Assessing Knowledge and Health Belief about Hypertension among Selected University Students in Dhaka City: Bangladesh

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DECLARATION

I hereby humbly declare that the thesis work entitled **'Assessing Knowledge and Health Belief about Hypertension among Selected University Students in Dhaka City: Bangladesh'**, a requirement for the degree of Master of Philosophy (M. Phil) in Faculty of Biological Science, University of Dhaka, was carried out by me under the guidance of Prof. Khurshida Khanom, Professor and Head of the Department, Department of Health Promotion and Health Education, Bangladesh Institute of Health Sciences (BIHS) during the period of June 2014 to July 2015.

No part of the work has been submitted elsewhere for any other purpose.

_____

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CERTIFICATION

This is to certify that Md. Rijwan Bhuiyan has completed his thesis work entitled **'Assessing Knowledge and Health Belief about Hypertension among Selected University Students in Dhaka City: Bangladesh'** in the Bangladesh Institute of Health Sciences (BIHS), Dhaka during the period of June 2014 to July 2015 under my supervision.

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DEDICATED TO

My beloved parents

&

All, those who are always struggling to prevent Non-communicable Diseases (NCD)

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LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
BIHS	Bangladesh Institute of Health Sciences
BP	Blood pressure
CDC	Center for disease control and prevention
CVD	Cardiovascular Diseases
GBD	Global Burden of Disease
HBP	High Blood Pressure
HBM	Health Belief Model
HTN	Hypertension
HSC	Higher secondary school certificate
MHFW	Ministry of Health and family welfare
NCD	Non-communicable Diseases
SD	Standard Deviation
SEAR	South East Asian Region
SSC	Secondary School Certificate
US	United State
WHO	World Health Organization

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ABSTRACT

Hypertension is becoming one of the major public health issues both in developed and developing countries. Prevention strategies for hypertension mainly based on modification of behavioral risk factors, which actually developed in young age and become established behavior in adult stage of life. Knowledge and belief can play in important role in determining and modifying the health related behavior. The objective of this study was to assess the knowledge and health belief about hypertension among selected university students in Dhaka city, Bangladesh. Descriptive type of cross-sectional study was conducted among undergraduate university students (17 to 25 years). A total 816 samples were selected through systematic random sampling technique. Data were collected through face-to-face interview by using pre-tested semi structured questionnaire. Ten knowledge questions (each contain 1 mark) and 20 health belief questions based on Health Belief Model (HBM) (assessed by five point likert scale) were used to assess the knowledge and health belief of the respondents. Study found, among 816 respondents, about 45.5% were female. The mean (± SD) age was 21.42 (± 1.85) years. About 56% respondents know the normal blood pressure level but only 18% know the high blood pressure level of the body. About 60%, 58% and 30% reported that Stress, Unhealthy diet and Overweight were the risk factors of hypertension respectively. However, about 93% respondents don't know that hypertension is asymptomatic and about 49% don't know that it is a lifelong diseases and have to take drugs for lifelong. About 68% and 58% said that Stroke and Heart attack are the complications of hypertension. About 65%, 58% and 54% reported that avoid unhealthy diet, reduce stress and regular physical activity can prevent hypertension. In case of health belief the mean (± SD) belief on Perceived susceptibility, severity, benefits and barriers about hypertension was 3.51 (± 0.54), 3.48 (± 0.51), 3.89 (± 0.46) and 3.40 (± 0.58) respectively. Study found very week positive significant correlation ($r = 0.0256$; $p = 0.000$) between total knowledge and health belief about hypertension. In conclusion, study revealed the insufficient knowledge about hypertension and has very weak positive significant correlation among knowledge and health belief of the university students. Therefore, knowledge should be improved about hypertension among young people and further investigate the relationship between knowledge and health belief about hypertension in large scale.

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CHAPTER - I:

INTRODUCTION

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INTRODUCTION

1.1. Introduction

Globally hypertension or high blood pressure is now becoming one of the serious public health issues. It is one of the major risk factors for premature mortality and morbidity. It is also becoming more prevalent in developing countries like Bangladesh where limited health care resources are available. Hypertension is not only a disease of ageing people but also can develop among young or child as well. Although the actual cause of hypertension (secondary hypertension) is unknown but several risk factors are responsible for the development of this condition. The risk factors can be categorized into two broad spectrums. One is genetic or hereditary (can't change) and another is behavioral factors. The behavioral risk factors can be change or modify through the modification of human behavior by improving knowledge, attitude and belief. Therefore prevention strategies for hypertension have given more efforts to the modification of behavioral risk factors among the general population.

Basically most of the lifestyle related behaviors are adopted during teen and young age and become established behavior at the adult stage of life. The lifestyle or behavior practiced in university life may persist or lasts for later stage of life. Therefore university settings are a very vital place where prevention program for hypertension can be started, where more chance to develop different kinds of risky and unhealthy behavior. In Bangladesh like a low middle income countries unhealthy life style is common among young people. There are also lack of health care facilities and educational programs as well. Study found lack of knowledge about hypertension among general people. Although hypertensive patient have some level of knowledge about hypertension but their practice is very low. Studies related to knowledge and beliefs about hypertension among young people especially university students are rarely found. Therefore it is very crucial to assess the level of knowledge and health belief about hypertension among this vulnerable group of people, in order to determine and modify the health behavior for the prevention of hypertension.

1.2. Background

Hypertension, also known as high or raised blood pressure of the body is now becomes a global public health issue and the leading risk of premature mortality and morbidity [1]. It is reported that, hypertension affects over one billion (1 billion) people globally, where about seven million (7 million) of them die annually as a direct result from hypertension [2]. Almost three-quarters of those who are suffering from hypertension (about 639 million people) live in developing countries with limited health care resources and have very low level of knowledge [3]. In case of mortality, every year approximately 17 million deaths occur from cardiovascular diseases [4] where about 9.4 million death account for the complications of hypertension [5]. Study found that hypertension is responsible for at least 45% of deaths due to heart disease and 51% of deaths due to stroke [4].

Traditionally, a high burden of hypertension and its adverse consequences has been mistakenly thought to be an affliction of only economically developed countries [6,7]. However, studies over the past two decades have reported that majority of people in many economically developing countries have blood pressure above the levels considered optimal with a high prevalence of hypertension present [8,9,10]. Although a high prevalence of hypertension in all world regions has been previously reported, a recent publication from the 'Global Burden of Disease (GBD) Study' has placed a renewed focus on the heavy toll of high blood pressure [3,11,7].

Even though hypertension is considered the disease of elderly, different study reported that it also developed among the adolescents and young people as well [12]. The cause of uncontrolled hypertension is multifactorial [13]. Experts still don't fully understand the exact cause of hypertension but the things that are linked to high blood pressure include: aging, drinking more alcoholic, eating a lot of sodium (salt), being overweight or obese, inadequate physical activity, being under a lot of stress, eating a diet low in potassium, magnesium, and calcium and being insulin-resistant [14]. The majority of the risk factors of hypertension are related to behavior and lifestyle. Several studies throughout the world have shown that lifestyle, such as physical activity and nutrition, plays an important role in preventing and controlling

hypertension and as well as preventing its long-term complications [15]. However hypertension in children or adolescents also related to their lifestyle. So in order to prevent early development of hypertension it is necessary to change the lifestyle factors among them [16]

To actively improve the lifestyle, individuals must have knowledge and understanding about hypertension, potential health risks associated with this condition and as well as potential positive effects of lifestyle modification [17]. Additionally, health belief is one determinants which can influence and modify health related lifestyle and behavior. Study has found inadequate knowledge and belief about blood pressure (BP) are also potential causes for non-adherence to taking antihypertensive drugs, and consequently, high rates of uncontrolled blood pressure (BP) [18]. Therefore people should have the knowledge they need to take care of themselves, to be able to define their condition, to evaluate risk factors, and to appreciate the significance of lifelong medical control [19,20,21].

Although several measures have taken to control the hypertension among adults population but young adults with hypertension are less likely to have their condition under control compared with middle-aged and older adults. Uncontrolled hypertension in young adults can increase risk for chronic kidney disease and strokes, especially among people with diabetes [22]. It is found that the risk factors for non-communicable disease begin early at the young age [23,24]. Studies among university students showed that students are also at risk of developing non-communicable diseases, specially CVD and hypertension [25,26]. However there was no study conducted that examined knowledge and health beliefs about hypertension among university students. University years represent a major transition for students because they are living away from home for the first time and have to make lifestyle decisions regarding personal health without their parents. Students begin adopting unhealthy behaviors like binge drinking, smoking, using illicit drugs, and poor dietary choices [27,28,29]. Thus, university setting offers an excellent platform to study Hypertension among young adults. University health care providers need to include NCD health as part of their regular assessment in order to make students aware of Hypertension.

1.3. Rationale

Although hypertension is the most commonly diagnosed condition in the world [30], but different surveys demonstrated that till now it is substantially underdiagnosed [31] and poorly controlled [32]. Especially in developing countries like Bangladesh where health care facilities are limited. Evidence showed that most of the risk factors of hypertension are related to behavior and can be prevented through the modification of unhealthy behavior in early stage of life. Moreover knowledge and beliefs about any health condition are useful for determining and modifying the unhealthy behavior of an individual [33,34]. Many psychosocial theoretical models are used by health educators to change or explain behavior. The health belief model is one of them and has been used to explain and predict health behavior for more than 50 years [34]. It is one of the most widely used models in the world [35]. Therefore knowledge and health belief about hypertension are crucial for the prevention and control of hypertension. So far literature reviews, studies related to knowledge, belief and practice about hypertension mostly done among hypertensive population [36,37]. Studies related to knowledge and beliefs about hypertension among general population especially young people are rarely found.

Freedman et al (1999) said behaviors that are learned and started in adolescence will carry over to adulthood [38]. So, unhealthy behavior developed in early stage of life and become established behavior in later stage of life. University students are vulnerable in developing different kinds of unhealthy behavior. Therefore, a university setting provides a unique opportunity to reach many young adults through disseminating hypertension risk reduction information [39,40]. Usually, poor compliance, decisions and knowledge among young people influence them to develop healthy behavior. Poor understanding of hypertension is also based on their personal lay beliefs and lack of knowledge [41,42,43,44]. Good knowledge of hypertension motivates individual for lifestyle modification, such as weight loss, alcohol reduction, regular aerobic exercise and increased consumption of fruit and vegetables. Petrie et al (1996) demonstrated that patients' perceptions of their illness accounted for a significant proportion of the variance between clinical disease severity and outcome [45]. Certain beliefs should be viewed as maladaptive because they act as barriers to

adherence or predict higher levels of disability and reduced quality of life. Therefore for the prevention of hypertension a sound understanding of people's knowledge and beliefs are required in this regard [46,47].

Several studies have done in different countries in different settings but so far literature review, no studies have found in Bangladesh related to knowledge and belief about hypertension among young people specially university students, who are vulnerable. We actually don't know about level of knowledge, belief and perception on hypertension of our young university students. Therefore it is very important to explore the level of knowledge and belief on hypertension and determine whether there is any association between knowledge and belief on hypertension among young people especially university students.

1.4. Research question

What are the overall levels of knowledge and health beliefs about hypertension among selected university students in Dhaka city: Bangladesh?

1.5. Research objective

1.5.1. General objective

To assess the levels of knowledge and health belief about hypertension among selected university students in Dhaka city, Bangladesh.

1.5.2. Specific Objectives

1. To assess the level of knowledge about hypertension among the respondents.
2. To assess the health belief about hypertension among the respondents.
3. To assess the socio-demographic characteristics of the respondents.
4. To ascertain the association between knowledge and health belief about hypertension of the respondents.
5. To determine the relationship between knowledge about hypertension and socio-demographic characteristics of the respondent.
6. To determine the relationship between health belief about hypertension and socio-demographic characteristics of the respondent.

1.6. Operational Definition

1.6.1. Knowledge

Knowledge is a part of cognitive domain which involves recalling data or information. For example identifying the symptoms of a disease or knowing safety procedures.

1.6.2. Hypertension knowledge

To assess the hypertension knowledge study use ten questions. These are: meaning of hypertension, normal blood pressure level, high blood pressure level, risk factors of hypertension, knowledge about feeling symptom of hypertension when it develop, knowledge about duration of becoming cure from hypertension, knowledge about duration of taking hypertensive drugs, complications of hypertension, prevention of hypertension and specific age for the development of hypertension.

1.6.3. Health belief

Beliefs are convictions that a phenomenon is true or real. In other words beliefs can be explained as statements of perceived fact or impressions about the world, which are neither correct nor incorrect.

1.6.4. Health Belief Model (HBM)

The Health Belief Model (HBM) was used as a theoretical framework for this study. HBM is one of the most widely used conceptual frameworks in health behavior research and it is designed to explain health behavior by better understanding beliefs about health. There are four main construct of HBM. These are: perceived susceptibility, perceive severity, perceived benefits, and perceived barriers.

1.6.5. Perceived susceptibility

Perceived susceptibility refers to "beliefs about the likelihood of getting a disease or condition"

1.6.6. Perceived severity/seriousness

Perceived severity/seriousness refers to "feelings about the seriousness of contracting an illness or of leaving it untreated include evaluations of both medical and clinical consequences and possible social consequences".

1.6.7. Perceived benefits

The construct of perceived benefits is a person's belief of the value or usefulness of a new behavior while trying to reduce the risk of developing a disease.

1.6.8. Perceived barrier

Perceived barrier is an individual's own evaluation of the obstacles in the way of him or her adopting a new behavior.

