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Original Research Article

Imbalances of both systolic and diastolic hypertension are implicated by a series of causative agents, a cross-sectional health survey

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Abstract

Background and Objectives: Hypertension (HTN) or high blood pressure is a chronic medical condition in which the blood pressure in the arteries is elevated. Blood pressure is summarized by two measurements, systolic and diastolic, which depend on whether the heart muscle is contracting (systole) or relaxed between beats (diastole). Our survey based study is carried out to estimate the current consequences of HTN among the populations of southern cities in Bangladesh.

Methods: We have conducted our research in context on population's age, gender, family history, addictive probability with type of drug habit, age of onset of respondents. We have compared systolic value with diastolic regarding these parameters by the help of self-designed standard questionnaire relevant with hypertension by manual data collection over six month's period. Total 350 subject respondents were investigated by majorly visiting at their home, work places and hospitals. Descriptive statistics were applied to the collected data and analyzed using Microsoft Excel software.

Results: 52.8% was male respondents and 47.8% was female of which 27.3% was the age range 56-65 years and another top most 23.4% was 46-55 years old. 90-100 mm/Hg diastolic value was noticed for 84.9% participants whereas 101-110mm/Hg was for remaining 9.3%. On the other hand, 140-150 and 151-160mm/Hg systolic pressure measured for 36.1% and 26.8% patients. Although 43.4% respondents answered yes in question for conveying hypertension from their family history but 56.6% was not at all. Narcotics substances immensely do impact in high blood pressure pathogenesis as it has showed almost 54.63% users among them betel & tobacco are experienced at least 71% following for smoking 29%. However, 68% betel & tobacco consumers had diastolic pressure 90-100 mm/Hg and 140-150 mm/Hg systolic value was measured for 37% betel and tobacco addicts followed by 26% chain smokers persist systolic pressure 151-160 mm/Hg range. Interestingly the maximum numbers of 32.2% peoples was first affected by hypertension in their age 36-45 years and 24.9% was the age range of 46-55 in second position.

Conclusion: Hypertension is a major public health problem and it is diagnosed on the basis of a persistent high blood pressure. Unfortunately, the tendency to start hypertension in young age is increasing day by day. Everybody should be very conscious about this severe health issue to give up all kind of habit forming narcotic agents.

Keywords: Hypertension, Health, Systolic, Diastolic.

1. Introduction

Hypertension (HTN) is one of the major non-communicable diseases in the world, which significantly contributes to the burden of cardiovascular diseases, stroke, kidney failure, disability, and premature death [1]. HTN is a term used to describe high blood pressure. It's deviate based on activities at a particular point in time. HTN occurs as a result of long duration of abnormal pressure of the main arteries. This literally means over perfusion of blood

and it is commonly known and used term for high blood pressure [2].

The following 4 stages are found for developing HTN including---

1) **Normal blood pressure:** Blood pressure is normal if it's bellow 120/80mmHg
2) **Hypertension:** Pre- HTN is a systolic pressure ranging from 120/139 mmHg or a diastolic pressure ranging from 80/89 mmHg. Pre- HTN tends to get worse over time.
3) **Stage1HTN:** Stage 1 HTN is a systolic pressure ranging from 140/159 mmHg or a diastolic pressure ranging from 90/99 mmHg.
4) **Stage 2 HTN:** It is more severe. Stage 2 HTN is a systolic pressure of 160 mmHg or higher or a diastolic pressure of 100 mmHg or higher. [3]

