

Nutrition, health and food security in poor people of Sylhet division

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Submitted by

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Dedication

**“Dedicated to my beloved family” For their love, endless support,
encouragement & sacrifices.**

Certificate

This is to certify that the thesis entitled “Nutrition, health and food security of poor people in Sylhet division” has been completed sincerely and satisfactory by Suraiya Perveen, registration no 190, session 2011-2012, enrolled in University of Dhaka, Dhaka-1000, Bangladesh, for the degree of Master of Philosophy (MPhil) in Nutrition and Food Science, is an original record and was supervised by me and can be submitted to the examination committee of evaluation.

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Supervisor

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Preface

This dissertation is submitted for the degree of Master of Philosophy in accordance with the rules and regulation of the University of Dhaka. The research described herein was conducted under the supervision of Prof. Dr Sheikh Nazrul Islam and Prof. Dr. Nazrul Islam Khan, Institute of Nutrition and Food Science, University of Dhaka, “between” June, 2015 to July, 2018.

These three years have been a challenging trip, with both ups and downs. Fortunately I was not alone on this road, but accompanied by an extended team of experts, always willing to coach, help, and motivate me. I would have never reached the point of finishing my dissertation without the help and support of others. For this, I would like to kindly thank them.

This work is to the best of my knowledge original, unpublished. Any similar dissertation has been or is being submitted for any other degree, diploma or any other qualification at any other University. It consists Nutrition, health and food security in poor people of Sylhet division.

Suraiya Perveen

July, 2018

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Author
July, 2018.

Abstract

Sylhet has branded itself as one of the richest and tourist attractive areas of Bangladesh. Contrarily nutrition indicators reflect that malnutrition level is very high here. Sylhet being a flood prone area, is a region of hoar where the farmers have to rely on one single crop - the boro paddy being. If the borocrop fails, the households become insecure by food, which could push thousands of families into poverty.

This study attempts to investigate the food security status at household level along with health and nutritional status of poor people in Sylhet division. In addition, attempt has also been taken to evaluate the dietary intake and nutrient intake patterns of the studied population. Calorie intake and income were used as poverty indicators.

Secondary data collected from the Nutrition, Health and Demographic Survey of Bangladesh – 2011 was used in the study. From the 1000 PSUs (Primary Sampling Unit) selected by BBS for whole Bangladesh, 14 PSUs comprising 350 households of Sylhet division was taken in this investigation. A pre-tested questionnaire was used to collect the data. It was collected by interviewing the household head. Data collection started in March, 2011 and ended in March, 2012. Nutritional status was measured by both direct (anthropometric) and indirect (dietary intake) methods. SPSS (version 21) was applied for data entry and analysis. Food security was calculated by the information of food shortage which is provided by interviewed population.

This study revealed that 19.7% households were lived in food insecurity. About 51% male and 46% female of under 5 years of age was stunted, and it was

associated with income, expenditure, education and food security status. The incidence of stunting is decreasing with the higher income, expenditure, education and in food secured family. It observed that 82% male and 50% female of adolescent household were under weight, 61.9% male and 55.2% female of old people were under weight. Nutritional status, particularly stunting was associated with food security. It was found that 87.6% of under 5 years children were immunized, 8.6% of the children were suffering from diarrhea, and 100% adolescent and 95.7% non-pregnant women were anemic in the Sylhet division. It was observed that almost 72% old people were suffering from various diseases. It is evident that food insecurity is associated with nutritional status.

	Content	
SI No.	Text	Page No.
	Acknowledgement	i - iv
	Abstract	V
	Acronyms	lx
	CHAPTER: 1 INTRODUCTION	1 – 12
1.1	Overview	2 – 3
1.2	Background	4 – 10
1.3	Rational of the study	10 – 11
1.4	Limitation of the study	11
1.5	Hypothesis of the study	12
1.6	Objective of the study	12
	CHAPTER: 2 LITERATURE REVIEW	11 – 19
2.1	Socio-economic status of people in Sylhet division	12 – 16
2.2	Nutritional status of people in Sylhet division	16
2.3	Health status	17 – 18
2.4	Food security	18-19
	CHAPTER: 3 METHODOLOGY	20-23
3.1	Study design	21
3.2	Study period	21
3.3	Study area	21
3.4	Study population	21
3.5	Sampling design	21-22

3.6	Sampling technique	22
3.7	Questionnaire development	22
3.8	Data collection and processing	22
3.9	Physical activity in adult population	23
	CHAPTER: 4 RESULT AND DISCUSSION	24 – 56
4.1	Household population	25 – 26
4.2	Socio-economic profile of households	26 – 28
4.3	Housing pattern of the studies area	28 – 31
4.4	Food intake	31
4.5	Calorie and other nutrient intake	32 – 33
4.6	Physical activity in adult population	33 – 35
4.7	Energy balance	35 – 36
4.8.1	Food security	36 – 39
4.8.2	Percent distribution of food security status at household level	39-40
4.9	Health	41
4.9.1	Vaccination coverage for children	41
4.9.2	Feeding practice during diarrhea	42
4.9.3	Prevalence of anemia (Hb level)	43
4.9.4	Prevalence of common diseases of old age people	44
4.10	Nutritional status	45
4.10.1	Percent distribution of undernourished children(aged <=5 to 10 years)	45 – 47
4.10.2	Nutritional status of households aged 11 to above 60 years	48 – 51
4.11	Association between nutrition, health and food security	52 – 56
	CHAPTER: 5 KEY FINDING & CONCLUSION	57 – 59
5.1	Key findings	58 – 59
5.2	Recommendation	59
5.3	Conclusion	59
	Reference	60-62
	Annex	63-65
SI No.	TABLE	Page No.
4.1.1	Percent distribution of household by district	25
4.1.2	Household population by age, sex and residence	26
4.2.1	Distribution of the households' male and female respondent by age, marital status, education, occupation, income and religion	27 – 28
4.3.1	Household characteristics – percent distribution of HH by housing characteristics by residence	29 – 31
4.4.1	Food consumption (gm/person/day) by food groups and income level	31

