PREVALENCE AND CORRELATES OF HYPERTENSION IN THE ELDERLY A COMMUNITY - BASED SURVEY IN URBAN BANGLADESH

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Dissertation submitted in partial fulfilment of the requirements for the award of the degree of Master of Public Health

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May 2000.

DECLARATION

I hereby certify that the work embodied in this dissertation entitled 'Prevalence and correlates of hypertension in the elderly: a community-based survey in urban Bangladesh' is the result of original research and has not been submitted for any degree in any other University or Institution.

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CERTIFICATE

Certified that this dissertation entitled 'Prevalence and correlates of hypertension in the elderly: a community-based survey in urban Bangladesh' is a record of bonafide original research work undertaken by Md. Iftekhar Quasem in partial fulfilment of the requirements for the Degree of Master of Public Health, under our guidance and supervision.

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CONTENTS

ABBREVIATIONS

BMI	Body Mass Index
BP	Blood Pressure
CAD	Coronary Artery Diseases
CHD	Coronary Heart Diseases
CI	Confidence Interval
CVD	Cerebrovascular Diseases
DBP	Diastolic Blood Pressure
DM	Diabetes Mellitus
HDL	High Density Lipoprotein
HTN	Hypertension
IHD	Ischemic Heart Diseases
ISH	Isolated systolic Hypertension
JNC	Joint National Committee
NHANES	National Health And Nutrition Examination Survey
OR	Odds Ratio
SBP	Systolic Blood Pressure
SD	Standard Deviation
SES	Socioeconomic status
SPSS	Statistical Software for Social Studies
WHO	World Health Organization
WHR	World Health Report

ABSTRACT

Objective:

To study the prevalence and correlates of hypertension (HTN) in the elderly population of urban Bangladesh. The prevalence of hypertension in the elderly was unknown. There are few prevalence studies on hypertension in Bangladesh but none of them studied specifically on elderly and most of them had methodological problems.

Design: Cross-sectional survey of subjects aged ≥ 60years, using a cluster sampling technique.

Setting: Municipal Corporation of Mymensingh district, Dhaka.

Participants: 240 individuals (107 F, 133 M), mean age 69±8.

Intervention: Measurement by physician and interview.

Main outcome measures: Prevalence of HTN (JNC VI/WHO criteria); awareness of, treatment for, and adequacy of control of HTN.

Results: The overall prevalence of HTN was 74.6% (95% CI 69.1-80.1), for male 72.2% (95%CI 69.3-75.1) and for female 77.6% (95% CI 74.9-80.2). Multiple logistic regression identified age group 75-79 years (OR= 4.15, 95%CI 1.16-14.8) and higher BMI (OR=3.35, 95% CI1.47-7.64) are directly related, and vigorous physical activity (OR=0.26,95% CI 0.07-0.93) and current smoking (OR=0.28, 95% CI 0.12-0.67) are inversely related to HTN. Further subgroup analysis was not possible due to inadequate sample size (sample size was calculated according to prevalence of hypertension). Among the hypertensives, 48.6% were aware, 38.5% treated for the condition, but only 4.5% were adequately controlled. 43.8% of the HTN subjects were unaware about their condition despite of having at least one physician visit in the previous year.

Conclusion: In our community-based urban sample of lean population, (mean BMI 20) around 75% of the elderly subjects were hypertensives. Awareness of HTN was low despite physician office visits and control of high blood pressure was uniformly poor. Our findings emphasize the need for community-based measured of increased awareness of HTN and in the general population, and to promote measurement of BP, and knowledge of current HTN guidelines among physicians of Bangladesh.

Chapter I

Introduction

1.1 Statement of the problem:

The Worlds demography has changed dramatically in the past century. With the increasing life expectancy, percentage of older people increases in age pyramid. The year 1999 is declared as year of elderly. Due to this demographic transition world is now facing problems related to aging specially the chronic disease.

Among the chronic diseases, cardiovascular diseases are responsible for around 20% of all deaths worldwide (approximately 14 million).[1] It is the principal cause of death in all developed countries, accounting for 50% of all deaths.[1] Cardiovascular diseases are also emerging as a prominent public health problem in developing countries, ranking third with approximately 16% of all deaths.[1] They have already become the first cause of death in developing countries such as Argentina, Chile, Cuba, Republic of Korea, Mauritius, Singapore, Sri Lanka, Trinidad and Tobago, and Uruguay.[1] The most common disease categories are hypertension, ischaemic heart disease and cerebrovascular disease. India is also experiencing high prevalence of morbidity of cardio- vascular disease like hypertension. India ranks fourth in terms of absolute number of elderly. Recently in 'Heart News' it has been stated that in India prevalence of hypertension is 40 percent in age group above 60 years.[2] Among the states of India southern states are mostly facing the chronic disease burdens. Kerala is one of them. Many studies have suggested that this state is having very high morbidity related to cardiovascular diseases specially hypertension among the elderly. Though Bangladesh is not in a comparative status, the country is heavily burdened with infectious diseases like, diarrhoea, acute respiratory tract infections, tuberculosis etc. But this country is also undergoing a development

process since its birth in 1971. Life expectancy at birth has increased from 47 to 59 years in past two decades.[3,4] Total proportion of aged population is now about 5.7%.[5] Mortality is declining very sharply. In 1997, according to Bangladesh Bureau of statistics, prevalence of morbidity among elderly was high, around 272 per 1000 population.[5] Studies related to chronic diseases are very few because most of the focus is on infectious diseases, which is a priority. But we do not know the magnitude of the problem of elderly hypertension. Some prevalence studies were conducted. They are not specific for elderly and they have some methodological problems. They found prevalence of hypertension ranging from 7.8 to 13.3 percent.

1.2 Justification of the study:

1. There are no specific studies on prevalence of hypertension among the elderly population.
2. 6 prevalence studies were done in Bangladesh. However, some methodological drawbacks exist in all of these studies. These are discussed below:

In all the studies, there was no mention of who had actually measured the blood pressure. Five of them did not mention any details about measurement readings that were taken. Three of the studies also did not mention how blood pressure was measured nor explain about which of the Korotkoff sounds were taken to detect systolic and diastolic blood pressure.

Two of the studies did not mention any sampling procedure and response rate of the participants.

With respect to analysis on influence of any associated factors, 3 of them had studied only age as an associated factor while one of them studied

age, BMI and glucose as associated factors. Two of the studies did not mention any at all.[6-11]

Most of the developed countries non-communicable diseases especially cardiovascular diseases consists most of the disease burden. In developed countries disease trend started changing form infectious diseases to chronic diseases. We do not know the magnitude of the problem of chronic disease like hypertension in Bangladesh. Since age is one of the important factor for hypertension and related cardiovascular disease, in this particular age group, like other countries, would have been higher prevalence of hypertension and other chronic diseases. On the other hand life expectancy of this country has been increased from 47 years to 59 years form its independence adding older people gradually into the age pyramid. So at this early stage of epidemiological transition we need to know the magnitude of problems to make our planners, health providers, and people aware about problem and to give base line information for planning health interventions.

1.3 Relevance of the problem to national or local health objectives:

Prevalence of hypertension in the elderly is not known. This study was limited to urban population and a similar study was done in same time in rural population, so both these studies could be complementary to each other and prevalence of hypertension both in urban and rural areas could be obtained. Since there is very limited study on prevalence of hypertension especially in elderly population, this study would give an overview of the problem as well as help to make decision regarding policy and future planning.

1.4 Fields of application of the proposed research results:

This study will contribute to the area of health policy and planning specially in terms of health care provision in the elderly through providing baseline information.

1.5 Objective of study:

Primary objective

To study the prevalence of hypertension among elderly rural people of Bangladesh

Secondary objective

- To study the relationship between hypertension and its important correlates.
- To study the health seeking pattern for hypertension.

1.6 Review of literature and other existing information:

Prevalence of hypertension

Bangladesh context: There are several studies done in Bangladesh to study prevalence of hypertension but none of them studied exclusively on elderly. A study was conducted in 5 rural villages of Bangladesh. [6] All the population above or equal to 15 years was taken in this study. Response rate was 75%. Who did BP measurement was not mentioned. Study defined hypertension as systolic and diastolic hypertension. The criteria for diastolic hypertension was a diastolic BP>90 mm of Hg and for systolic hypertension was a systolic BP> 140 mm of Hg. Age, BMI and Glucose level were studied as associated factor. They found overall systolic hypertension and diastolic hypertension was 10 percent 9 percent respectively. Both systolic and diastolic hypertension was lowest, 3.2 percent and 2.2 percent respectively, in age group 15 and highest in age group 50 and above years, 26.8% and 17.5% respectively. Study found significant correlation between age and blood pressure and BMI and blood pressure.

A study was conducted in secretariat population of Bangladesh [7]. Age group of the study was not well defined; range was 10 to 69 years. They defined hypertension as DBP

equal to or more than 90 mm of Hg. Over all prevalence according to their definition was 13.3 percent. They found high prevalence in age group 30-39 years, around 39 percent.