1.6.9. Hypertension/ high blood pressure

High blood pressure (HBP) or Hypertension (HTN) is a condition in which the blood vessels have persistently raised pressure. When pressure of the blood on blood vessels stays elevated beyond the normal over time called high blood pressure/ hypertension. In this study the normal blood pressure level was considered as less than equal 120/80 mm of Hg and high blood pressure level was more than equal 140/80 mm of Hg.

1.6.10.University student

Students who are currently studying at undergraduate level in the university were considered as population of this study.

CHAPTER - II:

LITERATURE REVIEW

2.1. Blood pressure

In human body, blood is carried from the heart to all parts through the blood vessels. Each time when the heart beats, it pumps blood into the vessels. Blood pressure (BP) is the pressure exerted by circulating blood upon the walls of blood vessels when the heart beats. A human body needs blood pressure to move the blood throughout the body so that every part of the body can get the oxygen it needs [48,49,50]. It is one of the principal vital signs measured to assess general health condition. Generally the higher the pressure the harder the heart has to pump in the body [1].

The measurement/reading of blood pressure gives two numbers and measured in millimeters of mercury (mm Hg). The top number is called the 'systolic blood pressure' and the bottom number is 'diastolic blood pressure' [51]. When heart beats, it contracts and pushes blood through the arteries to the rest of the body. This force creates pressure on the arteries. This is called systolic blood pressure. The normal systolic blood pressure is below 120 mmHg. The diastolic blood pressure number or the bottom number indicates the pressure in the arteries when the heart rests between beats. The normal diastolic blood pressure number is less than 80 mmHg [52,53].

Healthy arteries (the blood vessels that carry oxygen-rich blood from the heart to the rest of the body) in the body are elastic. They can stretch to allow more blood to push through them. How much they stretch depends on how hard the blood pushes against the artery walls. To stay healthy, it's important that human blood pressure should be within a healthy range [48]. But blood pressure can vary depending on situation, activity and disease states, and is regulated by the nervous and endocrine systems. Usually blood pressure that is pathologically low is called hypotension, and pressure that is pathologically high is called hypertension. Both have many causes, risk factors and can range from mild to severe, with both acute and chronic forms.

2.2. Hypertension (HTN) or High blood pressure (HBP)

High blood pressure (HBP) or Hypertension (HTN) is a condition in which the blood vessels have persistently raised pressure [(1)]. According to American heart association, when pressure of the blood on blood vessels stays elevated beyond the normal over time called high blood pressure. High blood pressure is "the silent killer" because it usually has no symptoms [(54)]. Some people may not find out they have it until they face any troubles. Once high blood pressure has developed, it usually lasts for lifetime. However, the good news is that it can be treated and controlled. If not treated, hypertension/high blood pressure can have deadly health consequences [(53,55)]. Normal blood pressure in a healthy adult is the pressure of the blood below or equal to 120 mm Hg when the heart beats (systolic) and the pressure of the blood below or equal to 80 mm Hg when the heart relaxes (diastolic). If the systolic blood pressure is equal to or above 140 mm Hg and the diastolic blood pressure equal to or above 90 mm Hg, it is considered to be high blood pressure or hypertension [(1,53)]. Sometimes hypertension causes symptoms such as headache, shortness of breath, dizziness, chest pain, palpitations of the heart and nose bleeds. However, most people with hypertension have no symptoms at all. Therefore, high blood pressure (HBP) or hypertension is a widely misunderstood medical condition. The truth is, anyone can be a calm, relaxed person and still have high blood pressure [(53)].

There are two main types of high blood pressure/hypertension. One is ‘Essential or Primary hypertension’ and another is ‘Secondary hypertension’. Essential hypertension is the term for high blood pressure with unknown cause and there is no specific disease process involved. This is the type of high blood pressure that most people have. It accounts for about 95% of cases. ‘Secondary hypertension’ is the term for high blood pressure when the change in blood pressure comes as a result of (or secondary to) a specific disease or defect. This is rare and is caused by conditions such as kidney disease, problems with glands that produce hormones, and congenital problems affecting a blood vessel near the heart or brain [(56,57)].

2.2.1. Epidemiology of Hypertension

Hypertension is now become an important public health challenges worldwide because of its high prevalence and concomitant increase in risk of disease [58,59]. It is the most important modifiable risk factor for cardiovascular, cerebrovascular and renal diseases. The comparative Risk Assessment Collaborating Group has identified hypertension as the leading global risk factor for mortality and as the third leading risk factor for disease burden [60]. According to WHO report, globally hypertension causes 7.5 million deaths which are the 12.8% of the total of all deaths. It is estimated that hypertension accounts for 57 million disability adjusted life years (DALYS) or 3.7% of total DALYS. The overall prevalence of raised blood pressure/hypertension in adults aged 25 and over was around 40% in 2008. The proportion of the world's population with high blood pressure, or uncontrolled hypertension, fell modestly between 1980 and 2008. However, because of population growth and ageing, the number of people with uncontrolled hypertension rose from 600 million in 1980 to nearly 1 billion in 2008 [61]. Study found that, in case of mortality, every year approximately 17 million deaths occur from cardiovascular diseases globally [4] where about 9.4 million death account for the complications of hypertension [5]. Study found that hypertension is responsible for at least 45% of deaths due to heart disease and 51% of deaths due to stroke [4]. Analysis of the global hypertension burden reveals that over 25 % of the world's adult population in 2000 suffered from hypertension and this proportion is expected to increase to 29 % by 2025 [62].

Hypertension is now becoming an important public health concern in developing countries. The trends of prevalence of hypertension suggest that it has increased in economically developing countries in recent years while remaining stable or having decreased in developed countries [63]. However across the WHO regions, the prevalence of raised blood pressure/hypertension was highest in Africa, where it was 46% for both sexes combined. Both men and women have high rates of raised blood pressure in the Africa region, with prevalence rates over 40%. The lowest prevalence of raised blood pressure was in the WHO Region of the Americas at 35% for both sexes. Men in this region had higher prevalence than women (39% for men and 32% for women). In all WHO regions, men have slightly higher prevalence of raised blood pressure than women. Across the income groups of countries, the prevalence of raised

blood pressure/hypertension was consistently high, with low, lower middle and upper middle countries and, all having rates of around 40%. The prevalence in high income countries was lower, at 35% [61].

In the South-East Asia Region it is estimated that the prevalence of hypertension of adult is 36%. WHO reported that high blood pressure is the leading risk factor for death claiming 1.5 million lives each year in the Region. One in three adults in this region has high blood pressure and males have a slightly higher prevalence of high blood pressure than females. The prevalence of high blood pressure in SEAR ranged from 19% in Democratic People's Republic of Korea to 42% in Myanmar. However, prevalence of hypertension is increasing in many countries in the Region. In India, raised blood pressure increased from 5% in the 1960s to nearly 12% in 1990s, to more than 30% in 2008. In Indonesia, the percentage of adult population with raised blood pressure increased from 8% in 1995 to 32% in 2008. In Myanmar, the Ministry of Health reported an increase in high blood pressure prevalence, from 18% to 31% in males, and from 16% to 29% in females during 2004–2009 [64,65].

Bangladesh is passing through a phase of epidemiological transition from communicable diseases to non-communicable disease (NCDs) and currently has a double burden of disease [66]. This means that the prevalence of hypertension is modest now but will show a rising trend. The estimated prevalence of hypertension from 1976 to 1994 was 11.3% [67]. Meta-analysis from 1995 to 2009 the prevalence of hypertension among the Bangladeshi adult population (age ≥ 15 years) was 13.5% (with 95% CIs ranging from 12.7% to 14.2%) [68].

2.2.2. Causes and Risk factors of Hypertension

In many people with high blood pressure, a single specific cause is not known. This is called essential or primary high blood pressure [55]. However, as of 90% cases high blood pressure cause is unknown but there are several factors can increase the risk of developing the condition [69]. Basically, risk factors are conditions or behaviors that increase the chances of developing any disease/condition. Therefore when someone has more than one risk factor, the risk of developing any condition/disease greatly multiplies. Some risk factors are related to behavior and lifestyle and can be

controlled and, some are not (e.g: age, family history) [70]. Risk factors of high blood pressure fall into two categories: those you can control, and those that are out of control. Risk factors that can be controlled are: Overweight/obesity, Unhealthy diet: especially high in sodium, Lack of physical activity, drinking too much alcohol, Smoking and tobacco use, Stress, Sleep apnea. Risk factors that can't be controlled are: Family history, Age, Gender, Race [48].

2.2.3. Sign and symptoms of Hypertension

High blood pressure (hypertension) usually has no obvious symptoms. Many people have high blood pressure/hypertension, for years without knowing it. That's why high blood pressure is called the 'Silent killer'. The only way to know if someone has high blood pressure is to measure the blood pressure periodically. All adults should get their blood pressure checked at least once every five years. However in some rare cases, where a person has very high blood pressure, they can experience symptoms, including: a persistent headache, blurred or double vision, nosebleeds, shortness of breath [71] but no significant strong evidence has found till now.

2.2.4. Complications of Hypertension

Healthy arteries in human body are made of muscle and a semi-flexible tissue that stretches like elastic when the heart pumps blood through them. The more forcefully that blood pumps, the more the arteries stretch to allow blood to easily flow. Over time, if the force of the blood flow is often high, the tissue that makes up the walls of arteries gets stretched beyond its healthy limit and damaged. This creates problems in several ways. First, the overstretching creates weak places in the blood vessels, making them more prone to rupture. Second, the overstretching can cause tiny tears in the blood vessels that leave scar tissue on the walls of arteries and veins. These tears and the scar tissue are like nets, and can catch debris such as cholesterol or blood cells traveling in the bloodstream. Trapped blood can form clots that can narrow (and sometimes block) the arteries. These clots sometimes break off and block vessels and the blood supply to different parts of the body and causes heart attacks or strokes. Damage to the vessels that supply blood to the kidneys and brain may negatively affect these organs [53].

2.2.5. Diagnosis of Hypertension

As there are no specific obvious symptoms of detecting high blood pressure therefore to find out if someone have high blood pressure, need to test the blood pressure by a healthcare professional. Blood pressure test is very simple, quick and painless method. Healthcare professionals use a medical instrument called a sphygmomanometer, which in layman's terms is known as a blood pressure monitor. Optimal blood pressure is less than 120/80 mm Hg (systolic pressure is 120 mm of Hg and diastolic pressure is less than 80 mm of Hg). American Heart Association recommended the high blood pressure level for adult person is more than equal 140/90 mm Hg mercury [72].

2.2.6. Management of Hypertension

Hypertension is already a highly prevalent cardiovascular risk factor worldwide because of increasing longevity and prevalence of contributing factors such as obesity. The treatment of hypertension has been shown to prevent cardiovascular diseases and enhance lifestyle. However hypertension remains inadequately managed everywhere. Multiple guidelines for the more effective management of hypertension have been published. However, guidelines to be useful in clinical practice, must be evidence-based and up-to-date [73].

The overall objectives of antihypertensive treatment are to prevent the occurrence of cardiovascular disease due to damage to the heart and blood vessels caused by sustained high blood pressure, and consequent functional impairment and death. In patients who have already developed cardiovascular disease, treatment is aimed at preventing progression or recurrence, reducing mortality and, thus, helping patients with hypertension to lead their lives as do healthy people [74]. The results of randomized case–control comparative studies provide the best scientific basis for evaluating the effects of antihypertensive treatment which is based on lifestyle modifications and drug therapy. The time of initiating antihypertensive drug therapy should be determined according to the level of blood pressure and the presence or absence of risk factors for cardiovascular disease and organ damage. In principle, antihypertensive drug therapy should be started with a low dose of a long-acting drug

once a day [74]. Lifestyle modification is indicated for all patients with hypertension, regardless of drug therapy. It may reduce, or even abolish, the need for antihypertensive drugs. Lifestyle modifications include restriction of salt intake, do adequate physical exercise, restriction of alcohol intake, promotion of fruit and vegetable consumption, restriction of intake of saturated fatty acids and total lipids, and cessation of smoking [75].

2.3. Knowledge about Hypertension

Bloom (1956) identified six categories of cognitive learning. The first or very basic of these categories is knowledge, which involves recalling data or information, for example identifying the symptoms of a disease or knowing safety procedures. The second level is comprehension (lowest level of understanding), third level is application (using learned material), fourth level is analysis (ability to analyze learned material), fifth level is synthesis (creating from learned material), and sixth level is evaluation (ability to judge the value). As we move through these levels, higher level of mental functioning is required [76]. Knowledge can be tested as being correct or incorrect. The usual methods by which knowledge is tested are true/false questions or multiple choice questions or matching and short essay questions [77,78].

In order to prevent hypertension it is very essential to have adequate knowledge and awareness about it among the general people. Although it is well-defined the preventive strategies of hypertension through lifestyle and dietary modifications, but it is not clear whether the public has access to this knowledge and services. An insight into the communities' knowledge and perceptions on hypertension is important as prevention requires a life-long adoption of healthy lifestyles. Also, it is essential to gather such information from different communities in order to develop community-specific information, education and communication (IEC) and appropriate strategies to bring about behavioral change. Aubert et al. emphasized the need to gather epidemiological and knowledge, attitude and practices (KAP) data on hypertension [79].