Globally, hypertension is known as a key contributor to the disease burden. Every year over 9.4 million deaths occur due to hypertension and its complications [4]. Owing to undergoing epidemiological transition, it has become a significant health problem in many developing countries [5]. As a developing country, Bangladesh is suffering from the same diseases from many years. According to ICDDRB report approximately 20% of adult and 40-65% of elderly people are suffering from HTN. With other NCDs HTN are responsible for around 68% of people in Bangladesh. Among them HTN was the major factor for mortality rate. However, 15-20% of adult in Bangladesh are at major risk of heart diseases and other cardiovascular diseases due to HTN [6]. Another report suggested that 18% or 12 million people at the age of 25 are suffering from HTN [7-8]. Chronically, cigarette smoking induces arterial stiffness that leads to hypertension which may persist for a decade after smoking termination [9]. Statistics shows that there are now 1.3 billion cigarette smokers of which 82 percent in developing countries. If these existing practices continue, there will be an estimated one billion tobacco-related deaths throughout the 21st century. The immediate noxious effects of smoking are related to sympathetic nerve over activity, which increases myocardial oxygen consumption through a rise in blood pressure, heart rate, and myocardial contractility [10]. Beside smoking smokeless tobacco also has significant role in HTN development. From 875 articles regarding smokeless tobacco, 12 pertinent articles were identifying that Smokeless tobacco caused a clinically significant acute elevation of systolic blood pressure, diastolic blood pressure and smokeless tobacco may elevate blood pressure up to 90 minutes after use [11]. Apart from these reports some other prevalence related data of HTN has been found. Like one meta-analysis [12], a population-based study [13] and a recently published survey [14] found the prevalence 11.3%, 18.6%, and 20.1%, respectively in Bangladesh. According to Bangladesh Non-Communicable Disease Risk Factor Survey 2010, prevalence of HTN is 17.9% in general, 18.5% in men and 17.3% in women and HTN is probably more common in elderly population, in one study 65% in general, 75% in urban area, and 53% in rural area [15]. In another more recent study among senior citizens, 44.8% were found to be hypertensive [16]. Developed countries with an ageing population the prevalence of hypertension is expected to be higher than developing countries with a younger population's such as Bangladesh, India, etc. but there are studies, which have documented a high prevalence rate of hypertension in developing countries [17-18].

The information available thereby, would help to formulate national policy to combat the deadly epidemic more efficiently in future both urban and rural area [19]. HTN is also identified as a global diseases burden and is ranked third as a cause of disability-adjusted life-years [20]. The global burden of HTN is projected to increase by 60% to affect approximately 1.6 billion adults worldwide by 2025 [21]. According to the World Health Organization (WHO), about 17 million deaths occur worldwide due to CVDs, of which HTN alone accounts for 9.4 million deaths [22-23]. The size of the elderly segment of the population is increasing in developing countries as with a concomitant increase in life expectancy. Indeed, it is estimated that by the year 2025 the majority of the elderly people worldwide will reside in developing countries [24-25].

HTN problem is increasing in Bangladesh day by day since the awareness level about the diseases is ridiculously low. Patient dependence on uneducated retailer pharmacist becomes the major issue for getting wrong medication. Economical issue is one of the major concerns for poor people of Bangladesh as the high price of anti-hypertensive drug and constant administration to control HTN. It should be emphasized to know about the age, sex and genetic factors that are responsible for uprising number of HTN in specifically in Bangladesh. The current study would correlate the HTN causing vital factors to generate consciousness about this disorder to build up a healthy generation but in future this type of study should be conducted further.

2. Materials and Method

2.1 Study design and Study population

The study was a cross-sectional survey of all data that has been collected from door to door and from hospital over six months period from 3 August, 2016 to 20 February 2017 at Gopalganj, Narail, Magura, Jessore, Bagerhat and several other southern districts in Bangladesh. At first by interviewing the people of different districts, observing the prescription and consulting to reporting nurse the patient were identified. After identifying the desired patient some selected questions asked about their blood pressure, age of onset, family history of HTN and habits related to HTN.

After assessing the data the sex, age, habit related factors are graphically analyzed.

2.2 Survey area

Gopalganj, Narail, Magura, Jessore, Bagerhat and several other districts of southern part in Bangladesh.

2.3 Study selection

At first we have evaluated the condition of patient. After the confirmation of HTN we further ask him the selected questions according to the questionnaire for door to door patient. In case of hospitalized hypertensive patient we observed the prescription and took information from the nurse. Finally, after collecting and combining all the data we systematically put them in the graph. Every step was commenced independently as well as all the graphs represent each variable.

2.4 Data collection process

A total 350 data were carefully monitored and estimated for ensuring quality issue. The data collectors were visited different local areas and meet various people from door to door of representing districts. We also went government medical hospital. Data accumulation and extraction was done independently by our group utilizing a simple, standardized form.