Another prevalence study was conducted in rural villages of Bangladesh.[8] 10 years and above age groups were included in the study. Hypertension was defined as DBP equal to or more than 90 mm of Hg. They found increased prevalence of hypertension with increased age; trend test was not done. Percentage of hypertension was lowest (1.77%) in the age group 10 to 19 years and highest (20.33%) in the 70+ age group of hypertension. 86.3 percent of the people were not aware of the problem.

Three other studies had been conducted but they did not define population and criteria for hypertension. [9-11]

One meta-analysis was done with all these prevalence studies. Three studies were not included due to lack of methodological information as mentioned earlier. Over all prevalence was found to be11.3 percent in above 15 years of age.[12]

Prevalence of hypertension, other country experience: A study was conducted to identify prevalence of hypertension in an elderly community based sample in Kerala, southern part of India.[13] This study examined prevalence of hypertension in urban, rural and coastal area by stratified multistage random sampling of elderly population. This study also examined the impact of selective social and demographic factor of elderly population on prevalence, awareness, treatment and control of hypertension. Overall prevalence of hypertension in elderly was found 51.8 percent. There was significant difference in prevalence in rural urban and coastal areas. Rate of hypertension was 45, 59 and 52 percent respective to rural, urban and coastal areas. Fewer than half of the

hypertensive subjects were aware about their condition and only a quarter of the treated hypertensive achieved adequate control of blood pressure.

A survey was done in Harlem to identify risk factors for cardiovascular disease.[14] They found that one third of the men and one third of the female was hypertensive. Prevalence of hypertension for the age group 45 to 64 was around 60 percent for men and 57.6 percent for women. However substantially lower percentage of specially men (12.1%) but also of women (22.4%) self reported hypertension in the survey.

Hypertension is extremely common in older Americans. Among Americans 60 years and older examined in the NHANES II, elevated blood pressure was found in 60 percent of non-Hispanic Whites, 71 percent of non-Hispanic African Americans, and 61 percent of Mexican Americans.[15] Especially among the older persons SBP is a better predictor of events (CHD, cardiovascular disease, heart failure, stroke, end-stage renal disease, and all cause mortality) than DBP.[16] Recently, it has become clear that an elevated pulse pressure (SBP-DBP), which indicates reduced vascular compliance in large arteries, may be an even better marker of increased cardiovascular risk than either SBP or DBP alone.[17]

BMI and Hypertension:

Obesity is a growing epidemic worldwide: According to Center for Disease control and prevention, Atlanta, USA 52 percent of American population is considered to be over weight or obese (body mass index is greater than 25). [18] The metabolic consequences of obesity were well documented.[19] Obese individuals are at risk of increased hypertension, hyperinsulinemia, hypercholesteolemia, hyperglycemia and type II diabetes. Excess body weight-body mass index of 27 or greater is correlated closely

with increased blood pressure. The deposition of excess fat in the upper part of the body (visceral or abdominal), as evidenced by waist circumference of 34 in (85 cm) or greater in women or 39 in (98cm) or greater in men, also has been associated with the risk of hypertension, dyslipidemia, diabetes, and CHD mortality.[20] Weight reduction, of as little as 4.5 kg (10lb), reduces blood pressure in a large proportion of overweight persons with hypertension.[21,22,23] In overweight patients with hypertension, weight reduction enhances the blood pressure lowering effect of concurrent anti hypertensive and can significantly reduce concomitant cardiovascular risk factors.[24]

Unlike the western countries, population of Bangladesh is lean. Study from rural population of China with a mean BMI 20.8 had suggested that, BMI was an important individual correlate for hypertension and other CVD risk factors even in the lean population.[25,26] Studies from Bangladesh also found BMI as an important correlate for hypertension.[6]

Alcohol intake and hypertension

Excessive alcohol intake is an important risk factor for high blood pressure,[27] can cause resistance to antihypertensive therapy,[28] and is a risk factor for stroke.[29] Limit of alcohol intake should not exceed more than 1 oz (30ml) of ethanol-e.g. 24 oz (750ml) of beer, 10 oz (300ml) of wine, or 2 oz (60ml) of 100-proof whisky. Because of women absorb more ethanol than men [30]and lighter-weight people are more susceptible than heavier people to the effects of alcohol, these group should restrict there intake to no more than 0.5 oz (15ml) of ethanol per day.[31] Such amounts do not raise blood pressure and have been associated with a lower risk for CHD. Significant hypertension may

develop during abrupt withdrawal from heavy alcohol consumption but recedes a few days after alcohol consumption is reduced.

Physical activity and hypertension

Regular aerobic physical activity, adequate to achieve moderate level of physical fitness, can enhance weight loss and functional status and reduce the risk for cardiovascular disease and all-cause mortality. [32, 33] When compared with their more active and fit peers, sedentary individuals with normal blood pressure have a 20% to 50% increased risk of developing hypertension. [34]

Blood pressure can be lowered with moderately intense physical activity (40%-60% of maximum oxygen consumption), such as 30 to 45 minutes of brisk walking most days of the week. [23] Most people can safely increase their level of physical activity without an extensive medical evaluation.

Dietary sodium and hypertension

Sodium in the form of sodium chloride or table salt is linked to levels of blood pressure. Individual response of blood pressure to variation intake differs widely; as groups. African Americans, older people, and patients with hypertension or diabetes are more sensitive to changes in dietary sodium chloride than are others in the general population. [35] Epidemiological data demonstrate a positive association between sodium intake and level of blood pressure. [36] Meta-analysis of clinical trials reveals that a reduction of sodium intake 75 to 100 mmol lowers blood pressure over periods of several weeks to few years.[37] These effects are greater for older persons and those with elevated blood pressure.[37,38] An analysis of 17 published RCTs involving patients 45 years or older with hypertension found an average decrease of 6.3/2 mm of Hg with a urinary

sodium reduction of 95 mmol/day. [38] Varieties of controlled and observational studies suggested that a diet with moderately reduced intake of sodium may be associated with other favorable effects on factors such as ability to reduce the need for antihypertensive medication, reduce diuretic induced potassium wastage, possibly regress LVH, and protect from osteoporosis and renal stones through reduction in urinary calcium excretion.[24, 39-44]

1.4.7. Tobacco use and hypertension:

Cigarette smoking is a powerful risk factor for cardiovascular disease, and avoidance of tobacco in any form is essential. A significant rise in blood pressure accompanies the smoking of each cigarette. Those who continue to smoke may not receive the full degree of protection against cardiovascular disease from antihypertensive therapy.[45] The cardiovascular benefit of discounting tobacco use can be seen within a year in all age groups.[46]

Education, socioeconomic status and hypertension

Some study showed education is inversely related to cardiovascular disease risk factors. As education increases risk of having cardiovascular risk factors decrease. In some population education was directly associated. Many studies did not find any association between material possession and risk for cardiovascular disease.[47-49]

Chapter II

Research Methodology

1.1 Research design:

The study is a cross-sectional descriptive study (prevalence study).

1.2 Selection of research setting:

Municipal Corporation of Mymensingh district (Sadar Thana) was selected because; firstly, investigator is familiar with this location. Secondly, Municipal Corporation of other 64 districts are more or less homogenous excepting 5 municipal corporation of metropolitan cities. Thirdly a study with same methodology was conducted at rural part of this district so that this two study can be complementary.

1.3 Study variables:

Both clinical and perceived prevalence of hypertension was measured and collected. Socio-demographic variables like age, sex, socioeconomic status and educational status were collected. Dietary habit, smoking, chewing and alcohol consumption was asked. Body Mass Index was calculated after measuring height and weight of the subject.

1.4 Sampling methods:

Sample size was calculated by using the formula $\frac{Z^2PQ}{\Delta^2} * d$.

Here,

Z= Confidence limit factor which is 1.96 for 95% confidence interval

P= Prevalence of hypertension, which was taken as 52% as reported in an elderly community based prevalence study done in Kerala, India.[13]

Q=1-P

Δ= Precision factor. (Difference between assumed prevalence and lowest expected prevalence). Here lowest expected prevalence was assumed 45 percent so Δ=.52-.45=.07.

d=design effect =1.2.

The formula we used $\frac{Z^2PQ * d}{\Delta^2}$ is for random sampling method.

For our study we used cluster sampling so in order to reduce the design effect 20% of the calculated sample was added to the sample size.

So, sample size = $\frac{1.96^2 * (.52 * .48)}{(.07)^2} * 1.2 = 235$

Sampling was done in of 30 clusters of 8 elderly (≥60years) individuals. So my sample size was 240. We used cluster sampling because of convenience and time and money constraints. List of elderly people was not available sometimes.

According to 1991 census (last) and District statistical office, Municipal Corporation of Mymensing districts is consists of 7 wards (the lowest administrative boundary) with a total population of 188713. Total male and female is 99806 and 88907 respectively. From each ward number of clusters were selected by dividing ward population by total population and multiplied with 30. According to proportion of total population number of cluster were selected from each ward are given below.