Most of the literatures related to the knowledge and awareness of hypertension have done among the hypertensive patients. However a limited study have found among healthy population especially among the young people. Although the level of awareness about hypertension among hypertensive patients range from mild to moderate but still now people are less aware regarding this facts, especially in prevention and management [80]. However, awareness about hypertension varies considerably between countries and regions. In developed countries there are one half to two third of hypertensive patients in the general population aware of their diagnosis and one third to one half receiving treatment. The level of awareness and treatment in most developing countries tend to be lower than those reported in developed countries [81]. Another review said from different national and regional surveys that hypertension is common in developing countries, particularly in urban areas, and that rates of awareness, treatment, and control are low [82]. In African region study found that there are low levels of awareness and treatment of hypertension and even lower levels of control in different part of African region [83,84]. However, one systematic review showed that the prevalence, awareness, treatment and control of hypertension in developing countries are coming closer to those in developed countries [85].

A systematic review in India reported that the awareness of HTN in India is low with suboptimal control rates [86]. Another systematic review and meta-analysis showed that about 33% urban and 25% rural Indians are hypertensive. Of these, 25% rural and 42% urban Indians are aware of their hypertensive status, which is quiet low [87]. Different studies showed that the level of awareness regarding hypertension among the hypertensive population is insufficient and situation among non-hypertensive especially young people is not known [88,89]. A joint study in Bangladesh and India revealed that only 45 % of the hypertensive subjects were aware of their elevated blood pressure status. However, only about 10% of hypertensive subjects were having their blood pressure controlled according to current JNC–VI recommendations. Study also demonstrated that women were more aware of their hypertensive status and more likely than men to be treated [89].

2.4. Health Belief about Hypertension

Beliefs are convictions that a phenomenon is true or real [90]. In other words beliefs can be explained as statements of perceived fact or impressions about the world, which are neither correct nor incorrect. For example, a student enters into the classroom and says that the classroom is big. For that student the classroom seems big because she might have been used to smaller classroom and from her perspective this classroom is big for her. Another student enters the same classroom and says that the classroom is small. That student might have been used to bigger classrooms and from her perspective the classroom is small. Both the student's statements about the class are right, but their beliefs are different.

A very common health belief is that going outside with wet head causes pneumonia. Modern medicine tells us that pneumonia is a bacterial disease and can happen from many causes but wet head is not one of them. However, if people belief that wet head causes pneumonia, then they might not go out with the wet head. An elderly woman might not go to get pneumonia vaccine because her beliefs are staying indoor until her hair get dry keeps her away from getting pneumonia. Some people's belief about smoking is that it is dirty, expensive, and can cause cancer while others might belief that smoking is relaxing and sociable. There is no one definitive scale to measure health beliefs as health belief tends to change and beliefs are different from individual to individuals and from one behavior to another behavior [90]. Various researches that were completed using HBM constructs have used Likert scales from "strongly agree to strongly disagree" to measure health beliefs [91,92].

Study showed that perceptions may be important in compliance and performance improvement [93]. However, if someone thinks that hypertension is a controllable disease, therefore this perception influence individual for healthy behavior (94). A study reported that the respondents who perceived high susceptibility, severity, benefit had better adherence compared to moderate and low susceptibility, severity, and benefit [95]. Several study have found about health belief on hypertension however, related study is rarely done in developing countries.

2.5. Health Belief Model

The Health Belief Model (HBM) was used as a theoretical framework for this study. HBM is one of the most widely used conceptual frameworks in health behavior research and it is designed to explain health behavior by better understanding beliefs about health [(96)]. This model was originated from a group of social psychologists who worked in the U.S. Public Health Service in the 1950s: Godfrey Hochbaum, Stephen Kegels, and Irwin Rosenstock. These psychologists were concerned about why people were not participating in free tuberculosis screening program offered by Public Health Service. To explain this phenomenon, and help recruit more people on screenings programs, these psychologists developed HBM [(77)].

The HBM is based on value expectancy theory developed by Kurt Lewin [(97)], who explained that behavior change depends on two things: i) the desire to avoid illness or get well (value); and ii) the belief that a specific health action available to a person would prevent illness (expectancy). The expectancy was further described in terms of the individual's approximations of personal susceptibility to and perceived severity of an illness, and likelihood of being able to reduce that threat through personal action. Initially, the HBM was used to address preventive health behaviors, later it was applied to illness behaviors, and behaviors related to chronic illness [(98)].

The following perceptions: perceived susceptibility, perceive severity, perceived benefits, and perceived barriers are the main four constructs of HBM. Each of these perceptions, individually or in combination, are used to explain health behaviors. Additional constructs such as cues to action, motivating factors, and self-efficacy have been added to the model. This study will be based on the four main constructs of HBM [(90)].

Perceived susceptibility refers to "beliefs about the likelihood of getting a disease or condition" [(91)]. For example, college students must believe that there is possibility of getting CVD if they do not practice healthy behaviors. Perception of susceptibility vary among individuals to any given illness or disease. There are some people on one extreme who completely deny any possibility of getting the disease, whereas other

people might admit the possibility of acquiring the disease but believe that it is not likely to happen to them [77]. The last groups of people are very much fearful of getting the disease but still believe that they will not acquire it. According to HBM, the more susceptible a person feels the greater likelihood of his or her taking preventive measures [91,77]. Perceived susceptibility has a strong cognitive component and is partly dependent on knowledge [90].

Perceived severity/seriousness refers to "feelings about the seriousness of contracting an illness or of leaving it untreated include evaluations of both medical and clinical consequences and possible social consequences" [91]. This perception also differs from person to person. Some people might perceive the disease purely from medical perspective and are mostly worried about signs and symptoms, while others might look from social perspective like adverse effects on the job, family, and relationships [77]. Rosenstock (1974) explained that like perceived susceptibility, perceived severity also has strong cognitive component which depends on knowledge [90]. According to HBM, health educators need to build perceived severity by explaining the severity of the disease and personalizing those to participants. For example, college students might be explained that consumption of large amount of saturated fats may lead to development of CVD and might also share an example of community member who had a heart attack [77].

The construct of perceived benefits is a person's belief of the value or usefulness of a new behavior while trying to reduce the risk of developing a disease [91]. People tend to engage in a behavior when they believe that there is benefit of doing it. For example, smokers will never quit if they do not believe that quitting is beneficial to their health or people might not eat enough fruits and vegetables if they do not know the benefits of eating five servings of fruits and vegetables a day. Even though procedure of mammogram and colonoscopy is uncomfortable, people still go for screening knowing the benefits of reducing breast and colon cancer.

Perceived barrier is an individual's own evaluation of the obstacles in the way of him or her adopting a new behavior [91]. An individual may believe that taking preventive action is good to reduce perceived susceptibility and perceived severity, but may consider the action to be expensive, inconvenient or upsetting [90]. In order for a new

behavior to be adopted, a person should believe that benefits of adopting a new behavior should outweigh the consequences of continuing old behavior. This enables to change old behavior and adopt new behavior. Among all the constructs of HBM, perceived barriers are the most significant in determining behavior change [91].

CHAPTER - III:

METHODOLOGY

METHODOLOGY

3.1. Study design

This study was descriptive type of cross-sectional study conducted among university students in Dhaka city, Bangladesh. Cross-sectional study defines 'the study that involves observations of a sample or a population or a phenomenon at one point in time' [99]. Therefore, in this study the university students (samples) were tested at one particular time.

3.2. Study settings

Selected two reputed public universities in Dhaka city, named Dhaka University and Jagannath University were the settings of this study.

- The University of Dhaka also known as Dhaka University is the oldest university in modern Bangladesh and established in 1921. Today, it is the largest public university in Bangladesh, with a student body of 33,000 and a faculty of 1,800. Students from different parts of Bangladesh come here to study in this university.

- Jagannath University is another Public University in Dhaka (the capital of Bangladesh) situated in the southern part of Dhaka city called Sadarghat near the river Buriganga. Jagannath University was established in 2005. It is one of the first growing public university having around 20,000 students.

3.3. Study period

The total period of this study was one year. Protocol writing was done in the first three months. One month was required for developing questionnaire and pretesting. The data collection period was 3 months. Rest of the time was required for data entry, analysis, literature review and report writing.

3.4. Study sample

University students age between 17 to 25 years and studying in undergraduate level of the Dhaka and Jagannath University were the sample of this study.

3.5. Inclusion criteria

- University students studying in undergraduate level (first year to fourth year)
- University students age between 17 to 25 years old
- Students wish to participate in this study

3.6. Exclusion criteria

- Students who have cognitive and visual problem
- Students who don't want to participate in this study

3.7. Sample size

Sample size was adopted based on unknown prevalence and with a required error totaling ± 5% units and a 95% confidence level. Then multiply by design effects and considering 10% non-response rate.

$$\boldsymbol{n = \frac{z^2 \times p \times (1 - p)}{e^2}}$$

Where, n = Minimum sample size

Z = The standard normal deviate (e.g.: usually set at 1.96 for 95% confidence level)

P = 0.05 (The proportion of the target population)

$1 - P$ = 0.05

e = 0.05 (5% absolute precision)

Design effects = 2

Non response rate = 10%

Therefore,

$$\boldsymbol{n = \frac{(1.96)^2 \times 0.5 \times 0.5}{(0.05)^2}}$$

$$\boldsymbol{n = \frac{3.84 \times 0.25}{0.0025}}$$

$$\boldsymbol{n = 384}$$

$n \times Design\ effects = 384 \times 2 = \mathbf{768}$

Considering 10% non-response rate, the sample size: **844**

3.8. Sampling technique

A systematic random sampling technique was adopted to select university students from selected universities for the study. At first universities were selected 'purposively' from Dhaka city then from the universities, sample were selected systematically from science, arts and business faculties. These diverse groups of students are representative of total university students. Majority of these students may not be aware of hypertension. This young population can have a significant impact on hypertension prevention efforts.

3.9. Tools and techniques of data collection

A pre tested knowledge and health belief related semi structured questionnaire was used to collect data. A 10 items hypertension knowledge related questionnaire and 20 items health belief on hypertension related questionnaire was used to assess the knowledge and health belief on hypertension of the respondents. The knowledge questions were developed from Aubert et al. (1998), Schapira et al. (2012), Oliveria et al. (2005), Han et al. (2011), Li, et al. (2013), Erkoc et al. (2012) and Almas et al. (2012), and necessary changes were made after pre-test [100-106]. The knowledge questions contained five open ended, three multiple responses and two close ended questions. These are (1) meaning of hypertension/high blood pressure, (2) normal blood pressure level, (3) high blood pressure level of the body, (4) risk factors of hypertension/ high blood pressure (multiple responses), (5) duration of

hypertension/high blood pressure to cure, (6) feeling symptoms of hypertension/high blood pressure when it develops, (7) duration of taking hypertensive drugs, (8) complications of hypertension/high blood pressure (multiple response), (9) preventions of hypertension/high blood pressure (multiple response), (10) specific age for the development of hypertension/high blood pressure. Each knowledge question contains 1 mark and the total knowledge score was 10 marks. The Health belief questions were designed based on health belief model (HBM) where health belief contains four construct as 'perceived susceptibility', 'perceived severity', 'perceived benefits' and 'perceived barriers'. Each construct contains 5 statements and a total 20 statements were incorporated [107-110]. Every health belief statement was measured by five point 'Likert scale' [Strongly agree (SA), Agree (A), Neutral (N), Disagree (D) and Strongly disagree (SD)]. Descriptive statistics (frequencies, percentages) of each sub group and summary of the Health Belief Model (HBM) constructs with the calculated grand mean of the subscales. Face to face interview method was used to collect the data from the respondents. Trained professional data collectors were recruited to conduct the interview and collect the data.

3.10. Quality control

Quality control of data was ensured by chain. The team leader was always present in the field and monitored the data collectors. After completing the data collection team leader check the all collected questionnaire on the spot and if found anything mistake, immediately correct it. Data was randomly again rechecked by the researcher after getting from team leader and final random checked by supervisor.

3.11. Data analysis

Each survey items were coded by the researcher and entered into the Statistical Package for the Social Science (SPSS) software. Data will be analyzed using the SPSS version 16.0. Descriptive statistics including frequencies, percentages, measures of central tendency, and dispersion were calculated for each item of the survey and for all demographic variables. Total knowledge, total health belief and all health belief subscales (perceived susceptibility, severity, benefits, and barriers) were calculated by

using descriptive statistics. Pearson correlation coefficient was conducted with total knowledge score and with total and individual subscales scores on health beliefs. Inferential statistics (independent t-test and one way ANOVA test) was conducted to determine the relationship between knowledge and health belief with socio-demographic characteristics of the respondents.

The knowledge part of the survey contains 10 items. The knowledge questions contained five open ended, three multiple responses and two close ended questions. 10 knowledge questions were coded as categorical variables where "correct" = 1, and "not correct" and "do not know" = 0. Total 10 questions were summed to create a total knowledge score. Therefore total knowledge scores ranged from 0 to 10. Health beliefs part of the survey contains 20 items in four subscales: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. These items had a five-point Likert-type scale response format where 1 = "strongly disagree" (SD), 2 = "disagree" (D), 3 = "neutral" (N), 4 = "agree" (A), and 5 = "strongly agree" (SA). Total 20 items were summed to create a total health belief score. Total health belief score ranged from 20 to 100.

3.12. Ethical considerations

The research protocol was first approved by Bangladesh Institute of Health Sciences (BIHS) and then ethical clearance was obtained from ethical review committee of Bangladesh Diabetic Association (BADAS). International ethical guidelines for biomedical research involving human subjects were followed throughout the study. Written informed consent was taken at the time of enrolling the respondents. However verbal consent was also taken when required. In consent form, the aim and confidentiality of the study was informed. All respondents were informed that they were free to leave or to refuse to take part in this study at any time. The information given by the respondents were analyzed using code number so that nobody can identify them.