2.5 Data items

Data for the following main outcomes that we extracted are: Blood pressure, age of onset of HTN, family history and addicting habits of patient.

2.6 Statistical analysis

Statistical method was applied to the collected data using SPSS and Microsoft excel software. Simple statistical method was used to calculate the data and finally expressed in percentage.

3. Results

Among all respondents with HTN 52% were male and 48% were female (figure 1). Respondent with the age of 56-65 years are mostly found to be hypertensive which is 27.3% and the percentage is 23.4 at age of 46-55years (figure 2). Diastolic value of surveyed HTN patient are mainly range from 90-100 mmHg which 85% on the contrary, range between 131-140 mmHg is uncommon. Second most value 9.3% at the range of 101-110 mmHg (figure 3). In case systolic value highest numbers of respondent are found at the range of 140-150 mmHg which is 36.1% and 26.8% is next to the highest value at the range of 151-160 (figure 4). From family history analysis, it's found that in 43.4 % patient have family history of HTN and 56.6% have no family history of HTN (figure 5). There is basically few kind of habits were seen, where smoking is 29%, betel and tobacco 71% (figure 6). Usually there is no definite age for the onset of HTN but as per finding the patients between 36-45 years are at the major risk of onset of HTN which is 32.2% and 24.9% respondents had their onset of HTN at the age of 46-55 years. At the age of 25-35 years, 13.2% respondents develop HTN. So, young aged people can also gain HTN even at 25 (figure 7). For diastolic value, 24.56% and 59.64% of respondent have smoking habit and betel & tobacco respectively at the range of 90-100 mmHg (figure 8). In case of systolic value 10.53% and 21.93% of respondent have smoking habit and betel & tobacco respectively at the range of 140-150 mmHg (figure 9). So, there is a marginal relation between these values to create a statistical comparison.