Table 1: Number of wards, population and clusters.

Ward	Total Population	Number of Clusters
1	32152	5
2	31517	5
3	25494	4
4	20167	3
5	18987	3
6	35695	6
7	24701	4
Total	188713	30

Each ward was divided into numbers of settlement areas named by the name of roads. Clusters are selected randomly from these settlement areas.

1.5 Survey design:

A Door to door survey was conducted. A physician did survey. In a settlement area from which end of the road survey would be started was selected randomly. First house on the left of the road near the first cigarette shop was selected as the first house of the cluster. If there was no elderly people in that house then opposite house was selected and then opposite of that house. Like this, the other houses were selected till 8 elderly subjects were interviewed from each cluster.

1.6 Survey instruments:

The physician administered a pre-tested questionnaire that sought information on the demographic characteristics, the socioeconomic status, and the medical history of the participant. Initially an idea about the study, its objectives and the importance of giving accurate answers were made very clear to the participants. Socio-demographic variable such as age, marital status, religion, education present and past occupation, day-to-day activity and a detail about the socioeconomic status were recorded for each participant.

Participants were enquired about their exact age. In many occasion participants could not tell their exact date of birth according to English calendar, so Bangale calendar was used to record their age. Sometimes important national and life events were used to calculate age for those who are not able to tell their birth date.

Numbers of years of formal school education was taken into consideration for educational status. Based on numbers of years of schooling the educational status was

divided into 4 subgroups: illiterate, 1-4 years of schooling, 5-10 years of schooling and 10 and above.

Housing was assessed based on following criteria.

Pucca: Roof, wall and floor were cemented.

Semi-pucca: Wall and floor were cemented. Roof was thatched or made of corrugated metal sheet.

Kutcha: Roof, wall and floor were not cemented.

Data was collected on monthly household expenditure, household type and assets like two wheeler, car, fridge, telephone, gas, computer etc. A subjective SES was done purely on observation on physical environment, assets. SES was classified into lower, middle and upper socioeconomic group.

Activity level was determined based on the current physical activity both occupational and household and personal by asking questions on day-to-day activities modified from CARDIA questionnaire.[50]

Details of dietary habit like vegetarian or non vegetarian and frequency of taking meat, fish and egg was collected through questionnaire. History of taking extra-salt was also collected. Extra salt meant whether the subject used to take added salt in addition to the salt used for cooking.

Frequency of smoking, chewing, and alcohol intake was collected. Quantity of alcohol intake and chewing was not obtained, because most of them are not branded or packed and participants were also felt difficulty in quantify.

Measurement of blood pressure, height and weight: This study was a part of a multi-center study. Four other similar studies with same questionnaire were conducted in India

and Bangladesh. All the instruments were standardized prior to the field survey. All five studies used same branded (Diamond) mercury column sphygmomanometer for blood pressure measurement. During the course of interview two measurements of blood pressure were taken from each subject. First measurement was taken after obtaining socio-demographic information and second measurement was taken after finishing all questions ensuring at least five minutes rest before measurement in a seated position. Blood pressure was measured on left hand if otherwise not indicate, in a seated position using an adult cuff with their hand bared and supported at heart level. It was made sure that the participants did not resort to smoking and or ingesting caffeine during the last 30 minutes. If they did BP was taken after 30 minutes. The cuff pressure was inflated 30 mm Hg above the levels at which redial pulses disappeared, then deflated slowly at the rate of 2mm/second and readings were recorded to the nearest 2 mm. The first and the fifth Korotkoff sounds were taken as indicative of the systolic and diastolic blood pressure respectively. Average of two blood pressures was taken as the blood pressure of the individual. If there was variation of 10 mm of Hg between two readings a third reading was taken after at least 5 minutes rest at seated position and average of three readings was taken as BP of that subject.[51, 52]

Weight of the participant was taken by a standardized bathroom scale. During measurement participant was barefooted and with wearing minimum cloths. Each time weight was measured; it was made sure that the pointer was at the zero mark.

Height was measured by a standardized graduated plumb line in centimeter against a straight wall. It was ensured that heel and hip of the subject was touching the straight line without bent knees and with eyes horizontally.

Definitions of hypertension:

The hypertension status of the participant was assessed by using standard criteria formulated by US Sixth Joint National Committee on Detection, Evaluation and Treatment of Hypertension (JNC-VI). [51] Hypertension was defined by as either systolic blood pressure (SBP)≥140 mm of Hg, and/or diastolic blood pressure (DBP) ≥90 mm of Hg and/or treatment with antihypertensive medication. This definition excludes hypertensives who have reduced their blood pressure to a normotensive range by non-pharmacological means.

A detail of medical history was asked. Reported morbidity on hypertension, diabetes, joint pain and renal disease was recorded. Investigation on blood cholesterol, blood glucose was recorded. Current treatment on hypertension, anti-cholesterol drugs was also recorded.

Definition of awareness treatment and control:

Awareness of hypertension was defined as the subject reporting a prior diagnosis of hypertension made by a health professional.[53] Treatment of hypertension was defined as current use of a prescription medication for lowering elevated blood pressure among hypertensive subjects in the sample.[53] Control of hypertension was defined as pharmacological treatment associated with SBP and DBP less than 140 and 90 mm of Hg respectively.[53] Control rates were calculated separately for all hypertensive subjects, and for the subgroup of hypertensives and being treated with antihypertensive medications, since awareness and treatment are prerequisites for the control of hypertension.

BMI was calculated dividing weight in Kg by height in meter squire.

After data collection from each house questionnaire was checked whether any entry was missing or not and finally at the end of every day all the questionnaires were checked again. Confusion or missing information was corrected at next morning before going to new cluster.

1.7 Data entry and analysis:

Data was entered in Microsoft Execel software. Data analysis was done in SPSS statistical software. Chi-square test was done for bivariate analysis and logistic regression was done for multivariate analysis.

Chapter III

Results

3.1 Sample characteristics: The sample population consisted of 240 subjects of age 60 years or more. Out of these 240 elderly individuals 133 (55.4%) are male and 107(44.6%) are female. Sex ratio of the study sample is 1:0.80 (M: F).

3.1.1 Age distribution: Figure 3.1.1 shows age distribution of the sample. The age ranges from 60-99 years. Mean age of the sample was 69±8 years. Median was 67 years. 37% of the subjects were in 60 to 64 years of age group.

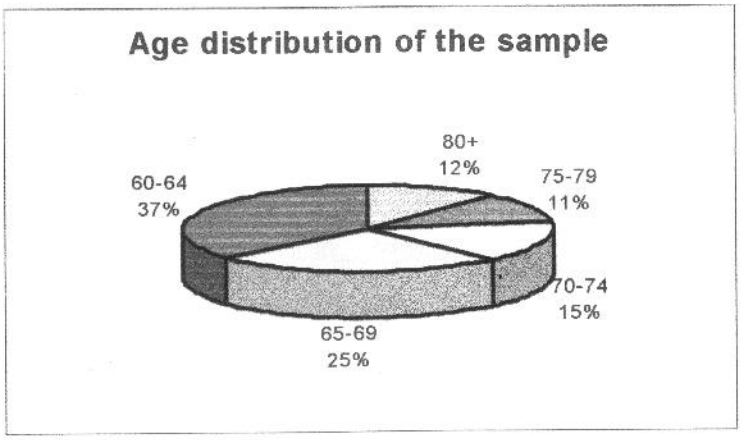

Figure 3.1.1: Age distribution of study sample

3.1.2 Religion: Table shows distribution of religion among the subjects.

Religion	Number	Percentage
Hindu	66	27.5
Muslim	169	70.4
Christian	5	2.1

Table 3.1.1Religion

Majority of the sample population were Muslim (70.4%), around 27.5 percent of the sample population was Hindu and rest of the population (2.1%) was Christian.

3.1.3 Education level: Table 1 shows the educational status of the study sample Around 65 percent of the population surveyed were literate.

Table 3.1.2: Education level of the sample

Years of schooling	Total n=240	Male n=133	Female n=107
0	83(34.6%)	24(18%)	59(55.1%)
1-4	20(8.3%)	7(5.3%)	13(12.1%)
5-10	92(38.3%)	58(43.6%)	34(31.8%)
11 and above	45(18.8%)	44(33.1%)	1(2.2%)

Male literacy was 82 percent while female literacy was only around 45%. Majority of females and males had between 5-10 years of schooling. Only18.8 percent of the sample had more than 10 years of schooling but there was a extensive gender gap.

3.1.4 Marital status: In this study sample majority were currently married.

Table 3.1.3: Marital status of the study sample.

Sex	Marital status		
	Married	Widow/ed	Never married
Male (n=133)	114(85.7%)	17(12.8%)	2(1.5%)
Female(n=107)	28(26.2%)	79(73.8%)	0(0%)
Total(n=240)	142(59.2%)	96(40%)	2(0.8%)

Proportions of widows were very high, (74 %), rather when compared to widowers which (13%). Never married constituted only 0.8 percent of the study sample.