3.13. Variables

3.13.1. Demographic variables (Independent)

- Age
- Gender
- Education in year
- Educational Background
- Parental level of education
- Living place
- Family history of chronic disease

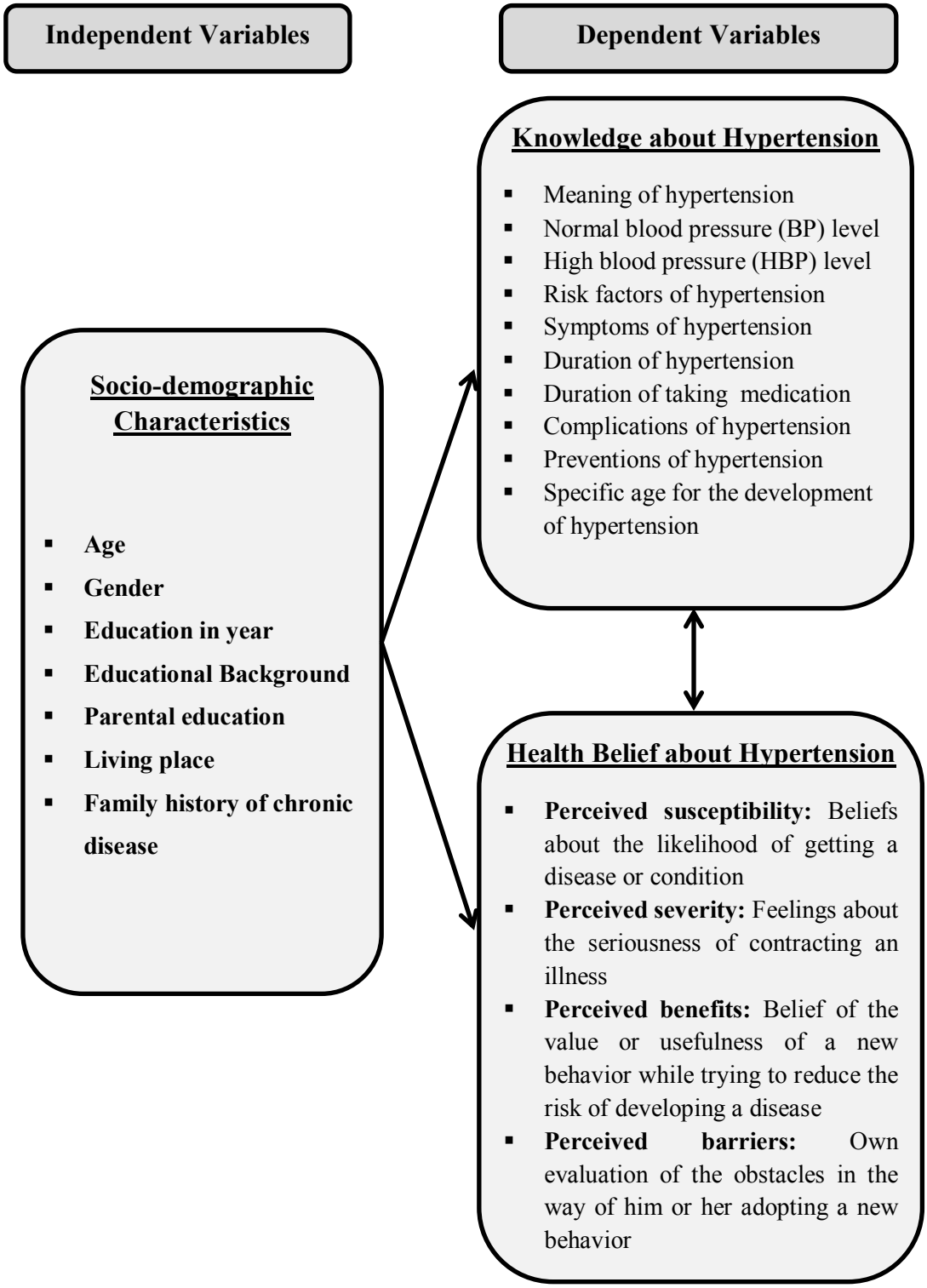
3.13.2. Knowledge about hypertension (Dependent)

- Meaning of hypertension
- Normal blood pressure (BP) level
- High blood pressure (HBP) level
- Risk factors of hypertension
- Symptoms of hypertension
- Duration of hypertension
- Duration of taking hypertensive drugs
- Complications of hypertension
- Preventions of hypertension
- Specific age for the development of hypertension

3.13.3. Health belief about hypertension (Dependent)

- Perceived susceptibility
- Perceived severity
- Perceived benefits
- Perceived barriers

3.14. Conceptual framework



CHAPTER IV:
RESULTS

RESULTS

A total 830 undergraduate university students (age between 17 to 25 years) were interviewed during the data collection period. The collected data were coded and entered into the SPSS software program version 16.0 and checked the data entry error by the researcher. Finally after all data cleaning process, 816 data were analyzed. The findings of the study are given below.

4.1. Socio-demographic characteristics of the respondents

4.1.1. Gender composition

Among the all (N = 816) respondents 54.5% (n = 445) were male and rest of 45.5% (n = 371) were female as shown in Table 1.

4.1.2. Age distribution

The mean (± SD) age of the respondents was 21.42 (± 1.85) years. In this study the ages were categorized into three groups. These are *'17 to 19 years'*, *'20 to 22 years'* and *'23 to 25 years'*. Study showed that more than half of the respondents (52.1%; n = 425) were in age between '20 to 22 years old'. The second highest respondents (29.4%; n = 240) were in age group '23 to 25 years old' and the remaining 18.5% (n = 151) were in age group '17 to 19 years old' (Table 1).

4.1.3. Education in year

Study found the highest proportion (34.7%; n = 283) of the respondents were in 'Fourth year', the second highest (27.8%; n = 227) respondents were in 'First year' and remaining 22.8% (n = 186) and 14.7% (n = 120) were in 'Third year' and 'Second year' respectively (Table 1).

Table 1: Frequency distribution of Socio-demographic characteristics of the respondents (N = 816).

Variables	Frequency (N)	Percentage (%)	Mean (±SD)
Gender			
Male	445	54.5	
Female	371	45.5	
Age (years)			
17 – 19 years	151	18.5	
20 – 22 years	425	52.1	**21.42 (1.85)**
23 – 25 years	240	29.4	
Education in year			
1st Year	227	27.8	
2nd Year	120	14.7	
3rd Year	186	22.8	
4th Year	283	34.7	
Educational Background			
Science	311	38.1	
Business	223	27.3	
Arts	282	34.6	
Father's level of Education			
Graduation/Post Grad	402	49.3	
Secondary/SSC/HSC	313	38.4	
Primary	57	7.0	
No formal education	44	5.4	
Mother's level of Education			
Graduation/Post Grad	147	18	
Secondary/SSC/HSC	494	60.5	
Primary	121	14.8	
No formal Education	54	6.6	
Living place			
Family	322	39.5	
Relatives	34	4.2	
Mess	211	25.9	
Hostel	249	30.5	
History of Chronic diseases in the family (Multiple response)*			
Hypertension	260	31.9	
Heart disease	96	11.8	
Diabetes	251	30.8	
Stroke	19	2.3	
Others	88	10.8	
None	314	38.5	

** 100% will not match as it is multiple responses*

4.1.4. Educational background

The educational backgrounds of the respondents were categorized into three groups as 'Science faculty', 'Business faculty' and 'Arts faculty'. Study showed that about 38.1% (n = 311) respondents were in 'Science' faculty, 27.3% (n = 223) were from 'Business faculty' and rest of 34.6% (n = 282) respondents were in 'Arts faculty' as shown in Table 1.

4.1.5. Parental level of education

The parental level of education was categorized into four groups as, *'No formal education', 'Primary', 'Secondary/SSC/HSC' and 'Graduation/Post graduation'*. Study found about half of the (49.3%; n = 402) respondent's father had completed *'graduation and post-graduation'* level of education. More than one third (38.4%; n = 313) respondent's father had completed *'Secondary/SSC/HSC'* level of education. Rest of 7% (57) and 5.4% (44) respondent's father had completed *'Primary'* level of education and *'No formal education'* respectively. In case of mother's level of education, the highest proportion of the (60.5%; n = 494) respondent's mother completed *'Secondary/SSC/HSC'* level of education. The second highest (18%; n = 147) respondent's mother completed *'Graduation and post-graduation'* level of education. The rest of 14.8% (121) and 6.6% (54) respondent's mother had completed *'Primary'* level of education and *'No formal education'* respectively. As shown in Table 1.

4.1.6. Living place

Living place of the respondents were categorized into 'Family', 'Relatives', 'Mess' and 'Hostel'. The highest proportion (39.5%; n = 322) of the respondents were live with their *'parents or family'*. About 30.5% (249) respondents live in *'Hostel'*, 25.9% (211) live in *'Mess'* and rest of 4.2% (34) respondents live with their *'Relatives'* (Table 1).

4.1.7. Family history of chronic diseases

Family history of chronic diseases of the respondents was incorporated through multiple responses. Study found 31.9% (n = 260) respondent's family has history of *'Hypertension'*. About 30.8% (n = 251) respondent's family have history of *'Diabetes'*. Rest of 11.8% (n = 96), 2.3% (n = 19) and 10.8% (n =88) respondents have history of *'Heart diseases'*, *'Stroke'* and *'Others'* conditions respectively where 38.5% (n = 314) respondents reported that they don't have any history of any chronic diseases (Table 1).

4.2. Knowledge about Hypertension (HTN) of the respondents

Table 2: Frequency distribution of knowledge about the meaning of 'hypertension' of the respondents (N = 816).

Responses	Frequency *(n)*	Percentage *(%)*
Increase blood pressure	694	85
Others	58	7.1
Don't know	64	7.8
Total	**816**	**100**

Based on the questions 'please tell me in short: what do you mean by hypertension/high blood pressure?' study found about 85% (n = 694) respondents know the meaning of hypertension or high blood pressure. About 7.1% (n = 58) gave wrong answer and rest of 7.8% (n = 64) respondents said that they don't know the meaning of hypertension/high blood pressure (Table 2).

Table 3: Frequency distribution of knowledge about the normal blood pressure (BP) level of the body (N = 816).

Responses	Frequency *(n)*	Percentage *(%)*
120/80 or less	462	56.6
Others	112	13.7
Don't know	242	29.7
Total	**816**	**100**

Table 3 shows the respondent's knowledge about normal blood pressure level of the body. The correct answer of normal blood pressure level was considered as 120/80 mm of Hg or less [53] in this study. If someone is able to mention the two (systolic and diastolic) values exactly or more close to the reference value, only then the answer was considered as correct. Therefore study found about 56.6% (n = 462) respondents know the normal blood pressure level of the body. About 13.7% (n = 112) respondents gave other answers and rests of 29.7% (n = 242) respondents reported that they don't know the normal blood pressure level of the body.

Table 4: Frequency distribution of knowledge about high blood pressure (HBP) level of the body (N = 816).

Responses	Frequency *(n)*	Percentage *(%)*
140/90 or more	151	18.5
Others	367	45
Don't know	298	36.5
Total	**816**	**100**

Table 4 shows the knowledge about high blood pressure level of the body. In this study high blood pressure level was considered as 140/90 mm of Hg or more [53]. If someone is able to mention the two (systolic and diastolic) values exactly or more close to the reference value, only then the answer was considered as correct. Therefore study found that about 18.5% (n = 151) respondents know the high blood pressure level of the body. About 45% (n = 367) said other answers and rest of 36.5% (n = 298) answered that they don't even know the high blood pressure level of the body.

Table 5: Frequency distribution of knowledge about risk factors of hypertension (N = 816)

Responses	Frequency *(n)*	Percentage *(%)**
Ageing	46	5.6
Unhealthy diet	477	58.5
Smoking/SLT	220	27.0
Over weight/ Obesity	246	30.1
Tension/ Depression	494	60.5
Heredity	86	10.5
Extra salt intake	196	24.0
Inadequate Physical Activity	178	21.8
Don't know	74	9.1

**100% will not match as it is multiple responses question*

Table 5 shows the knowledge about risk factors of hypertension of the respondents. From multiple responses study found about 5.6% (n = 46) respondents answered that ageing is the risk factors for developing high blood pressure. About 58.5% (n = 477), 27% (n = 220), 30.1% (n = 246), 60.5% n = (494), 10.5% (n = 86), 24% (n = 196) and 21.8% (n = 178) answered that 'Unhealthy diet', 'Smoking or smokeless tobacco', 'Over weight', 'Stress/tension', 'Hereditary factor', 'Extra salt intake' and 'Inadequate Physical activity' are the possible causes to increase the risk of developing high blood pressure respectively.

Table 6: Frequency distribution of knowledge about symptom of hypertension (N = 816)

Responses	Frequency *(n)*	Percentage *(%)*
No	56	6.9
Yes	642	78.7
Don't know	118	14.5
Total	**816**	**100**

Table 6 shows that about 6.9% (n = 56) respondents know that hypertension/high blood pressure is asymptomatic (correct answer) when it develops. About 78.7% (n = 642) respondents reported that hypertension has symptoms and rest of 14.5% (n = 118) respondents don't know the answer.

Table 7: Knowledge about duration of hypertension (N = 816)

Responses	Frequency *(n)*	Percentage *(%)*
Lifelong disease	415	50.9
Few years	22	2.7
Others	64	7.8
Don't know	315	38.6
Total	**816**	**100**

Table 7 shows that about 50.9% (n = 415) respondents said hypertension/high blood pressure is a lifelong disease, where 2.7% (n = 22) respondents answered hypertension lasts for 'few years', about 7.8% (n = 64) answered others answers and rest of 38.6% (n = 315) answered that they don't know the duration of hypertension.