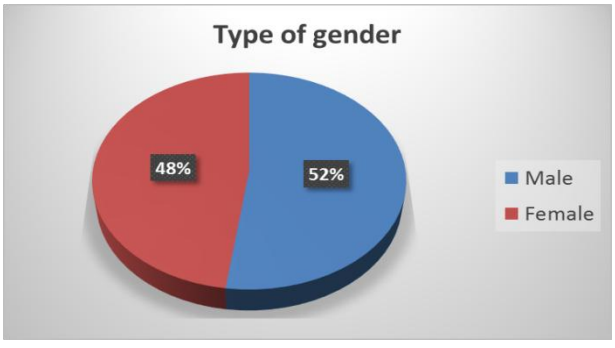

Figure 1: Gender categorization

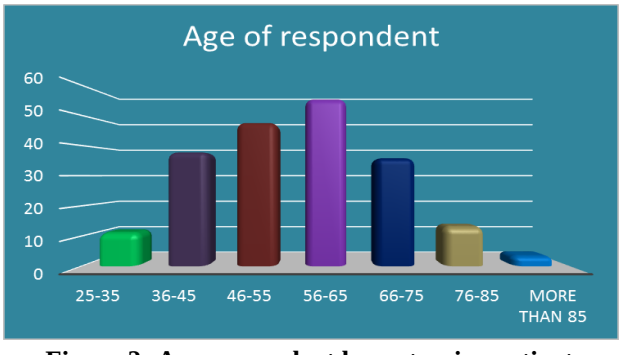

Figure 2: Age respondent hypertensive patient

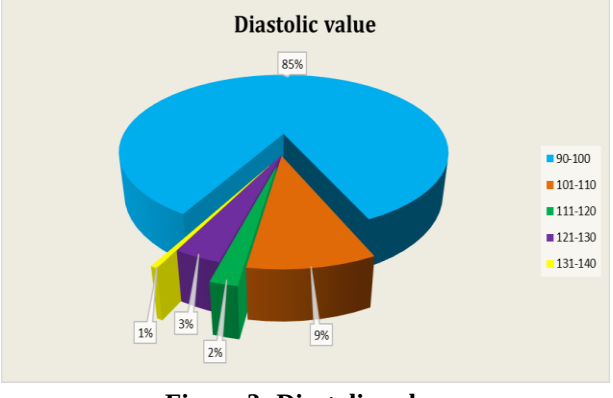

Figure 3: Diastolic value

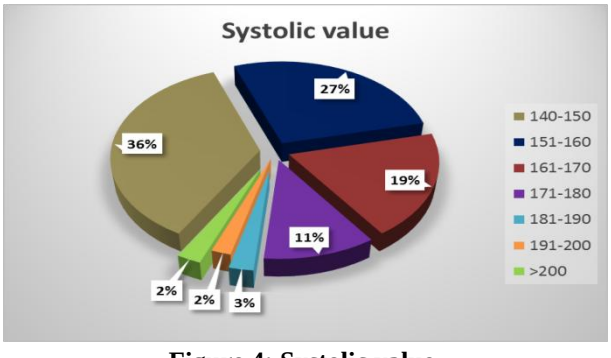

Figure 4: Systolic value

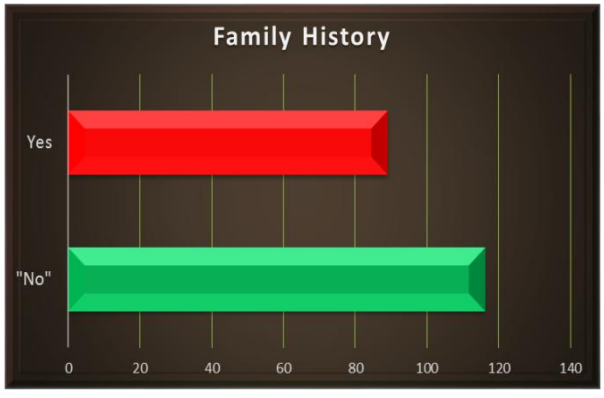

Figure 5: Family history

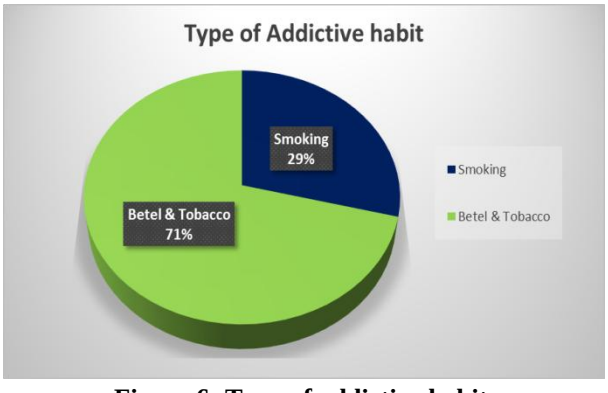

Figure 6: Type of addictive habit

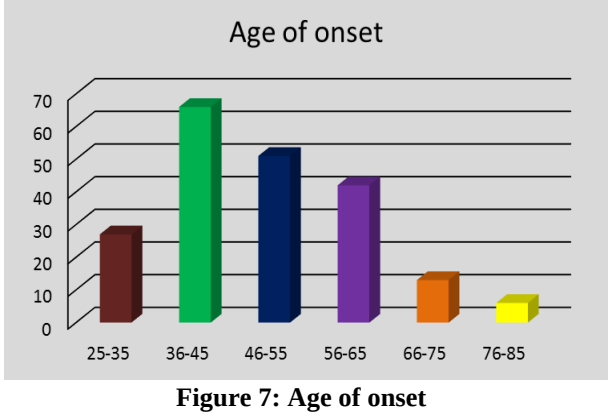

Figure 7: Age of onset

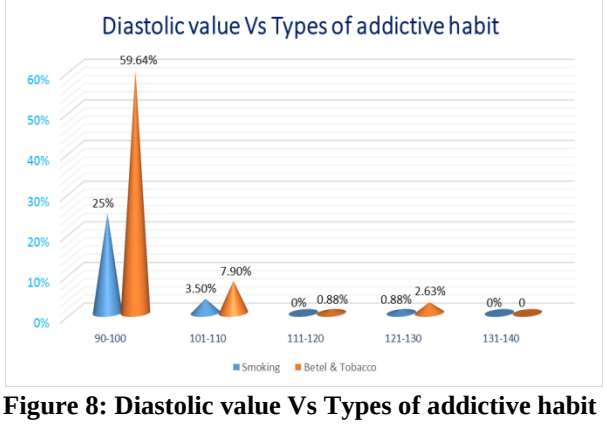

Figure 8: Diastolic value Vs Types of addictive habit

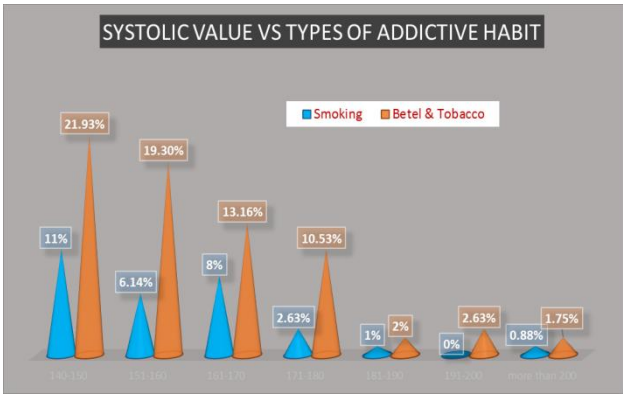

Figure 9: Systolic value VS Types of habituation

4. Discussion

In this cross-sectional survey we have made an attempt to represent the prevalence of HTN across the southern part of Bangladesh. As a rural part of a poverty stricken developing country it has been overlooked in many ways especially in hypertension related mass survey. Aim of this study is to find out a clear concept on HTN prevalence in this surveyed area, male-female ratio, onset of age, effect of addictive habit and provide statistical base for further study. Based on data it has been found that males are mostly prone to HTN but number of female patients are not so less. From the age related data middle aged people are susceptible to HTN mostly.

It is also clear that HTN is obvious as with age increase because after the age of 35 the percentage of HTN is increasing gradually. Though aged people are vulnerable to HTN development but young people are not out of this risk as we have found a rich data on HTN about young people. Besides that, maximum of systolic and diastolic value belongs to stage-1 HTN but stage-2 HTN patients are found less which reflect in the percentage. Almost half of the HTN cases associate with family history implies that next generation could potentially suffer from HTN or inherit the gene that responsible for HTN development.

So, Family history is an important factor for HTN. The higher rate of HTN without family history indicates that some other non-genetic factors like sedentary life style causing weight gain resulting increased BMI. An elevated BMI being associated with prehypertension may propose that such individuals are at amplified risk of developing to frank hypertension. Food habit like additional salt intake causes water retention in kidney resulting HTN. Blockages occur in blood vessel due to intake of food with high cholesterol (LDL) consequence in HTN. Addiction of tobacco, and smoking as the possible cause of HTN. So, addicting habits have significant effect on developing HTN.