3.1.5 Occupational status: Regarding current occupation of study sample, around 60 per cent of the total males were retired, and 35 per cent of females were retired. Around 40 percent of males had some sorts of activity and 59 percents of females had been doing household works.

3.1.6 Socioeconomic status (subjective), type of housing and per-capita expenditure:

Figure 31.2 shows socioeconomic status of sample.

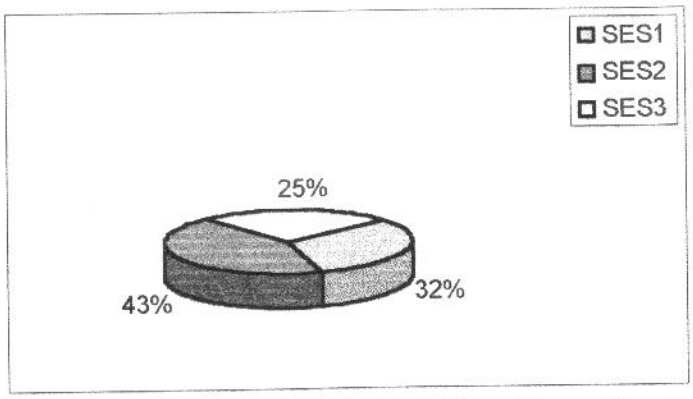

Figure 3.1.2 Socioeconomic status based on subjective assessment.

43% of subjects belonged to the middle class (43%). Poor and affluent class was around 25% and 32% respectively.

Type of housing:

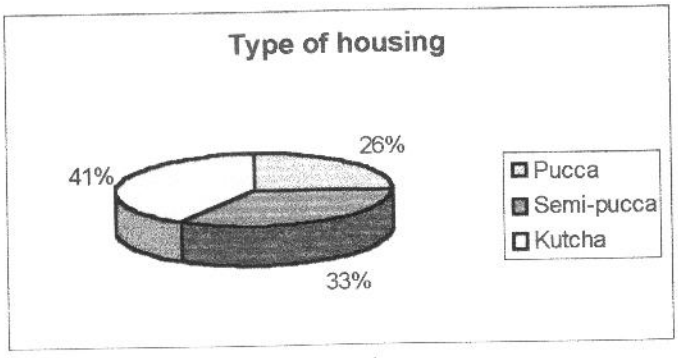

Figure 3.1.3: Type of housing

26% were of the individuals living in pucca house, 33% were living in semi-pucca house and 41% were living in kutcha house. Around 60 percent had a house of their own.

Per-capita expenditure: Average per-capita expenditure of the sample was 1107 Taka ($1=Tk 51). Median per-capita expenditure was 875 Taka. Per-capita expenditure was ranging from 60 Taka to 5000 Taka.

3.1.7 Dietary habit of the sample:

Table 3.1.4: Dietary habit of study population.

Dietary habit	Male n=133	Female n=107	Total n=240
Vegetarian	2(1.5%)	8(7.5%)	10(4.2%)
Egg	114(85.7%)	77(72%)	191(79.6%)
Fish	131(98.5%)	98(91.6%)	203(84.6%)
Meat	120(90.2%)	83(77%)	203(84.6%)
Extra salt	64(48.1%)	72(67.3%)	128(53.3%)

4.2 percent of the study populations were vegetarian and 80 percent of the vegetarians were females. Consumption of egg, fish and meat was less in females when compared with that of males but extra salt intake in a higher proportion was seen in females.

3.1.8 Life style habits of the sample: Table 3.1.5 shows distribution of tobacco and alcohol consumption. In this study population, 55 percent were non-smoker. 96 percent of the females and 28 percent of the males were non-smoker. 47 percent and 32 percent of the males were ex-smokers and current smokers respectively.

Table3.1.5: Smoking, Chewing and drinking habit of the population.

Life style habit	Male n=133	Female n=107	Total n=240
Tobacco smoking			
Non-smoker	28(21%)	103(96%)	131(55%)
Ex-smoker	63(47%)	2(2%)	65(27%)
Current-smoker	42(32%)	2(2%)	44(18%)
Tobacco chewing			
Non-chewer	47(35%)	24(34%)	71(30%)
Ex-chewer	21(16%)	11(10%)	32(13%)
Current-chewer	65(49%)	72(67%)	137(57%)
Drinking Alcohol			
No alcohol intake	227(94%)	0	227(94%)
Ex-alcohol intake	99(4%)	0	9(4%)
Current-alcohol intake	4(2%)	0	4(2%)

57 per cent of the total population had habit of chewing tobacco during time of study, out of which 66 percent were females and 49 percent were males. Around 30% of the total study population never had the habit of chewing tobacco.Only 2 percent of the total population gave the history of drinking alcohol. Around 94% were non- alcoholic.

3.1.9 Physical activity level of the study sample:

Around 80 percent of the total samples were sedentary, around 14% had moderate level of activity and around 6 percent were engaged in vigorous activity.

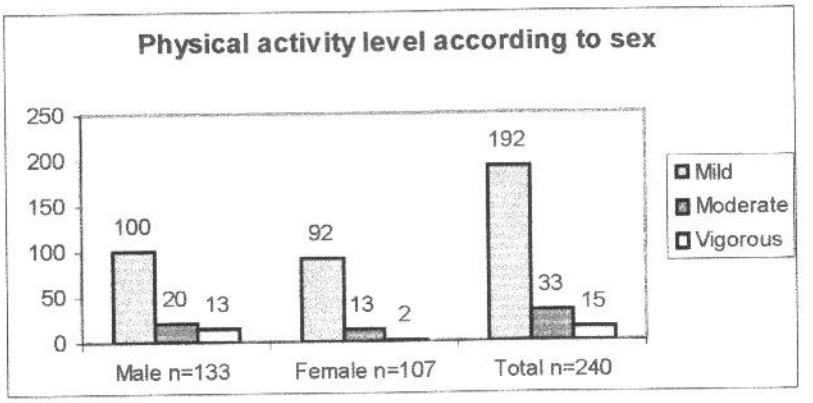

Figure 3.1.4: Distribution of physical activity according to sex.

Around 75 percent of the males and around 86 percent of the females were sedentary. 15 percent of the males and 12 percent of female were engaged in moderate level of activity. Only 10 percent of males and 2 percent of female had vigorous level of activity.

3.1.10 BMI distribution of the sample:

BMI group	Male n=133	Female n=107	Total n=240
Group I (BMI ≤ 24.99)	124 (93%)	94(88%)	218(91%)
Group II (BMI 25 to 29.99)	9(7%)	11(10%)	20(8%)
Group III (≥30)	0	2(2%)	2(1%)

Table 3.1.6: Distribution of BMI.

Standard classification was used for grouping BMI. BMI was less than or equal to 24.99 was around 91 per cent of the total study population. 8 percent had BMI ranging from 25 to 29.99.). And only 1 percent had BMI more than 30. Mean BMI of this study population was 20.07, median was 19.84 and range was 11. 34 to 35.63. BMI in the females ranged from 13.14 to 35.63 with a mean of 20.18 and median of 19.70. For males BMI ranged from 11.34 to 29.39 with a mean of 20.07 and median of 19.84.

In this study sample the mean BMI for smoker is less than that of the non-smoker and ex smoker. Table 3.1.7 shows mean and median BMI among current smokers, ex-smoker and non-smokers.

Table 3.1.7: Mean and median BMI smoking status.

Smoking status	BMI	
	Mean	Median
Non-smoker	20.216	19.779
Ex-smoker	20.737	20.821
Current smoker	18.662	17.970
	Among male	
Non-smoker	19.948	19.703
Ex-smoker	20.818	20.964
Current smoker	18.732	18.480

3.1.11 Selected perceived morbidity: Figure 3.1.5 shows the selected perceived morbidity of the study sample. Out of total sample 37.9 percent were known hypertensives, 13.3 percent reported as diabetes and 7.5% had experienced attack of stroke at least one occasion. 15.4 per cent of the population was suffering from joint pain, and 6.3 per cent was suffering from asthma. 7.1 per cent of the total populations were blind due to opacity of the lenses.

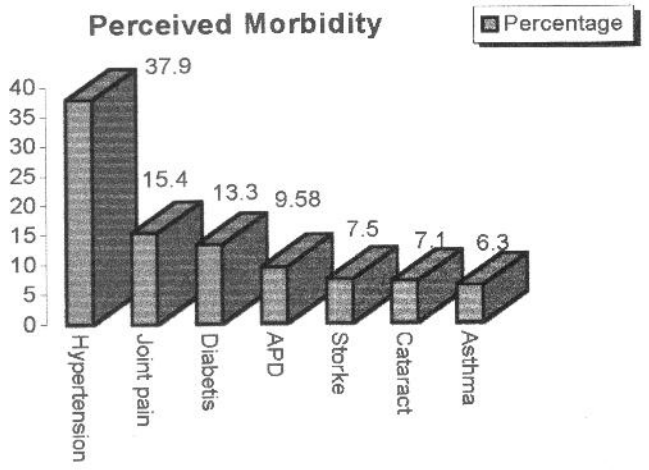

Figure 3.1.5: Selected perceived morbidity

3.2 Prevalence and correlates of hypertension:

3.2.1 Sex and prevalence of hypertension:

Over all prevalence of hypertension in this sample was 74.6 percent with 95% CI of 69.1 to 80.1.

