available electronically, and those that have electronic text came into existence recently. Although a number of full text articles that were otherwise unavailable in the Web through personal communications with Bangladeshi researchers were collected, and have to rely on the abstract for a few studies.

Recommendations:

Although an adequate number of hypertension prevalence studies have been conducted, they were mostly done in and outside the city areas, leaving many regions of the country unstudied. Few data exist on the prevalence of other cardiovascular diseases such as ischemic heart disease. We recommend that future prevalence studies focus

on the gaps identified in this review. In addition, we suggest that samples of the future studies are selected systematically, according to the administrative structure of the country (division, district, upazila, etc.), in order to capture any differences in disease prevalence by geographical regions. We did not find any longitudinal cohort studies on HTN. This is a significant gap in the knowledge and understanding of these chronic diseases in the context of Bangladesh. Such studies would provide essential information on the incidence of these diseases, their associated risk factors, and the groups that are at higher risk of developing with understanding the disease progression and prognosis. Development of a cohort study would require considerable effort and data would not be available for many years. In the mean time, retrospective cohort studies could be conducted using medical records available in various government (NICVD-National Institute of Cardiovascular Diseases) and private institutions (ICDDR,B-International Center on Diarrheal Diseases and Research, Bangladesh; BIRDEM-Bangladesh Institute of Research and Rehabilitation for Diabetes, Endocrine, and Metabolic Disorders; NHF National Heart Foundation). Such retrospective studies could begin to address some of the research issues outlined above such as disease complications and treatment adherence.

Conclusion:

The prevalence of hypertension in the rural population was found to be on the increased compared to previous reports of Bangladesh. The study thus underscores the importance of screening asymptomatic individuals. Every adult's blood pressure should be checked. Primary health-care centers, community clinics and all health-care facilities should implement this strategy for the prevention and control of hypertension. Although this simple meta-analysis does not provide data representative of Bangladesh, it gives a more informative estimate than individual studies do.

More studies are suggestive to evaluate the prevalence of hypertension in the rural population of Bangladesh.

Conflict of Interest - None.

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