Table 8: Frequency distribution of knowledge about duration of taking hypertensive drugs (N = 816)

Responses	Frequency *(n)*	Percentage *(%)*
Lifelong	404	49.5
1 to 2 years	9	1.1
Others	70	8.6
Don't know	333	40.8
Total	**816**	**100**

Study found about 49.5% (n = 404) respondents know that drugs for hypertension/high blood pressure should be taken for life-long. About 1.1% (n = 9) answered 1 to 2 years, 8.6% (n = 70) replied others answer and rest of 40.8% (n = 333) reported that they don't know the answer (Table 8).

Table 9: Frequency distribution of knowledge about complications of hypertension (N = 816)

Responses	Frequency *(n)*	Percentage *(%)**
Heart attack	374	57.9
Stroke	441	68.4
Kidney diseases	62	9.6
Visual problem	31	4.8
Don't know	171	21.0

**100% will not match as it was multiple response question*

Table 9 shows that about 45.8% (n = 374) respondents answered that 'Heart Attack' is the complications of high blood pressure. About 54% (n = 441), 7.6% (n = 62) and 3.8% (n = 31) reported that 'Stroke', 'Kidney diseases' and 'Visual Problem' are the complications of high blood pressure respectively (from multiple responses).

Table 10: Frequency distribution of knowledge about prevention of hypertension (N = 816)

Responses	Frequency *(n)*	Percentage *(%)**
Avoid unhealthy diet	480	64.9
Avoid Smoking/SLT	215	29.1
Maintain body weight	213	28.8
Reduce stress/ tension	428	57.8
Regular Physical Activity	398	53.8
Reduce Extra salt intake	195	26.4
Don't know	76	9.3

**100% will not match as it was multiple response question*

Table 10 shows the knowledge about hypertension of the respondents from multiple responses**.** Study found about 58.8% (n = 480) answered that 'Avoid unhealthy and fatty food' is one of the preventative measures of hypertension. About 26.3% (n = 215), 26.1% (n = 213), 52.5% (n = 428), 48.8% (n = 398) and 23.9% (n = 195) respondents answered that 'Stop smoking/SLT', 'Reducing body weight', 'reducing tension and depression', 'regular physical activity' and 'reduce extra salt intake consumption' are the prevention of hypertension respectively.

Table 11: Knowledge about specific age for development of hypertension (N = 816)

Responses	Frequency *(n)*	Percentage *(%)*
False	576	70.6
True	196	24.0
Don't know	44	5.4
Total	**816**	**100**

Respondents were asked like 'hypertension/ high blood pressure does not develop among young people; the statement is True/False?' Study found about 70.6% (n = 576) respondents answered that hypertension/high blood pressure can develop in young people (correct answer). About 24% (n = 196) respondents answered that hypertension does not develop among young people and rest of 5.4% (n = 44) answered that they don't know (Table 11).

Table 12: Hypertension knowledge score of the respondents (N = 816)

HTN Knowledge level	Total Score	Mean	SD	Range
HTN Knowledge level	10	4.35	1.80	0 - 9

Study found the mean (± SD) of total knowledge about hypertension among the university undergraduate students was 4.35 out of 10 with standard deviation 1.80 and range from 0 to 9 marks as shown in Table 12.

4.3. Health belief about hypertension of the respondents

Table 13: Frequency distribution of 'Perceived susceptibility' about hypertension of the respondents (N = 816)

Perceived Susceptibility	SA		A		N		D		SD	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
I feel there is a chance that I will have HBP in future	114	14	513	62.9	111	13.6	59	7.2	19	2.3
At my age I probably will not develop HBP	67	8.2	256	31.4	123	15.1	316	38.7	54	6.6
I am worried about becoming affected from HBP	130	15.9	283	34.7	189	23.2	182	22.3	32	3.9
I am a healthy person, so I will not have HBP	49	6.0	123	15.1	161	19.7	398	48.8	85	10.4
HBP is a disease of aged people, so I should not worried about this now	21	2.6	63	7.7	62	7.6	477	58.5	193	23.7

SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree

In perceived susceptibility, majority of the participants (62.9%; n = 513) agreed and secondary majority (14%; n = 114) were strongly agreed that 'they feel, there is a chance that they will have high blood pressure/hypertension in future'. More than one third (38.7%; n = 316) reported that they were disagreed with the statement that 'at my age I probably will not develop HBP' however 31.4% (n = 256) reported that they were agreed with this statement. The highest proportion of respondents (34.7%; n = 283) reported that they were agreed and the second highest (23.2%; n = 189) respondents reported that they were neutral about the statement of 'I am worried about becoming affected from HBP'. About half (48.8%; n = 398) of the respondents were disagreed and about 19.7% (161) were neutral about statement that 'I am a healthy person, so I will not have HBP'. Finally more than half (58.5%; n = 477) of the respondents reported that they were disagreed and about 23.7% (n = 193) were strongly disagreed about the statement that 'HBP is a disease of aged people, so I should not worried about this now' (Table 13).

Table 14: Frequency distribution of 'Perceived severity' about hypertension of the respondents (N = 816)

Perceived Severity	SA		A		N		D		SD	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
I think that HBP is a life threatening disease	151	18.5	254	31.1	128	15.7	230	28.2	53	6.5
HBP is a simple Ageing problem	31	3.8	143	17.5	155	19.0	393	48.2	94	11.5
Having HBP could cause to have chronic disease	234	28.7	458	56.1	76	9.3	36	4.4	12	1.5
HBP is a fully curable disease	24	2.9	107	13.1	211	25.9	387	47.4	87	10.7
If I have HBP than my next generation may develop HBP	52	6.4	290	35.5	212	26.0	209	25.6	53	6.5

SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree

Regarding individual statement on perceived severity about 'HBP is a life threatening disease', 'HBP could cause to have chronic disease', 'If I have HBP, it can affect my next generation' the highest proportion of them [31.1% (n = 254), 56.1% (n = 458) and 35.5% (n = 290)] were agreed with the statement respectively. In case of statement 'HBP is a simple Ageing problem' and 'HBP is a fully curable disease' the highest proportion [48.2% (n = 393) and 47.4% (n = 387)] were disagreed with the statement respectively (Table 14).

Table 15: Frequency distribution of Perceived benefits about hypertension of the respondents (N = 816)

Perceived Benefits	SA		A		N		D		SD	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Taking regular drugs can cure HBP fully	30	3.7	197	24.1	221	27.1	328	40.2	40	4.9
HBP is a lifelong disease so there is nothing to do	19	2.3	103	12.6	91	11.2	470	57.6	133	16.3
HBP can be control through taking regular medication, healthy diet and physical activity	381	46.7	381	46.7	26	3.2	18	2.2	10	1.2
To control HBP need to stop smoking and take extra salt during meal	201	24.6	481	58.9	70	8.6	55	6.7	9	1.1
If I will take healthy diet and do physical activity than I can prevent HBP	252	30.9	491	60.2	43	5.3	24	2.9	6	0.7

SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree

Regarding individual questions on perceived benefits about 'Taking regular drugs can cure HBP fully' and 'HBP is a lifelong disease so there is nothing to do' the highest proportion of them [40.2% (n = 328) and 57.6% (n = 470)] were disagreed with the statement respectively. In case of statement 'HBP can be control through taking regular medication, healthy diet and physical activity', 'To control HBP need to stop smoking and take extra salt during meal' and 'If I will take healthy diet and do physical activity than I can prevent HBP' the highest proportion of them [46.7% (n = 381), 58.9% (n = 481) and 60.2% (n = 491)] were agreed with the statement respectively (Table 15).

Table 16: Frequency distribution of 'Perceived barriers' about hypertension of the respondents (N = 816)

Perceived Barriers	SA		A		N		D		SD	
	n	%	n	%	n	%	n	%	n	%
Taking regular drugs for HBP is a painful task	57	7.0	314	38.5	173	21.2	213	26.1	59	7.2
I have no enough time to do regular physical exercise for HBP	36	4.4	263	32.2	119	14.6	340	41.7	58	7.1
Healthy diet is costly, so I can't manage it	20	2.5	104	12.7	81	9.9	446	54.7	165	20.2
Avoiding fast food is a easy task for me	131	16.1	327	40.1	110	13.5	202	24.8	46	5.6
Avoiding extra salt intake is easy task for me	257	31.5	344	42.2	63	7.7	120	14.7	32	3.9

SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree

Regarding individual questions on perceived barriers about 'Taking regular drugs for HBP is a painful task', 'Avoiding fast food is a easy task for me' and 'Avoiding extra salt intake is easy task for me' the highest proportion of them [38.5% (n = 314), 40.1% (n = 327) and 42.2% (n = 344)] were agreed with the statement. In case of the statement 'I have no enough time to do regular physical exercise for HBP' and 'Healthy diet is costly, so I can't manage it' the highest proportion of them [41.7% (n = 340) and 54.7% (n = 446)] were reported that they were disagreed with the statement (Table 16).

Table 17: Summary table of Health belief score about hypertension of the respondents (N = 816)

Health belief Construct	Grand Mean	Standard Deviation
Perceived Susceptibility[1]	3.51	0.54
Perceived Severity[2]	3.48	0.51
Perceived Benefits[3]	3.89	0.46
Perceived Barriers[4]	3.40	0.58

[1]The higher the score, the greater the tendency to feel susceptible to hypertension
[2]The higher the score, the greater the tendency to feel seriousness to hypertension
[3]The higher the score, the greater the tendency to get benefits from health behavior of hypertension
[4]The lower the score, the higher the tendency to face barriers from health promotion activities of hypertension

According to Health Belief Model (HBM) health belief contains the combination of four perceptions: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. The grand total mean of every four categories are described below.

Perceived susceptibility measured participants of belief about personal susceptibility to hypertension/ high blood pressure and the higher the score, the greater the tendency to feel susceptible to hypertension. Grand mean score on the perceived susceptibility subscale was 3.51 with the standard deviation of 0.54. Considering mean of 2.5 as central mean, the participant's susceptibility to HTN was above the central mean. This indicates that majority of the participants feel themselves susceptible to hypertension (HTN)/ high blood pressure (HBP).

Perceived severity measured participant's belief about seriousness of developing hypertension/ high blood pressure. The higher the score the greater the tendency to perceive seriousness of hypertension. Study found the grand mean scores on the perceived severity subscale was 3.48 with the standard deviation of 0.51. Considering mean of 2.5 as central mean, the participant's severity to hypertension/high blood

pressure was above the central mean. This indicates that majority of the participants feel themselves seriousness to hypertension (HTN)/ high blood pressure (HBP).

Perceived benefit measured the participant's belief about the getting benefits of healthy behaviors in order to prevent HTN; the higher the score, the greater tendency to perceive benefits as good for preventing HTN. As shown in Table 18, overall grand mean score on the perceived benefit scale was 3.89 and the standard deviation was 0.46. Considering mean of 2.5 as central mean, the participant's severity to hypertension/high blood pressure was above the central mean. This indicates that majority of the participants feel themselves getting benefits from hypertension (HTN)/ high blood pressure (HBP) of healthy behaviors in order to prevent HTN.

Finally, perceived barriers measured participant's belief about the barriers towards health promoting behaviors preventing HTN; the lower the score, the higher the perceived barriers. Grand mean score on perceived barrier subscale was 3.40 and standard deviation was 0.58. Considering mean of 2.5 as central mean, the participant's perception of barrier to hypertension/high blood pressure in health promotion activities was above the central mean. This indicates that majority of the participants do not feel themselves getting barriers during health promotion activities of hypertension/ high blood pressure (Table 17).

4.4. Association between knowledge and health belief about hypertension of the respondents

Table 18: Association between knowledge and health belief about hypertension of the respondents (N = 816)

Health Belief constructs	Association with total HTN knowledge	
	Correlation coefficient *(r)*	*P* value
Perceived Susceptibility	0.098	0.005
Perceived Severity	0.246	0.000
Perceived Benefits	0.273	0.000
Perceived Barriers	0.030	0.396
Total Health Belief	**0.256**	**0.000**

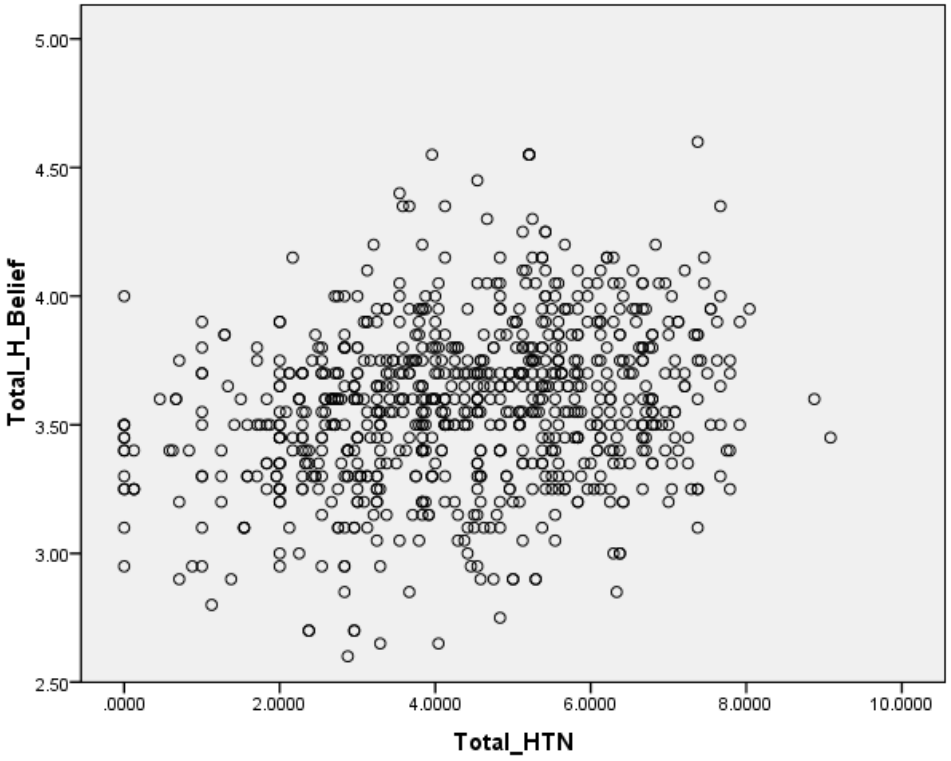


Figure 1: Association between knowledge and health belief about hypertension of the respondents (N = 816)

To assess the association between knowledge and health belief about hypertension of the respondents 'Pearson correlations' were done among total knowledge score, individual knowledge questions (meaning of HTN, normal blood pressure level, high blood pressure/ hypertension level, risk factors of HTN, symptoms of HTN, duration of HTN, duration of medication of HTN, complications of HTN, preventions of HTN, specific age for development of HTN), total Health Belief and four subscales of Health Belief Model (perceived susceptibility, perceived severity, perceived benefits, and perceived barriers) about Hypertension (HTN).