Table3.2.1: Prevalence of hypertension according to gender.

	Male		Female		Total		P value
	n	%	n	%	n	%	0.34$^{\chi}$
HTN	96	72.2	83	77.6	179	74.6	
Total	133	55.4	107	44.6	240	100	

χ: Chi-square

Table 3.2.1 shows prevalence of hypertension according to gender. Among females prevalence of hypertension was 77.6 (95% CI 69.1-80.1) percent and among male it was 72.2 (95%CI 69.3-75.1) percent. Though female had higher prevalence compared to male but difference was not significant.

3.2.2 Prevalence of hypertension according to age:

Up to the age group 75-79, prevalence of hypertension was increasing as age increases then decreases again. Prevalence was highest (81.5%) in the age group 75-79 years and lowest (67.8%) in the age group 60-64 years. Prevalence was low (78.6%) in the age group 75-79 when compared to age group 80+ years age group.

Table 3.2.2: Prevalence of hypertension according to age:

Age group	Hypertension		OR(95%CI)	Chi-square	P value
	No	%			
60-64 (n=87)	59	67.8	1		
65-69 (n=61)	47	77	1.59 (0.71-3.66)	1.08	0.29
70-74 (n=37)	29	78.4	1.72 (0.66-4.91)	0.94	0.33
75-79 (n=27)	22	81.5	2.09 (0.67-7.75)	1.27	0.26
80+ (n=28)	22	78.6	1.74 (0.59-5.82)	0.72	0.39

Overall chi-square for 4 df was 3.49 and P value was 0.47.

While taking 60 to 64 years age group as a reference group there was no statistical significant difference between different age group.

3.2.3 Hypertension and educational status:

Table 7 shows percentage of hypertensive individual of the study sample in different education group. Lowest percentage of hypertension was observed in illiterate and highest percentage was observed in education group more than 10 years of schooling.

Table 3.2.3: Education and hypertension.

Education level	HTN		Non HTN		P value
	n	%	N	%	
Illiterate (n=83)	59	71.1	24	28.9	0.314^{χ}
Up to 4 years (n=20)	16	80	4	20	
5-10 years (n=92)	66	71.7	26	28.3	
Above 10 years(n=45)	38	84.4	7	15.6	
Total	179	74.6	61	25.4	

χ: Chi-square test value

There was no significant relation between education and hypertension. P value (Chi-square test) was 0.314.

3.2.4: Hypertension and socioeconomic status:

Table 3.2.4 shows prevalence of hypertension with socioeconomic status. As per subjective classification of SES prevalence of hypertension was highest (78.7%) among the affluent group and lowest (71.1%) in the poor group but there was no significant relation between SES and hypertension. Chi-square test value was 0.59.

Table3.2.4: Prevalence of hypertension according to socioeconomic status.

SES	HTN		Non HTN		P value
	n	%	N	%	
1	54	71.1	22	28.9	
2	77	74.8	26	25.2	0.59^{χ}
3	48	78.7	13	21.3	
Total	179	74.6	61	25.4	

χ: Chi-square test value.

3.2.5 Smoking and hypertension:

Table 3.2.5: Prevalence of hypertension among current, past and non-smokers.

	HTN n=179	No HTN n=61	% Of HTN	Odds ratio	P value
Non Smoker	106	25	80.9	1	
Past Smoker	49	16	75.4	0.72(0.34,1.59)	0.47
Current Smoker	24	20	54.5	0.28(0.13,0.63)	0.001
Chi-square trend test value (p): 0.00106					
Among males					
Non Smoker	25	3	89.3	1	
Past Smoker	48	15	76.2	0.38(0.7,1.56)	0.24
Current Smoker	23	19	54.8	0.15(0.02,0.2)	0.0053
Chi-square trend test value (p): 0.0012					

Prevalence of hypertension was high (80.9%) among non-smoker with respect to that of past smokers (75.4%) and current smokers (54.4%). Taking non-smoker as reference, odds for past smoker and current smoker were 0.72 (0.34,1.59) and 0.28 (0.13,0.63). Current smoking was protective, as odds ration did not touch 1. P value for linear trend test was 0.0012.

If we restrict the analysis only with male still non-smoker had significant higher percentage of hypertension compared to ex-smoker and current smoker. Current smoking was protective for males also. P value for chi-square leaner trend was 0.001

3.2.6 Tobacco chewing and hypertension:

Table 3.2.6: Prevalence of hypertension among chewer

	HTN n=179	No HTN n=61	% Of HTN
Non-chewer	52	19	73.2
Past-chewer	27	5	84.4
Current-chewer	100	37	73

P value: 0.392

Table 3.2.6 shows prevalence of hypertension among chewers, non-chewers and ex-chewer. Percentage of hypertension is much higher among the past-chewer in relation to other group. Out of 32 past-chewer 27 was found hypertensive (84.4%), other two group had similar percentage of hypertensive, around 73%. But this difference is not significant as p value was 0.392

3.2.7 Dietary habit and hypertension:

Table 3.2.7 shows dietary habit and hypertension. There was no statistical significant difference between different diet groups.

Table 3.2.7: Dietary habit and hypertension.

N=240	HTN	No HTN	% Of HTN	P value
Vegetarian	170	60	73.9	0.25
Non-vegetarian	9	1	90	
Extra salt: No	90	22	80.4	0.054
Extra salt: Yes	89	39	69.5	
Egg: No	39	10	79.6	0.36
Egg: Yes	140	51	73.3	
Meat: No	31	6	83.8	0.16
Meat: Yes	148	55	72.9	
Fish: No	10	1	90.9	0.20
Fish : Yes	169	60	73.8	

3.2.8 Hypertension and BMI:

Table 3.2.8: BMI and hypertension.

BMI Group	HTN n=179	HTN n=61	% of HTN	Odds ratio	P value
Group I (<18)	48	31	60.8	1	
Group II (18-21.39)	63	17	78.8	2.39(1.13,5.16)	0.021
Group III (>21.4)	68	13	84	3.38(1.52,7.75)	0.0019
P value for leaner trend was 0.0008					

BMI grouping was done according to percentiles. Group I was less than 33.33 percentiles, Group II was between 33.33 to 66.7 percentiles and Group III was more than 66.7 percentiles. Prevalence of hypertension in-group II and group III were significantly higher when compared to group I. Risk of being hypertensive was 2. 39 and 3.38 times higher in group II and III when compared to group I. P values were 0.021 and 0.0019 respectively for group II and III. P value for linear trend was also significant. (0.0008).

3.2.9 Smoking and BMI:

Table 3.2.9 smoking and BMI.

	Non smoker	Past smoker	Current smoker
BMI group I	**42(32.1)**	**17(26.2)**	**23(52.3)**
BMI group II	**48(36.6)**	**21(32.3)**	**10(22.7)**
BMI group III	**41(31.3)**	**27(34.2)**	**11(25)**

P value 0.04 (chi-square)

Table 3.2.9 shows relation of smoking and BMI. Out of 131 non-smoker 32.1 percent was in BMI group I that is BMI less than 18, 36. 6 percent was in BMI group II that is BMI within 18 to 21.39. And 31.3 percent was in BMI group III that is BMI more than 21.04. Out of 65 past smokers 26.2 percent was in BMI group I and 32.3 percent was in BMI group II and 34.2 percent was in BMI group III. Out of 44 current smoker 52.3 percent was in BMI group I, which was significantly higher in respect to non-smokers and past smokers. Current smokers had significantly lower BMI than the other groups. P value for Chi-square test was significant (0.04).

3.2.10 Physical activity and hypertension:

Table 3.2.10: Physical activity and hypertension.

	HTN n=179	No HTN n=61	% of HTN	Odds ratio	P value
Activity level I (Mild)	147	45	76.6	1	
Activity level II (Moderate)	27	6	81.8	1.38(0.51,4.33)	0.66
Activity level II (Vigorous)	5	10	33.3	0.15(0.04, 0.53)	0.0008

Prevalence of hypertension those who had mild physical activity was 76.6 percent. Those who had vigorous physical activity prevalence of hypertension were 33.3 per cent. Moderately active group had higher prevalence of hypertension among the groups (81.8%). If we took mild activity level as a reference, chance of being hypertensive wa 1.38 times higher in moderately active group but it was not significant since 95% CI for Odds ratio touching 1 and p value was not significant (0.66). While comparing mild active group with vigorously active group, vigorous activity group had less chance of being hypetensive. Odds ratio was 0.15 and 95% CI for odds was not touching 1. P value was highly significant (0.0008).