5. Conclusion

At the advent of the new millennium, we are really unconscious of our real circumstances whereas HTN is getting proportion worldwide. There is no more time to lapse. Large scale, preferably, nationwide survey and clinical research should be conducted to determine the difference aspects of HTN in Bangladesh. Although HTN is more prevalent in urban areas than rural but in southern part of Bangladesh which is mostly a rural area, is gradually affected by the noxious HTN alarmingly.

According to this survey it is clear that along with male, female should be more conscious of HTN especially at the age 36-45 years due to higher rate of onset. People with HTN family history should be aware of the tendency to develop HTN. Addicting habits surely a determining factor behind HTN as most people with addicting habits are victimized. Specifically, the smoking and tobacco intake are the major risk factor in increasing systolic pressure and diastolic pressure as well. Smoking should be avoided in any hypertensive patient because it can markedly increase the risk of secondary cardiovascular complications and enhance the progression of renal insufficiency. So, a combined effort of government, mass media, NGO's as well as general people should be given to build up mass awareness and an effective healthcare system for defending HTN.

Conflict of Interest

The authors declare that they have no conflict interest to conduct the study.

Ethical Considerations

According to the general principles of World Medical Association (WMA) declarations of Helsinki the study was ledand which was performed in association with all the persons supported with their full approval. Department of Pharmacy, Bangabandhu Sheikh Mujibur Rahman Science and Technology University, Gopalganj-8100, Bangladesh give support to this research work. In the fieldwork no samples were collected from the human subjects involved in this study. Since human subjects only participated in the interview, this survey based research didn't take any further authorization from institutional ethics committee.

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