Study found very week positive statistically significant correlation (r = 0.256; p = 0.000) between total knowledge and total health belief of the respondents. Study also found very week positive statistically significant correlation between total knowledge about hypertension and every subscale of health belief [perceived susceptibility (r = 0.098; p = 0.005), perceived severity (r = 0.246; p = 0.000), perceived benefits (r = 0.273; p = 0.000) and perceived barriers (r = 0.030; p = 0.396)] as shown in Table 18 and Figure 2.

Study found week positive statistically significant correlation between total knowledge with each knowledge questions [Meaning of HTN (r = 0.49), Normal BP level (0.53), HBP level (0.47), Risk factors of HTN (0.57), Duration of HTN (0.09), Duration of Medication of HTN (0.64), Complication of HTN (0.59), Prevention of HTN (0.57) and Specific age for the development of HTN (0.42)]. However among the total health belief with each health belief constructs (susceptibility, severity, benefits and barriers) found strong positive statistically significant correlation with r = 0.57, 0.59, 0.63, 0.62 respectively (Table 19).

Table 19: Correlation between total knowledge, each knowledge questions, health belief constructs and total health belief about hypertension of the respondents (N = 816)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Total HTN Knowledge																
2. Meaning of HTN	0.49**															
3. Normal BP level	0.53**	0.20**														
4. High BP level	0.47**	0.12**	0.38**													
5. Risk factors of HTN	0.57**	0.27**	0.19**	0.18**												
6. Symptoms of HTN	0.09**	0.01	-0.03	0.07*	-0.07*											
7. Duration of HTN	0.64**	0.09**	0.09*	0.07*	0.27**	-0.04										
8. Duration of Medication	0.59**	0.08*	0.07*	0.05	0.17**	-0.02	0.76**									
9. Complication of HTN	0.54**	0.21**	0.22**	0.19**	0.46**	-0.05	0.28**	0.19**								
10. Prevention of HTN	0.57**	0.30*	0.20**	0.15**	0.82**	-0.08	0.24**	0.18**	0.46**							
11. Specific age for HTN	0.42**	0.29**	0.08*	0.09*	0.24**	-0.07	0.02	0.00	0.12**	0.23**						
12. HB of P. Susceptibility	0.09*	0.04	0.08*	0.08*	0.07	0.04	0.02	0.00	0.07	0.04	0.08*					
13. HB of P. Severity	0.25**	0.14**	0.11**	0.04	0.18**	0.01	0.19**	0.15**	0.15**	0.17**	0.11*	0.13**				
14. HB of P. Benefits	0.27**	0.16**	0.16**	0.12**	0.23**	0.03	0.13**	0.12**	0.15**	0.26**	0.12**	0.12**	0.25**			
15. HB of P. Barriers	0.03	0.05	0.03	0.05	-0.03	0.04	-0.04	-0.06	-0.02	-0.02	0.11**	0.09*	0.07*	0.24**		
16. Total Health Belief	0.26**	0.15**	0.15**	0.12**	0.18**	0.05**	0.11**	0.08**	0.14**	0.17**	0.17**	0.57**	0.59**	0.63**	0.62**	

** Correlation is significant at the 0.05 level (two tailed). ** Correlation is significant at the 0.01 level (two tailed).*

4.5. Relationship between hypertension knowledge and Socio-demographic characteristics of the respondents

Table 20: Relationship between level of knowledge about hypertension with socio-demographic characteristics of the respondents (N = 816)

Socio-demographic characteristics	Knowledge score		*P* value
	Mean	*SD*	
Gender*			
Male	4.06	1.81	**0.000**
Female	4.70	1.73	
Age**			
17 – 19 years	4.24	1.99	
20 – 22 years	4.23	1.77	**0.012**
23 – 25 years	4.64	1.68	
Education in year**			
1st year	3.94	1.92	
2nd year	4.19	1.79	**0.000**
3rd year	4.62	1.65	
4th year	4.57	1.74	
Educational Background**			
Science	4.89	1.65	
Business	4.13	1.74	**0.000**
Arts	3.93	1.85	
Living place**			
Family	4.71	1.63	
Relative's house	3.99	2.17	**0.000**
Mess	3.54	1.69	
Hostel	4.62	1.83	
History of HTN in Family**			
Yes	4.90	1.81	**0.000**
No	4.09	1.73	

** independent t- test; ** one way ANOVA test*

Table - 20 shows the bivariate analysis to find out the relationship between knowledge about hypertension and socio-demographic characteristics of the respondents. Study used independent t- test to determine the relationship between knowledge about hypertension and gender and found significant difference (p = 0.000) of knowledge about hypertension among male and female respondents. From one way ANOVA test study found knowledge about hypertension significantly differ with age (p = 0.012), educational level (p = 0.000), educational background (p = 0.000) and living place (p = 0.000) of the respondents. Finally, study found knowledge about hypertension significantly differ (p = 0.000) with history of having hypertension in family among the respondents.

4.6. Relationship between Health belief on hypertension and Socio-demographic characteristics of the respondents

Table 21: Relationship between Health belief on hypertension and Socio-demographic characteristics of the respondents (N = 816)

Socio-demographic Characteristics	Health Belief of HTN									
	Susceptibility		***Severity***		***Benefits***		***Barriers***		***Total HB***	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
Gender*										
Male	3.54	0.55	3.46	0.53	3.88	0.49	3.40	0.59	3.57	0.32
Female	3.48	0.54	3.50	0.49	3.90	0.42	3.39	0.56	3.57	0.30
t/p	***1.63/0.104***		***-1.17/0.241***		***-0.63/0.531***		***0.31/0.755***		***0.14/0.888***	
Age**										
17 – 19 Y	3.44	0.52	3.40	0.46	3.80	0.44	3.35	0.57	3.49	0.31
20 – 22 Y	3.49	0.54	3.48	0.53	3.91	0.46	3.41	0.60	3.57	0.32
23 – 25 Y	3.59	0.55	3.52	0.51	3.90	0.46	3.41	0.55	3.61	0.29
F/p	***4.58/0.011***		***2.46/0.086***		***3.09/0.046***		***0.53/0.588***		***5.55/0.004***	
E. in year**										
1st year	3.47	0.51	3.41	0.49	3.82	0.48	3.37	0.58	3.52	0.31
2nd year	3.55	0.54	3.51	0.55	3.89	0.45	3.41	0.62	3.59	0.35
3rd year	3.50	0.52	3.46	0.51	3.90	0.43	3.35	0.54	3.55	0.28
4th year	3.53	0.58	3.53	0.51	3.93	046	3.45	0.59	3.61	0.31
F/p	***0.81/0.487***		***2.32/0.074***		***2.74/0.042***		***1.26/0.289***		***3.96/0.008***	
E. Background										
Science	3.51	0.58	3.54	0.53	3.96	0.47	3.41	0.56	3.60	0.32
Business	3.50	0.54	3.44	0.48	3.87	0.39	3.38	0.59	3.55	0.39
Arts	3.52	0.50	3.46	0.51	3.82	0.48	3.39	0.59	3.55	0.32
F/p	***0.120/0.887***		***1.87/0.155***		***7.22/0.001***		***0.19/0.829***		***2.68/0.069***	
Living place**										
Family	3.48	0.58	3.52	0.53	3.89	0.45	3.42	0.57	3.58	0.31
Relative	3.52	0.37	3.44	0.53	3.85	0.36	3.36	0.54	3.54	0.27
Mess	3.55	0.54	3.37	0.51	3.88	0.49	3.34	0.60	3.54	0.33
Hostel	3.51	0.51	3.51	0.49	3.89	0.44	3.43	0.58	3.58	0.31
F/p	***0.76/0.515***		***4.12/0.007***		***0.12/0.950***		***1.21/0.307***		***1.11/0.343***	
Family History of HTN**										
Yes	3.59	0.51	3.51	0.51	3.91	0.46	3.40	0.54	3.60	0.29
No	3.47	0.56	3.46	0.52	3.88	0.46	3.40	0.59	3.55	0.32
t/p	***-2.79/0.005***		***-1.34/0.182***		***-0.78/0.439***		***-0.01/0.995***		***-2.04/0.042***	

** independent t- test; ** one way ANOVA test*

To assess the relationship between health belief on hypertension and gender of the respondents study use independent t- test and found no statistical significant differences ($t = 0.14$; $p = 0.0888$) of the respondents. One way ANOVA test was done to assess the relationship between total health belief and all health belief constructs with age, educational level, educational background, living place and family history of hypertension. Study found statistically significant differences ($F = 5.55$; $p = 0.004$) between total Health belief and age of the respondents. In educational level of the respondents, study found significant differences ($F = 3.96$; $p = 0.008$) with total Health belief on hypertension. In case of educational background ($F = 2.68$; $p = 0.069$) and living place ($F = 1.11$; $p = 0.343$) of the respondents no significant differences had found with the total Health belief on hypertension. From independent t-test found significant difference ($t = -2.04$; $p = 0.042$) between family history of hypertension and total health belief on hypertension of the respondents (Table 21).

CHAPTER V:
DISCUSSIONS

DISCUSSIONS

Demographic data of this study provided descriptive overview of the participants. Almost half of the respondents of this study were female and more than half of them were in age group 20 to 22 years old. The mean (± SD) age of the respondent was 21.42 (± 1.85). More than one third respondents were studying in 4th year and second most were studying in 1st year. In case of educational background, more than one third respondents were in science faculty and second most were in business faculty. Almost half of the respondent's father completed graduation/ masters level of education and more than half of the respondent's mother completed 'Secondary/SSC/HSC' level of education. Study also found that more than one third respondents live with their parents and second most respondents live in hostel. In case of having chronic diseases in family members, study found about one third respondents' family members (at least one) are suffering from 'hypertension' and the second most were from diabetes (Table 1).

The overall hypertension knowledge score was 4.35 (± 1.80) out of 10 and range from 0 to 9 which is lower than the central mean. Study found, the majority of the respondents know the meaning of hypertension. Study conducted among hypertensive population in Karachi, Pakistan and found about half of the hypertensive patient knows the meaning of hypertension [101]. However, study among young people especially university students have rarely found to match the findings. Study found more than half of the respondents know the normal blood pressure (BP) level of human body. However, only minor proportion knows the high blood pressure level of the body. So far there are no similar findings have found but one studies among hypertensive population showed that more than half of them know the normal and high blood pressure level [102,101,103].

In case of knowledge about risk factors of hypertension, more than half of the respondents reported that unhealthy diet and tension/depression were the risk factors of hypertension/ high blood pressure. About one third reported that overweight/ obesity was the risk factors of high blood pressure/ hypertension and minimal proportion said that smoking, extra salt intake, inadequate physical activity, heredity

and ageing were the risk factors of hypertension/ high blood pressure. However, one study identified some gaps in knowledge regarding both modifiable and non-modifiable risk factors of hypertension among fresh undergraduate medical students even [112]. A study related to knowledge about risk factors of cardiovascular diseases reveled that knowledge as well as positive attitude towards major risk factors of cardiovascular diseases among the adolescent students is unsatisfactory in Kathmandu [113].

More than two third respondents reported that hypertension/ high blood pressure has no specific symptoms. This is almost similar to the findings among hypertensive people in Pakistan [101]. About half of the respondents reported that hypertension/ high blood pressure is a lifelong disease and should take medication for life long [101,103]. In case of complication of hypertension/high blood pressure about half of the respondents reported that high blood pressure causes heart attack. But majority were don't know the other complications of hypertension [103]. In case of prevention of hypertension/ high blood pressure, about half of the respondents know that avoid unhealthy diet, reducing depression and regular physical activity are the prevention of hypertension/ high blood pressure but most of them don't know the other preventions of hypertension/ high blood pressure. Majority respondents reported that hypertension can causes even in young people. Study conducted about awareness on cardiovascular diseases among young students in developed countries and found that the overall knowledge and awareness of cardiovascular diseases was low among them [114,115]. Even, lack of awareness about CVDs and high prevalent of CVD risk behavior have found among first year medical students in India [116].