3.2.11 Diabetes and Hypertension:

Table 13: Prevalence of hypertension among diabetic people

Male	HTN	No HTN	Odds ratio	P value
No Diabetes	80(70.2)	34	1	
Diabetes	16(84.2)	3	2.27(0.59,12.85)	0.32
Female				
No diabetes	71(75.5)	23	1	
Diabetes	12(92.3)	1	3.89 (0.52,173.3)	0.2894 ϕ

ϕ Fisher's exact test

In this study population total diabetic subject was 32. Out of these 32 people 28(87.5%)were hypertensive. Out of 19 diabetic male 16(84.2%) were hypertensive and out of 13 diabetic female 12(93.3%) were hypertensive. Compared with non-diabetic, diabetic males had 2.27 times and diabetic female had 3.89 times higher chance of being hypertensive but in both cases 95% CI for odds touching 1 and P value was not significant.

3.2.12: Multivariate analysis:

The variables those were significant (P <0.05) in bivariate analysis and age group as clinically significant variable were taken into multivariate logistic regression analysis.

Table3.2.12 Results of multivariate logistic regressions.

Body Mass Index	Odds Ratio	95% CI	P value
BMI group I (BMI< 18)	1		
BMI group II (BMI 18-21.39)	2.74	1.24, 6.06	0.01
BM group III (BMI≥21.4)	3.35	1.47, 7.64	0.0034
Physical activity			
Mild Physical activity	1		
Moderate physical activity	1.61	0.59, 4.55	0.36
Vigorous physical activity	0.26	0.07, 0.93	0.033
Tobacco smoking			
Non-smoker	1		
Past smoker	0.49	0.21, 1.11	0.082
Current smoker	0.28	0.12, 0.67	0.0033
Age			
Age Group 60-64 years	1		
Age Group 65-69 years	1.92	0.81, 4.55	0.12
Age Group 70-74 years	2.67	0.92, 7.69	0.064
Age Group 75-79 years	4.15	1.16, 14.8	0.025
Age Group 80+ years	2.27	0.71, 7.23	0.15

After adjusting age, physical activity and smoking, taking BMI group I as reference, BMI group II and III had higher chance of being hypertensive. Odds ratios were 2.74 and 3.35 respectively for these two groups. In both the groups 95 percent CI did not touch 1.

P values were statistically significant. Adjusting for age BMI and physical activity, compared to non-smoker, past smoker and current smoker had less chance of being hypertensive. Odds ratio were 0.49 and 0.28 respectively for past smoker and current smoker. Adjusting for smoking age and BMI, compared to mild physical activity, vigorous active group had less chance of being hypertensive. Odds ratio was 0.26, 95% CI not touched 1 and p value was significant. Adjusted for BMI, sex and smoking, only age group 75-79 had significantly higher chance of being hypertensive compared to age group 60-64 years.

3.3 Health Seeking:

Out of total 240 individual, 171 (71%) visited health professional at least once in one year. Health seeking was predominantly in allopathic system, 85.4%. Out of 171 visits, in 147 (86%) occasions blood pressure was measured by health professionals. Out of 179 hypertensive individuals, 49(27.4%) individuals did not visit health professional for last one year. Out of 130 hypertensive people visited to health professional, BP was measured 114 occasions (87.7%). 86.9 percent of the visit was made in allopathic system.

3.3.1 Awareness, treatment and control of hypertension:

Total hypertensive individuals in the sample were 179. Out of which 91 (48.6) subjects were aware about the problem, 69(38.5%) subjects were on treatment and 8(4.5%) subjects were able to control high blood pressure, meaning able keep SBP and DBP less than 140 and 90 mm of Hg respectively.

Table 3.3.1: Awareness, treatment and control of hypertension.

	Hypertensive (n=179)			Treated hypertensive(n=69)	
HTN	Aware	Treated	Controlled	Controlled	Uncontrolled & Severe HTN
Total (n=179)	87(48.6)	69 (38.5)	8 (4.5)	8/69 (11.5)	22/69(32)
Male (n=96)	45 (46.9)	37 (38.5)	4 (4.2)	4/37(10.8)	10/37(27)
Female (n=83)	43 (50.6)	32 (38.5)	4 (4.8)	4/32(12.5)	12/32(37.5)
P value	0.73	0.87	0.88	0.85	0.35
Age group					
<70 years (n=106)	56(52.8)	44(41.5)	4(3.7)	4/44(9)	16/44((36.4)
70-79 years (n=51)	22(43.1)	17((33.3)	2(3.9)	2/17(11.8)	2/17(11.76)
>80 years (n=22)	9(40.9)	8(36.4)	2(9)	2/8(25)	4/8(50)
P value	0.19	0.43	0.85	0.55	0.35

Out of 96 male, 45(46.9%) were aware, 37(38.5%) were on treatment and 4(4.2%) were controlled. Out of total 83 hypertensive female 43 (50.6%) were aware about the problem, 32(38.5%) were on treatment and 2(4. 8%) were able to control. P values while comparing male to female were not significant.

Among 179 hypertensive subjects 106 subjects were in age group less than 70 years, 51 subjects were in age group 70 to 79 years of age and 22 subjects were in the age group more than 80 years of age. In the age group less than 70 years of age, 56(52.5%) subjects were aware about the problem, 44(41.5%) were on treatment and 4(3.7) were able to control BP. In the age group 70-79 years, 22(43.1) were aware, 17(33.3%) were on treatment and 2(3.9%) were able to control BP. In 80+ age group, 9(40.9%) were aware, 8(36.4%) were on treatment and 2(9%) able to control BP. There were no significant difference in awareness, treatment and control across the age group.

Out of the treated hypertensives only 11.5 percent were able to control blood pressure, out of the treated males 10.81percent were controlled and out of the females 12.5 percent

were controlled. 32 percent of the total treated hypertensives had sever and uncontrolled hypertension (SBP≥180 and or DBP≥110). 27 percent of the treated hypertensive males and 37.5 percent of the treated hypertensive females had uncontrolled severe hypertension. 36.36 percent in the age group of less than 70years of age, 11.76 percent in the age group of 70-79 years age and 50% in the age group of 80+ years of age had uncontrolled hypertension. There was no significant difference between sex and age in terms of control of hypertension and sever hypertension among treated persons.

Chapter IV

Discussion:

4.1 Prevalence of hypertension: The main objective of this study was to find out magnitude of the problems related to hypertension in the elderly. Overall prevalence of hypertension we found in this study was 74.6 percent with a 95 % CI of 69.1, 80.1. For male prevalence was 72.2% (95%CI 69.3-75.1) and for female 77.6% (95% CI 74.9-80.2). Prevalence of hypertension was high compared to developing countries [2,13] but similar findings were found in developed countries.[15, 54-56] In the developing countries prevalence ranged from 40 to 60 percent and in the developed countries prevalence ranged from 60 to 80 percent. Similar findings were also found on survey on elderly individuals in Europe[57] and South America.[58] Rate was somewhat higher than studies done at Kerala and other parts of India. Apart from the inherent difference of population, sampling method and survey design may contribute this geographic variation in prevalence.

4.2 Correlates of hypertension:

When analyzed alone, age was not significantly related to hypertension. But when adjusted for other variable like BMI, smoking and physical activity, 75-79 years of age group had higher prevalence of hypertension compared to 60-64 years of age. This finding was similar to study done at Kerala India.[13] Odds ratio was 4.15 with 95%CI 1.16 to 14.8, and p value was 0.025.

Unlike the other studies, there was no significant difference in prevalence of hypertension observed between sexes though the female sex had higher prevalence.

Some studies showed education inversely related and some times positively related to hypertension [47-49, 59] but in this study we did not find any significant relation between

education and rate of hypertension. In this study, as socioeconomic condition increased the prevalence of hypertension increased with improved SES but this was not significant. Some studies found inverse relationship between SES and blood pressure but most of them took educational status as marker for socioeconomic status.

There was not significant relation of hypertension between with extra salt intake, intake of egg, meat and fish etc. There was no association between hypertension and vegetarian diet. Sample size was very small to perform further analysis.

In both bivariate and multivariate analysis tobacco smoking was significantly related to hypertension in a very unusual way. When compared with non-smokers, past smokers and current smokers had less chance of being hypertensive. After adjusting for smoking, BMI, and age, odds of past smokers and current smoker were 0.49 and 0.28 respectively. P value was highly significant (0.0033) for current smokers but not significant for past smokers. Probably this may be due to relation between BMI and smoking. Those who were smokers tend to have less BMI. P value was significant, 0.04. Population was very lean and the difference of BMI between 33rd and 66th percentile was not much. Subgroup analysis was not done due to the small sample size. So it was not possible to make causal inference in this study and at the same time Cross-sectional study design has its own demerits of making causal inference.

Like the other studies else where, BMI in this study was directly related to prevalence of hypertension.[18-26] BMI was grouped according to 33.33 rd and 66.7th percentiles. Compared to the group who had BMI less than 18, other two groups (BMI between 18-21.39 and BMI more than 21.4) had significantly higher prevalence of hypertension. Odds of being hypertensive of these two groups were 2.39 (1.13, 5.16) and

3.38 (1.52,7.75). P value for linear trend was 0.0008. In final model analysis BMI was also directly related to hypertension after adjusting for age, smoking and physical activity. Taking group I as reference(BMI less than 18), odds ratio of group II (BMI between18-21.39) and group III (BMI ≥ 21.4) were 2.74 (1.24,6.06) and 3.35(1.47,7.64) respectively. P values were significant for both the groups (0.01 and 0.0033 respectively) but for group III it was highly significant.

Those who were moderate active had higher prevalence of hypertension than those with mild activity but this difference was not significant. There was significant difference between vigorous active and mild active group. Chance of being hypertensive was less in vigorous active group compared to mild active group. Odds for vigorous active group was 0.15 with 95% CI of 0.04 to 0.53. P value was highly significant (P=0.0008). This finding was also found in regression analysis. After adjusting for age, smoking and BMI vigorously active groups had less chance of having hypertension. Odds ratio was 0.26 with 95% CI of 0.07 to 0.93 and P value of 0.033. This finding was very similar to the other studies [32-34] but in this study sample size was very less for vigorous group to make conclusion.

4.3. Awareness and treatment and control:

Though 71% of the total samples visited at least once to health professional within a year, awareness about hypertension was only around 49 percent. Only 38.5 percent had been treated out of the total hypertensive individuals and only very few (4.5%) had achieved adequate control over their high blood pressure. Among the treated hypertensive(38.5%) individuals only 11.5 percent had achieved adequate control over their hypertension and

32 percent had uncontrolled severe hypertension. Regarding awareness, treatment and control, there is no significant difference between sexes and across age groups.

4.4 Conclusion: Overall prevalence of hypertension was 74.6 percent, which was very high compared to the findings of other developing countries. There were no significant sex differentiation though higher percentage of females (77.6%) were hypertensive than males (72.2)

1. Significant positive correlation was found between BMI and hypertension. There were significant inverse relationship was found with vigorous activity and hypertension. Unusual relation was found with smoking and hypertension. With hypertension. Smokers had less chance of being hypertensive. As this study design was cross-sectional and sample size was calculated according to the prevalence of hypertension, it is very difficult to remark on these findings.
2. Awareness about hypertension was very poor in this study population. Only 49 percent of the hypertensive individuals were aware about the problem, 38.5 percent were treated and only 4percent of them had achieved adequate control over hypertension. Among the treated group only 11 percent achieved adequate control of their high blood pressure and a major portion (32%) had uncontrolled severe hypertension.

4.5 Limitations: Study design had some inherent limitations, it is not possible to say concretely about causal association but our prime objective was to highlight the magnitude of the problem that was fairly done by this study design. Sampling was not representative for the country but representative for this urban area, which can represent

other 64 districts excepting the metropolitan municipalities. Sex ratio of the sample was 0.80 which corresponds to the sex ratio of Bangladesh as well. In Bangladesh in this age group male outlived females. Survey was conducted during winter season. So BMI may give an upper estimate. It was not possible for the study to measure blood pressure in three occasions and three reading per occasion due to time constraints. Most of the people were unable to state exact age or date of birth. Approximate age was calculated by comparing the historical events and life events (i.e. India Pakistan partition, marriage child birth, menopause), was one of the major limitations of this study.

4.6 Policy implications:

Burden of hypertension in this age group was quite high but only around 49 percent of the total hypertensives were detected in spite of 71% physician visit. Among the treated individuals only around 11 percent achieved adequate control over high blood pressure. Percentage of uncontrolled severe hypertension was very high (32%). This may be one of the reasons for very high-perceived prevalence of stroke in this population (7.5%). So we need to increase the awareness the of the general population and service providers as well. In primary health care setting of both private and public system passive screening should be mandatory at least. Standard protocols should be made available for promotion of measurement of BP and treatment of hypertension among the physicians.

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APPENDIX – 1

QUESTIONNAIRE

Achutha Menon Centre for Health Science Studies,
Sree Chitra Tirunal Institute For Medical Sciences &Technology, Thiruvananthapuram. Study on **"Prevalence and Correlates Of Hypertension"**, conducted by ***Md. Iftekhar Quasem***, MPH Scholar.

Code No: Date: Cluster No:
Ward No: Ward Name:
Name: Age: Sex:
Address:

1. Total household size:

2. Information on SES
   a) What is your (household) expenditure in the last month? Rs:
   b) Type of the house: Kucha / Semi-pucca / Pucca
   c) Assets: Bike/Car/TV/A.C/ Fridge/VCR/Phone/Computer/Wash machine/Gas/Stove

3. Religion: Hindu / Christian / Muslim / Others (specify)

4. Marital status: Married / Divorced / Widowed / Never Married

5. Occupation:
   a) Current: Duration:
   b) Past: Duration:

6. Education:

7. Past Medical History:
   a) Did you had any major illness: Yes / No
   b) Which major illness: DM/ HTN / ASTH / REND / Others (specify)
   c) Did you visit a doctor in the last one-year? Yes / No
   d) If yes, the doctor you visited belong to which system of medicine: Allopathic / Ayurveda / Homeopathy / Naturopathy / Siddha / Others (specify)
   d) If you had visited, did the doctor measure your blood pressure? Yes / No
   e) Are you on any pills for lowering blood cholesterol? Yes / No
   f) Did you undergo a blood test for identifying DM? Yes / No
   g) Did you undergo a blood test for identifying or Cholesterol status? Yes / No
   h) Have you been told to have heart failure by a doctor? Yes / No

8. Hypertension:
   a) Do you have hypertension? Yes / No
   b) Are you currently on treatment for hypertension? Yes / No
   c) System of medicine used for treatment for hypertension:
      Allopathic / Ayurveda / Homeopathy / Naturopathy / Others (specify)
   d) Currently used anti-hypertensive allopathic drugs:
      Duration:

9. Dietary habit:
   a) Vegetarian / Egg / fish / meat
   b) Frequency: Egg: /1 /7 /30
      Fish: /1 /7 /30
      Meat: /1 /7 /30
   c) Use of extra salt: Yes / No

10. Smoking:
   a) Do you smoke? Yes / No
   b) If yes, since how long?
   c) Type: Cigarette / Beedi / Others (specify)
   d) Frequency: Cigarette: /1 /7 /30
      Beedi /1 /7 /30
      Others /1 /7 /30
   e) If No: Did you ever smoke? Yes / No
   f) If yes: How long did you smoke?
   g) Type: Cigarette / Beedi / Others (specify)
   h) Frequency: /1, /7, /30
   i) Reason For Quitting:
   j) Duration of quitting?

11. Chewing:
   a) Do you chew tobacco? Yes / No
   b) If yes, since how long?
   c) Type: Khaini / Betel quid /Panmasala / Others
   d) Frequency: /1, /7, /30
   e) If No: Did you ever chew? Yes / No
   f) If yes: How long did you chew?
   g) Type: Khaini / Betel quid / Panmasala / Others
   h) Frequency: /1, /7, /30
   i) Reason for quitting?
   j) Duration of quitting?

12. Alcohol
    a) Do you drink alcohol? Yes / No
    b) If yes, since how long?
    c) Brand: Whisky / Brandy / Rum / Gin / Vodka / Toddy / Arrack / Others
    d) Frequency: /1, /7, /30
    e) If No: Did you ever drink alcohol? Yes / No
    f) If yes: How long did you drink?
    g) Brand: Whisky / Brandy / Rum / Gin / Vodka / Toddy / Arrack / Others
    h) Frequency: /1, /7, /30
    i) Reason for quitting?
    j) Duration of quitting?

13. Physical activity: Vigorous / Moderate / Light

14. Any other relevant information:

Measurements

Body Weight (Kg):

Height (cm):