The grand mean of four components of health belief about hypertension/ high blood pressure were more than central mean value. That means majority respondents perceived about the four components of hypertension/ high blood pressure. As per literature review studies related to health belief on hypertension among young students have rarely found. However, findings from developed countries about health belief on CVD reported that young adults have moderate to low belief on hypertension. Vanhecke (2006) and Smalley (2004) showed that younger adults do not feel personally vulnerable to CVD [114,117]. Study by Cohen, Mansoor, Langut, & Lorber (2007) found that perceived severity was the significant contributor to health

related quality of life among adolescents with heart disease [118]. Mahlik (2011) and Folta et al. (2008) explained about the perceived barrier beliefs as significant contributors to the prevention of CVD [119,120].

Study found very week positive statistically significant correlation between knowledge and health belief about hypertension of the university students. This means that health belief did not have strong relationships with hypertension knowledge score. However, this finding is not consistent with the other partially related findings. Previous literature on HBM suggested that perceived susceptibility beliefs were good for preventive behaviors (121), while perceived benefits beliefs were good for sick role behaviors [90], however for this study it was found that relationship between health belief and hypertension knowledge scores were weak, which means knowledge is affected by variables other than health belief.

CHAPTER VI:
CONCLUSION

CONCLUSION

Findings of this study showed that the university students have insufficient knowledge about hypertension. Especially they have very limited knowledge about the complications and preventions of hypertension. Study found most of the respondents have good belief about hypertension but still now a considerable portion have lack of belief about hypertension. Study also revealed that knowledge and health belief of hypertension was weekly correlated. That means knowledge is affected by variables other than health belief. Therefore, it is necessary to explore the other factors influencing knowledge. As the hypertension is now becoming more prevalent in both developed and developing countries, therefore it is necessary to prevent hypertension through the modification of unhealthy behavior. Preventative measures should be taken at the beginning stage of life where high chance of the development of unhealthy behaviors through improvement of knowledge. Additionally focus should be taken about which factors are responsible for influencing behavioral factors other than health belief.

CHAPTER VII:
LIMITATION

LIMITATION

The following limitations are considered in this study:

- In this study the universities are selected purposively, therefore the samples are not representative to the all university students.
- Knowledge and health belief questions were not validate
- During interview some students may have class or some other tasks, therefore the answers may be under or over reported.

CHAPTER IX:
RECOMMENDATION

Dhaka University Institutional Repository

RECOMMENDATION

The following recommendation can carried out from the study as:

- To prevent hypertension need to change unhealthy behavior among the university students. Therefore need educational intervention program about hypertension in educational institutes.
- Further study should be done in large scale to test the association between knowledge and health belief about hypertension.

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Appendix: I

Questionnaire (English)

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Bangladesh Institute of Health Sciences (BIHS)
[An enterprise of Bangladesh Diabetic Somity (BADAS)]

Consent form

Welcome to you in a research work related to hypertension. My name is…….
I am a data collector of M.Phil researcher Md Rijwan Bhuiyan in Bangladesh Institute of Health Science.

In this research work you will be asked regarding personal and hypertension related questions. Your answer is very important for us. So answer all the questions very carefully and taking time. Please answer each question from your own knowledge.
Attending this research work you will not face any physical, mental and social risks.

All information provided by you will be treated as confidential (that means that your friends and your family will not learn about your answers) and in the event of any report or publication it will be ensured that source of information remains anonymous. The researchers assure you that your identity as well as the provided information will be kept confidential and will not be used unless the purpose of the particular study.
Your participation in this study is voluntary and you may withdraw yourself at any time during this study without any negative consequences. You also have the right not to answer a particular question that you don't like or do not want to answer during interview.

Having informed of all the objectives, risk factors and benefits I hereby give my consent to response.

. Name & Signature of the respondent : Date:

……

2. Name & Signature of the Researcher : Date:

……
(Md Rijwan Bhuiyan)

3. Name & Signature of the Data collector : Date:

……

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Section - A

(Socio-demographic Information)

Question	Coding category	Code No
1. How old are you?	_____Year	☐☐
2. Gender	0 = Male 1 = Female	☐
3. In which year are you studying?	1 = 1st 2 = 2nd 3 = 3rd 4 = 4th	☐
4. What is your study subject?	□ ……	
5. What is your father's level of education?	0 = Illiterate 1 = Able to sign name 2 = Primary 3 = Secondary/SSC/HSC 4 = Graduate/Masters	☐☐
6. What is your mother's level of education?	0 = Illiterate 1 = Able to sign name 2 = Primary 3 = Secondary/SSC/HSC 4 = Graduate/Masters	☐☐
7. With whom are you living	1 = With family 2 = Relatives 3 = Mess 4= Hostel	☐
8. What is your family income	□ …….. Tk	
9. Do you have any personal income?	0 = No 1 = Yes (……Tk)	☐

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10. Is there any family members in your family are suffering from any chronic diseases?	0 = None 1 = Hypertension 2 = Heart diseases 3 = Diabetes 4 = Stroke 5 = Others……	
11. How you pass your leisure time?	1 = Reading books 2 = Games in Computer 3 = Gossiping 4 = Playing 5 = Others	

Section – B

(Hypertension knowledge question)

Code	Question	Answer	Answer Code
B0	12. Have you ever heard the term Hypertension/ High blood pressure	0 = No 1 = Yes	
B1	13. Please tell me in one sentence: What do you mean by hypertension/high blood pressure?	1 = Increase blood pressure in the body 2 = Increase blood volume in the body 3 = Others……. 0 = Don't know	
B2	14. Please tell me, what is the normal blood pressure (BP) level of our body?	1 = 120/80 or less 2 = Others……. 0 = Don't know	
B3	15. Which blood pressure values are considered as high blood pressure value of the body?	1 = 140/90 or less 2 = Others……. 0 = Don't know	

B4	16. In which causes do you think increase the risk of developing high blood pressure? (Multiple response)	1 = Ageing 2 = Unhealthy diet 3 = Smoking/SLT 4 = Overweight 5 = Tension/depression 6 = Overweight 7 = Extra salt intake 8 = Others…….. 0 = Don't know			
B5	17. If someone develops hypertension, usually does he feel any symptom?	1 = No	2 = Yes	0 = Don't know	
B6	18. If someone develops hypertension, usually how long do you think it takes to cure fully?	1 = Whole life 2 = Several years 3 = 5 to 10 years 4 = Others 0 = Don't know			
B7	19. How long do you think hypertensive drug should be taken?	1 = Whole life 2 = 1 to 2 years 3 = 5 to 10 years 4 = Others 0 = Don't know			
B8	20. What types of complications do you think may develop due to neglecting hypertension? (Multiple response)	1 = Heart attack 2 = Stroke 3 = Kidney disease 4 = Visual problem 5 = Others 0 = Don't know			

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B9	21. What do you think; we should do for the prevention of hypertension/ high blood pressure? (Multiple response)	1 = Avoid fatty food 2 = Avoid smoking/SLT 3 = Reduce weight 4 = Reduce depression 5 = Do Physical Activity 6 = Avoid extra salt intake 7 = Others 0 = Don't know			☐
B10	22. Hypertension/ high blood pressure does not develop among young people. The statement is-	1 = True	2 = False	0 = Don't know	☐

Section - C

(Health Belief on Hypertension)

	Health Belief	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Perceived Susceptibility						
1	I feel there is a chance that I will have HBP in future					
2	At my age I probably will not develop HBP					
3	I am worried about becoming affected from HBP					
4	I am a healthy person, so I will not have HBP					
5	HBP is a disease of aged people, so I should not worried about this now					

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Perceived Severity						
6	I think that HBP is a life threatening disease					
7	HBP is a simple Ageing problem					
8	Having HBP could cause to have chronic disease					
9	HBP is a fully curable disease					
10	If I have HBP than my next generation may develop HBP If I have HBP than my next generation may develop HBP					
Perceived Benefits						
11	Taking regular drugs can cure HBP fully					
12	HBP is a lifelong disease so there is nothing to do					
13	HBP can be control through taking regular medication, healthy diet and physical activity					
14	To control HBP need to stop smoking and take extra salt during meal					
15	If I will take healthy diet and do physical activity than I can prevent HBP					

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Perceived Barrier						
16	Taking regular drugs for HBP is a painful task					
17	I have no enough time to do regular physical exercise for HBP					
18	Healthy diet is costly, so I can't manage it					
19	Avoiding fast food is an easy task for me					
20	Avoiding extra salt intake is easy task for me					

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Appendix: II

Questionnaire (Bangla)

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Bangladesh Institute of Health Sciences (BIHS)
[An enterprise of Bangladesh Diabetic Somity (BADAS)]

সম্মতি পত্র

উচ্চ রক্তচাপ সম্পর্কিত একটি গবেষনা কর্মে আপনাকে স্বাগতম। আমার নাম .....। আমি বাংলাদেশ ইনিষ্টিটিউট অফ হেলথ সায়েন্স এর এম ফিল গবেষক, **মোঃ রিজ্ওয়ান ভূইয়ার** গবেষনা কর্মের তথ্য গ্রহনকারী।

এই গবেষনা কর্মে আপনাকে কিছু **ব্যক্তিগত** এবং **উচ্চ রক্তচাপ সম্পর্কিত** প্রশ্ন করা হবে। আপনার উত্তরগুলো আমাদের কাছে খুবই গুরুত্তপূর্ণ। তাই প্রতিটি প্রশ্ন বুঝে সময় নিয়ে উত্তর দিবেন। প্রতিটি উত্তর আপনার ব্যক্তিগত ধারনা থেকে বলবেন।

এই গবেষনায় আংশগ্রহনে আপনার কোন শারিরীক, মানসিক কিংবা সামাজিক ঝুকির সম্ভাবনা নাই। আপনার প্রতিটি উত্তর গোপন রাখা হবে। আপনার পরিবার পরিজন ও বন্ধু বান্ধব আপনার উত্তর সম্পর্কে কিছুই জানবে না। এই গবেষনা কর্মে **আপনার অংশগ্রহন সম্পুর্ণ ঐচ্ছিক**। আপনি চাইলে যে কোন প্রশ্নের উত্তর নাও দিতে পারেন অথবা গবেষনা কর্মে অংশ গ্রহন নাও করতে পারেন। এই সম্মতিপত্রে স্বাক্ষর প্রদানের মাধ্যমে আপনি সম্মতি প্রদান করলেন যে, আপনি সেচ্ছায় এই গবেষণায় অংশগ্রহন করতে সম্মত আছেন।

সম্মতিঃ
আমি স্বেচ্ছায় একজন তথ্য প্রদানকারী হিসেবে আমার মতামত দিতে সম্মত আছি।

১। অংশগ্রহণকারীর নাম ও স্বাক্ষরঃ তারিখ ঃ

..... মোবাইল নাম্বারঃ

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'ক' বিভাগ

প্রশ্ন কোড	প্রশ্ন	কোড পদ্ধতি	কোড
A1	১। আপনার **বয়স** কত?	.....বছর	
A2	২। লিঙ্গ	১ = পুরুষ ২ = মহিলা	
A3	৩। আপনি এখন কোন **বর্ষে** পড়াশোনা করছেন?	১ = ১ম বর্ষ ২ = ২য় বর্ষ ৩ = ৩য় বর্ষ ৪ = ৪র্থ বর্ষ	
A4	৪। আপনার অধ্যয়নের **বিষয়**?	.....	
A5	৫। আপনার **বাবার** শিক্ষাগত যোগ্যতা কি?	০ = অক্ষর জ্ঞানহীন ১ = নাম লিখতে পারেন ২ = প্রাথমিক (৫ম শ্রেণী পর্যন্ত) ৩ = নিম্ন মাধ্যমিক/SSC/HSC ৪ = স্নাতক/ স্নাতকোত্তর (BA, MA)	
A6	৬। আপনার **মায়ের** শিক্ষাগত যোগ্যতা কি?	০ = অক্ষর জ্ঞানহীন ১ = নাম লিখতে পারেন ২ = প্রাথমিক (৫ম শ্রেণী পর্যন্ত) ৩ = মাধ্যমিক/SSC/HSC ৪ = স্নাতক/ স্নাতকোত্তর (BA,MA)	
A7	৭। আপনি বর্তমানে কার সাথে থাকেন/ **বসবাস** করেন?	১ = পরিবারের সাথে ২ = আত্মীয়ের বাসায় ৩ = মেসে থাকি ৪ = হোস্টেলে থাকি	
A8	৮। আপনার পরিবারের **মাসিক আয়** কত?	.....টাকা।	
A9	৯। আপনার কি কোন **ব্যক্তিগত আয়ের** উৎস আছে?	০ = না ১ = হ্যাঁ।(.....টাকা/মাস)	
A10	১০। আপনার পরিবারের কেউ কি কোন **জটিল রোগে** ভুগছেন? **(একাধিক উত্তর হতে পারে)**	০ = না, কেউ ভুগছেন না ১ = হাইপ্রেশার/ উচ্চ রক্তচাপ ২ = হার্টের সমস্যা ৩ = ডায়াবেটিস ৪ = স্ট্রোক/ প্যারলাইসিস ৫ = অন্যান্য.....	
A11	১১। আপনার **অবসর সময়** কিভাবে কাটে?	১ = বই পড়ে ২ = কম্পিউটার/গেমস খেলে/মুভি দেখে ৩ = আড্ডা/গল্প করে ৪ = খেলা ধুলা করে ৫ = অন্যান্য.....	