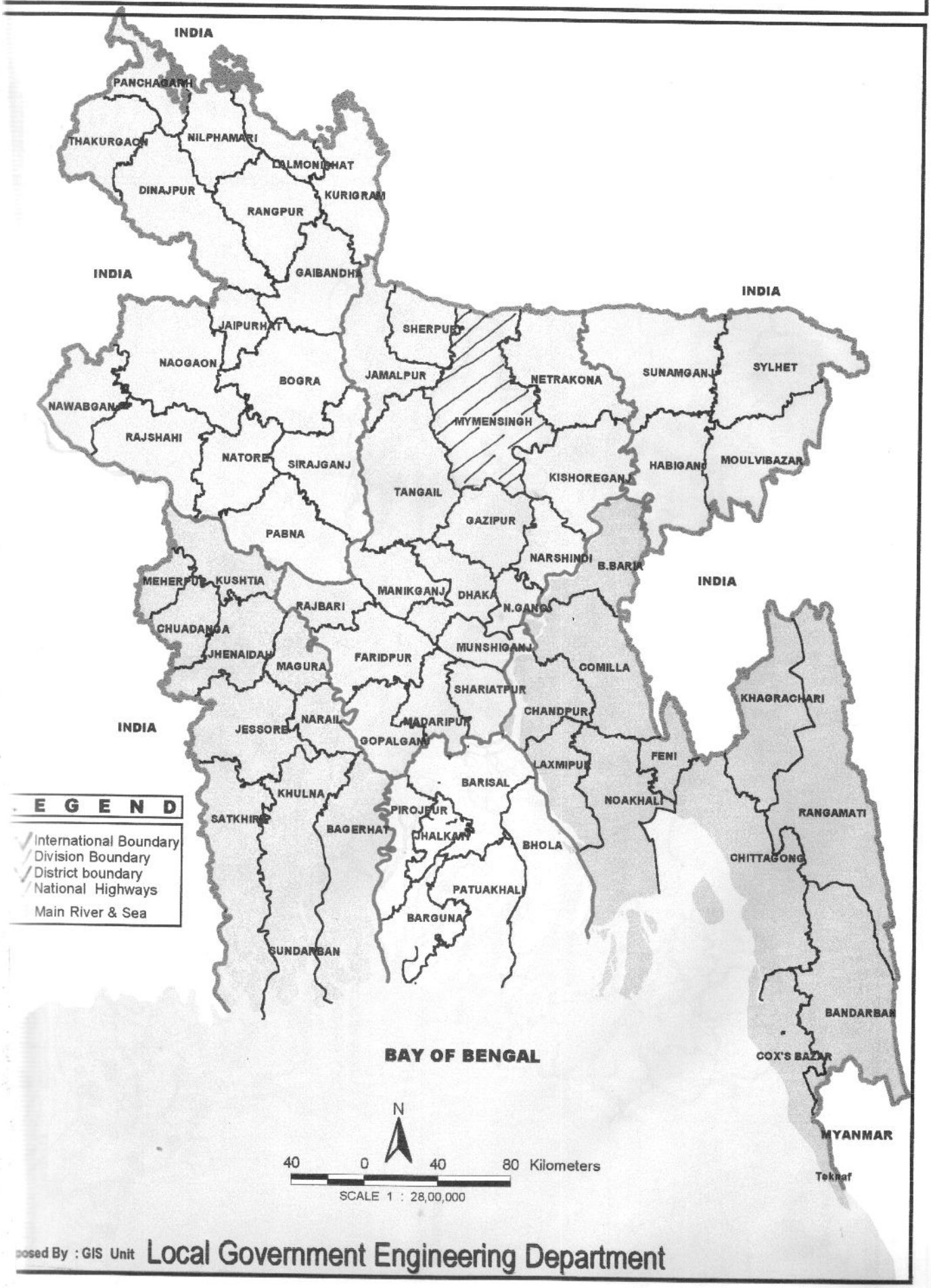
Blood Pressure (mm of Hg):

Blood Pressure	SBP (mm of Hg)	DBP (mm of Hg)	Arm used
1st Measurement			
2nd Measurement			
3rd Measurement			

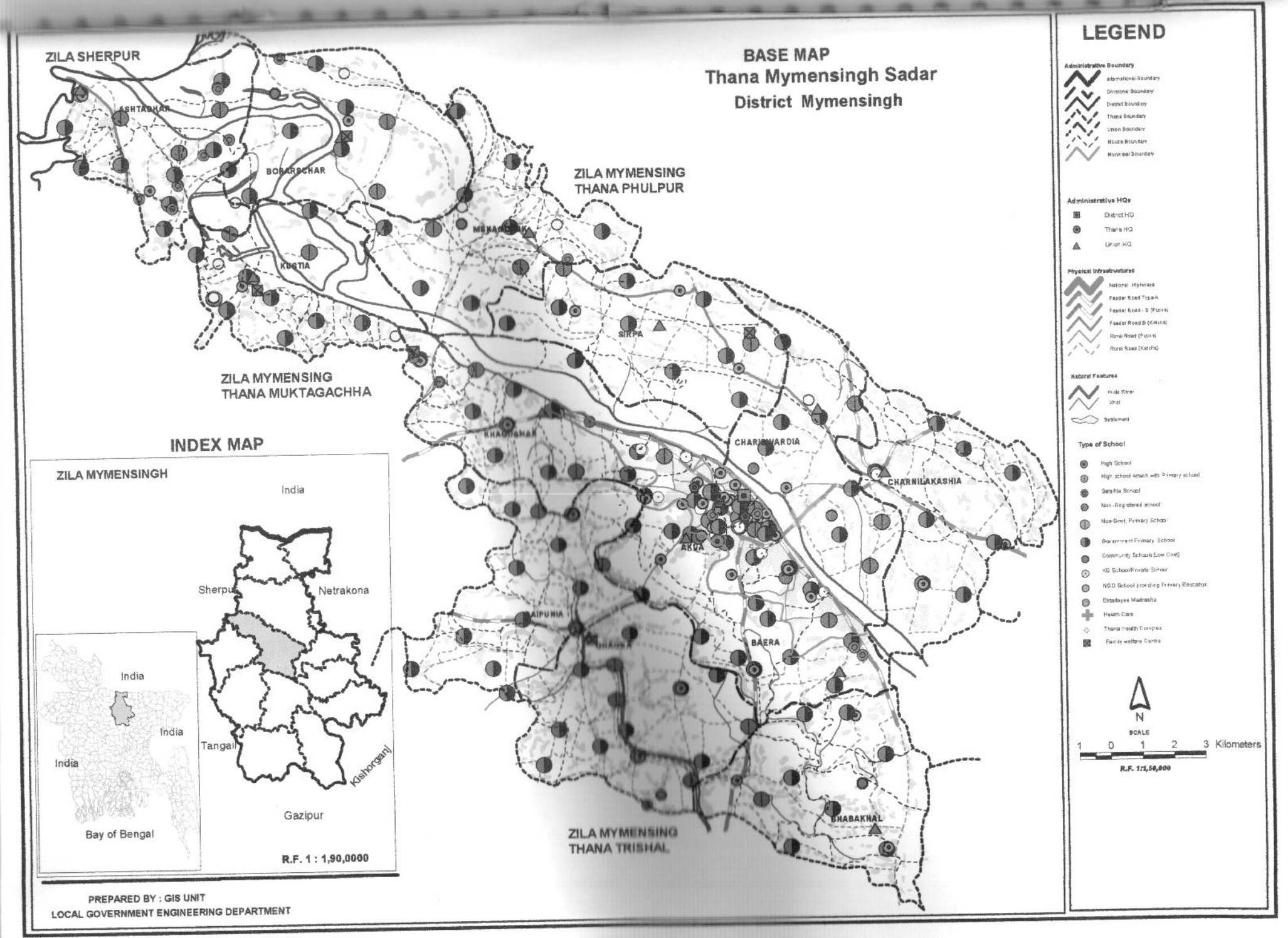
Checklist for Physical Activity

Physical Activity Categories		
1 .Vigorous activities	**2. Moderate activities**	**3 .Light activities**
Agricultural work	Home maintenance of garden	Walking
Pulling Riksha/ Cart	Maintenance of cattle	Walking to office
Digging	Fetching water	Desk work at office
Breaking stone	Carrying Wood	Watching TV
Exercise : By bicycle, rowing	Washing cloths	Reading Books
Carpentry work/ Masonry work	Others specify	Others specify:
Others specify		Cooking

B A N G L A D E S H M A P



posed By : GIS Unit **Local Government Engineering Department**


BASE MAP
Thana Mymensingh Sadar
District Mymensingh
ZILA SHERPUR
ASHTADHAR
BOKAICHAR
KUSTIA
ZILA MYMENSING
THANA PHULPUR
MUKTAGACHHA
SIRPA
ZILA MYMENSING
THANA MUKTAGACHHA
KHAGDAHAR
CHARIGHARDIA
CHARNILAKASHIA
AKUA
BAERA
BHABAKHAL
ZILA MYMENSING
THANA TRISHAL
INDEX MAP
ZILA MYMENSINGH
India
Sherpur
Netrakona
Tangail
Kishorganj
Gazipur
India
India
India
Bay of Bengal
R.F. 1 : 1,90,0000
PREPARED BY : GIS UNIT
LOCAL GOVERNMENT ENGINEERING DEPARTMENT
LEGEND
Administrative Boundary
International Boundary
Divisional Boundary
District Boundary
Thana Boundary
Union Boundary
Mouza Boundary
Municipal Boundary
Administrative HQs
District HQ
Thana HQ
Union HQ
Physical Infrastructures
National Highways
Feeder Road Type-A
Feeder Road - B (Pucca)
Feeder Road B (Kutcha)
Rural Road (Pucca)
Rural Road (Kutcha)
Natural Features
River
Khal
Settlement
Type of School
High School
High school Attach with Primary school
Satellite School
Non-Registered school
Non-Govt. Primary School
Government Primary School
Community Schools (Low Cost)
KG School/Private School
NGO School providing Primary Education
Ebtadayee Madrasha
Health Care
Thana Health Complex
Family welfare Centre
N
SCALE
1 0 1 2 3 Kilometers
R.F. 1:1,50,000