‘খ’ বিভাগ

প্রশ্ন কোড	প্রশ্ন	উত্তর	উত্তর কোড
B0	**১৪।** আপনি কি কখনো **হাইপ্রেশার/উচ্চ রক্তচাপ** কথাটি শুনেছেন?	**১ =** হ্যাঁ **০ =** না	
B1	**১৫।** এক কথায় বলুনতোঃ **হাইপ্রেশার**/ উচ্চ রক্তচাপ বলতে আপনি কি বোঝেন?	**১ =** শরীরে রক্তচাপের পরিমান বেড়ে যাওয়া **২ =** শরীরে রক্তের পরিমান বেড়ে যাওয়া **৩ =** অন্যান্য ..... **০ =** আমার ধারনা নেই	
B2	**১৬।** আপনি বলুনতোঃ আমাদের শরীরের **স্বাভাবিক** ব্লাডপ্রেশার/ রক্তচাপের পরিমান কত?	**১ =** **১২০ / ৮০** এর নিচে হলে **২ =** অন্যান্য ..... **০ =** আমি জানি না	
B3	**১৭।** শরীরের রক্তচাপের পরিমান কত হলে তাকে **হাইপ্রেশার**/উচ্চ রক্তচাপ হিসেবে গণ্য করা হয়?	**১ =** **১৪০ / ৯০** বা তার উপরে হলে **২ =** অন্যান্য ..... **০ =** আমি জানি না	
B4	**১৮।** কি কি কারনে হাইপ্রেশার/ উচ্চ রক্তচাপ হওয়ার **ঝুঁকি বাড়ে** বলে আপনি মনে করেন? **(একাধিক উত্তর হতে পারে)**	**১ =** বয়স বাড়ার সাথে সাথে **২ =** অতিরিক্ত তেল, চর্বি জাতীয় খাবার খেলে **৩ =** ধূমপান/ জর্দা/ সাদা পাতা খেলে **৪ =** শরীরের ওজন বাড়লে (স্থুলতা বৃদ্ধী) **৫ =** অতিরিক্ত মানসিক দুশ্চিন্তাগ্রস্থ থাকলে **৬ =** বংশগত কারনে (মা/বাবার থাকলে) **৭ =** নিয়মিত পাতে লবন খেলে **৮ =** অন্যান্য ..... **০ =** আমি জানি না	
B5	**১৯।** একজন সুস্থ্য মানুষের নতুন করে হাইপ্রেশার রোগটি হলে, সে কি কোন **লক্ষন** অনুভুত করে?	**১ =** না | **২ =** হ্যাঁ | **০ =** জানি না	
B6	**২০।** কারো হাইপ্রেশার/ উচ্চ রক্তচাপ এক বার ধরা পড়লে তা, সাধারনত তা **কত দিন পর্যন্ত স্থায়ী** হয় বলে আপনি মনে করেন?	**১ =** সারা জীবন **২ =** কয়েক বছর **৩ =** ৫ থেকে ১০ বছর **৪ =** অন্যান্য..... **০ =** আমি জানি না	
B7	**২১।** হাইপ্রেশার/ উচ্চ রক্তচাপের **ঔষধ কত দিনসেবন** করতে হয় বলে আপনি মনে করেন?	**১ =** সারা জীবন **২ =** ১ থেকে ২ বছর **৩ =** ৫ থেকে ১০ বছর **৪ =** অন্যান্য ..... **০ =** আমি জানি না	
B8	**২২।** হাইপ্রেশার/ উচ্চ রক্তচাপ কে অবহেলা করলে, কি কি ধরনের **শারিরীক জটিলতা/ অন্য রোগ** দেখা দিতে পারে বলে আপনি মনে করেন? **(একাধিক উত্তর হতে পারে)**	**১ =** হৃদ রোগ/ হার্ট এটাক **২ =** স্ট্রোক/ প্যারালাইসিস **৩ =** কিডনির সমস্যা **৪ =** দৃষ্টি শক্তির সমস্যা **৫ =** অন্যান্য ..... **০ =** আমি জানি না	

B9	**২৩।** হাইপ্রেশার/ উচ্চ রক্তচাপ **প্রতিরোধের** জন্য আমাদের কি কি করা উচিৎ বলে আপনি মনে করেন? **(একাধিক উত্তর হতে পারে)**	**১** = তেল,চর্বি জাতীয় খাবার থেকে বিরত থাকা **২** = ধূমপান/ জর্দা খাওয়া থেকে বিরত থাকা। **৩** = শরীরের ওজন নিয়ন্ত্রন করা **৪** = মানসিক দুশ্চিন্তা মুক্ত থাকা **৫** = নিয়মিত শরীর চর্চা/ ব্যয়াম করা **৬** = পাতে লবন খাওয়া থেকে বিরত থাকা **৭** = অন্যান্য ..... **০** = আমি জানি না			☐
B10	**২৪।** যুবক বয়সে উচ্চ রক্তচাপ হয় না। উক্তিটিঃ	**১** = সত্য	**২** = মিথ্যা	**০** = জানি না	☐

'গ' বিভাগ

নিম্নের **হাইপ্রেশার/উচ্চ রক্তচাপ** সম্পর্কিত উক্তি গুলো সম্পর্কে আপনার মতামত ***[গোল (O)]*** দিন। এখানে কোন **ভুল বা শুদ্ধ** উত্তর নেই। আপনার ব্যক্তিগত উপলব্ধি থেকেই উত্তর দিবেন।

	উক্তি	প্রবলভাবে সমর্থন করি	সমর্থন করি	নিরপেক্ষ অবস্থান	সমর্থন করি না	প্রবলভাবে সমর্থন করি না
		Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
C1	আমি মনে করি, **ভবিষ্যতে** জীবনের যে কোন সময় আমি উচ্চ রক্তচাপে আক্রান্ত হতে পারি।	☐	☐	☐	☐	☐
C2	আমি মনে করি, আমার **এই বয়সে** উচ্চ রক্তচাপে আক্রান্ত হওয়ার কোন সম্ভাবনা নাই।	☐	☐	☐	☐	☐
C3	উচ্চ রক্তচাপে আক্রান্ত হওয়ার বেপারে আমি এখন থেকেই **খুব সচেতন** থাকি।	☐	☐	☐	☐	☐
C4	আমি একজন **স্বুস্থ্য সবল** মানুষ, সুতরাং আমার উচ্চ রক্তচাপ হওয়ার সম্ভাবনা নেই।	☐	☐	☐	☐	☐
C5	উচ্চ রক্তচাপ একটি বড়দের সমস্যা, সুতরাং এ নিয়ে আমার এখন **চিন্তিত হবার** কোন কারন নেই।	☐	☐	☐	☐	☐
C6	উচ্চ রক্তচাপ একটি **মরনঘাতী রোগ।**	☐	☐	☐	☐	☐
C7	উচ্চ রক্তচাপ একটি **সাধারন বয়স জনিত** সমস্যা।	☐	☐	☐	☐	☐
C8	উচ্চ রক্তচাপের কারনে আমার **জটিল ধরনের** শারিরীক সমস্যা দেখা দিতে পারে।	☐	☐	☐	☐	☐
C9	উচ্চ রক্তচাপ রোগটি **সম্পূর্ণরূপে ভাল** হয়ে যায়।	☐	☐	☐	☐	☐
C10	একবার উচ্চ রক্তচাপ হলে, আমার পরবর্তী **বংশধররা** ও এই সমস্যায় ভুগতে পারে।	☐	☐	☐	☐	☐
C11	নিয়মিত **ঔষধ সেবন** করলে উচ্চ রক্তচাপ সম্পুর্নরূপে ভাল হয়ে যায়।	☐	☐	☐	☐	☐

C12	উচ্চ রক্তচাপ একটি সারাজীবনের রোগ, সুতরাং এই রোগ হলে বিশেষ কিছু করার নেই।	☐	☐	☐	☐	☐
C13	নিয়মিত ঔষধ সেবন, স্বাস্থ্যসম্মত খাবার গ্রহন এবং শারিরীক ব্যয়ামের মাধ্যমে উচ্চ রক্তচাপ কে নিয়ন্ত্রন করা যায়।	☐	☐	☐	☐	☐
C14	**ধূমপান ও পাতে লবন খাওয়া** বন্ধ করলে উচ্চ রক্তচাপ কে নিয়ন্ত্রন করা সম্ভব।	☐	☐	☐	☐	☐
C15	যদি আমি নিয়মিত স্বাস্থ্যসম্মত খাবার খাই এবং শারিরীক ব্যয়াম করি তাহলে আমি নিজেকে উচ্চ রক্ত চাপ থকে বিরত রাখতে পারব।	☐	☐	☐	☐	☐
C16	উচ্চ রক্তচাপের জন্য নিয়মিত ঔষধ সেবন খুবই **বিরক্তিকর কাজ**।	☐	☐	☐	☐	☐
C17	প্রতিদিন নিয়মিত শারিরীক ব্যয়াম করার মত সময় আমার হাতে নেই।	☐	☐	☐	☐	☐
C18	সুষম খাবার ব্যয়বহুল, সুতরাং তা আমার পক্ষে নিয়মিত খাওয়া সম্ভব না।	☐	☐	☐	☐	☐
C19	**কোলা/ফাস্ট ফুড** জাতীয় খাবার পরিহার করা আমার জন্য খুব সহজ।	☐	☐	☐	☐	☐
C20	পাতে লবন খাওয়া **পরিহার / বন্ধ** করা আমার পক্ষে খুব সহজ।	☐	☐	☐	☐	☐

Appendix: III

Health Belief Model (HBM)

Health Belief Model (HBM)

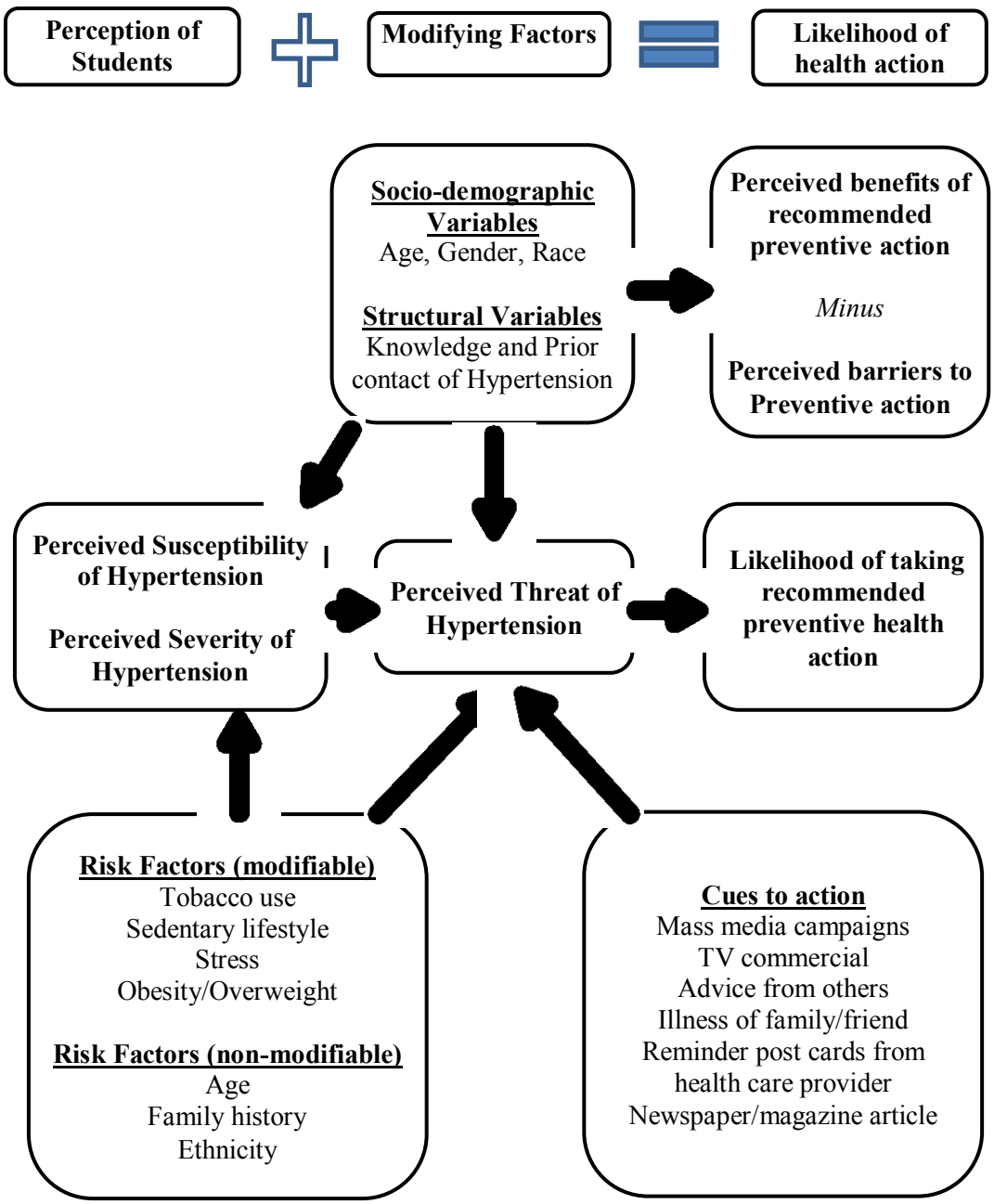

Figure: Health Belief Model [Adopted from Champion and Skinner (2008)]

Appendix: IV

Work schedule

Sl.No	Task	June, 2014	July-August, 2014	September, 2014	October, 2014	November, 2014	December, 2014 – February, 2015	March, 2015	April – May, 2015	June, 2015
01	Prepare and translate manuals, study materials, obtain approval									
02	Literature review									
03	Setting objectives, Develop questionnaire									
04	Recruitment of project personnel									
05	Training of data collector									
06	Pre-testing									
07	Sampling									
08	Data Collection									
09	Data cleaning, entry and analysis									
10	Report writing									
11	Submission of Thesis									*