4.5.1	Calorie and macro nutrient intake (per capita per day) by sex and income level.	32
4.5.2	Micro nutrient intake (per capita per day) by sex and income level(per capita per month)	32
4.5.3	Calorie and macro nutrient intake (per capita per day) by sex, residence and income level (per capita per month).	33
4.6.1	Distribution of adult male and female population by mean PAL value according to occupation and sex	34
4.6.2	Percent distribution of adult male and female according to PAL value by residence and sex.	35
4.7.1	Mean energy consumption, energy expenditure and energy balance (in kcal) of adult population by occupation	36
4.8.1.a	Ever face food shortage at household level by residence	37
4.8.1.b	Food security situation in household experiencing food shortage (Percent distribution)	38 – 39
4.8.2.a	Percent distribution of food security status of household by income	40
4.8.2.b	Percent distribution of households' food security status by residence	40
4.9.1.a	Percent distribution of vaccination coverage for children (age <=5years) by location of residence	41
4.9.2.a	Percent distribution of children aged <=5 years, who had diarrhea in the two weeks preceding the survey by feeding practice during diarrhea and residence	42
4.9.3.a	Percent distribution and degree of anemia (Hb level) amongst non pregnant women(NP) of age 13-40 years by age and residence	43
4.9.4.a	Percent distribution of common diseases of old age people (self-reported) by residence	44
4.10.1.a	Percent distribution of undernourished children aged <5 years by anthropometric indicator of nutritional status: height for age (stunting), weight for height (wasting), weight for age (underweight) by residence	46
4.10.1.b	Percent distribution of undernourished children aged 5 to 10 years by anthropometric indicator of nutritional status: height for age (stunting), weight for height (wasting), weight for age (underweight) by residence	47
4.10.2.a	Percent distribution of Nutritional status (BMI criteria for ASIAN) of households aged 11 to 19 years by sex and residence	48
4.10.2.b	Percent distribution of Nutritional status (BMI criteria for ASIAN) of households aged 15 to 49 years by sex and residence	49
4.10.2.c	Percent distribution of Nutritional status (BMI criteria for ASIAN) of households aged 49 to 60 years by sex and residence	50

4.10.2.d	Percent distribution of Nutritional status (BMI criteria for ASIAN) of households aged above 60 years by sex and residence	51
4.11.1	Percent distribution and degree of anemia amongst non pregnant women (aged 13-40) by household income	52
4.11.2	Percent distribution of prevalence of anemia among non pregnant women (aged 13-40) by the situation of food security	53
4.11.3	Percent distribution of malnourished children aged <=5 years by anthropometric indicator: height for age (stunting)by household income	54
4.11.4	Percent distribution of nutritional status (stunting) aged <=5 years by food security	55
4.11.5	Percent distribution of nutritional status of HH (aged 11-19) by BMI (ASIAN) and HH income	55
4.11.6	Percent distribution of nutritional status of adolescent households by food security	56
	Figure	
4.1.1	Map of Bangladesh (Indicated Sylhet Division)	6

Acronyms

FAO	Food and Agriculture Organization of the United Nations(FAO)
WB	World Bank
NHDSBD	Nutrition Health and Demographic Survey of
USAID	

BDHS	Bangladesh
RIMS	United States Agency International Development
MIC	Bangladesh Demographic and Health Survey
UNICEF	Result and Impact Management System
WHO	Middle Income Country
WFP	United Nations Children's Fund
IFAD	World Health Organization
BBS	World Food Program
INSHBD	International Fund of Agriculture Development
LGED	Bangladesh Bureau of Statistics
DGHS	Integrated Nutrition Survey in Habiganj district of
DGFP	Bangladesh
MCWC	Local Government Engineering Department
TB	Directorate General of Health Services
MOHFW	Directorate General of Family Planning
IPC	Mother and Child Welfare Centre
BMI	Tuberculosis
EPI	Ministry of Health and Family Welfare
ORS	Integrated Food Security Phase Classification
FPMU	Body Mass Index
HIES	Expanded Program on Immunization
BCG	Oral Rehydration Solution
PSU	Food Planning and Monitoring Unit
TEE	Household Income and Expenditure Survey
PAL	Bacillus Calmette-Guerin Vaccine
BMR	Primary Sampling Unit
PAR	Total Energy Expenditure
MDG	Physical Activity Level
	Basal Metabolic Rate
	Physical Activity Rate
	Millennium Development Goal

CHAPTER: 1

INTRODUCTION

1.1 Overview

Nutrition is defined as the intake of food, considered in relation to the body's dietary needs. Good nutrition is an adequate, well balanced diet combined with regular physical activities is a cornerstone of good health (www.who.int/topic/nutrition/en). Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (www.wikipedia.com).

On the other hand, food security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO).

Poverty is a condition where people's basic needs for food, clothing and shelter are not being met (WB). There are three available approaches to measure poverty- (1) a direct method using information on calorie consumption, (2) an indirect method using data on income/expenditure and (3) a qualitative method using the perception of the respondents. There are two types of poverty in Bangladesh depending on calorie intake. These are hard core poverty (intake ≤ 1805 kcal) and absolute poverty (intake ≤ 2122 kcal) (NHDSBD-2011). In this study, I worked with the both types of poor people depending on calorie intake.

Since independence in 1971, Bangladesh has made significant progress in the areas of poverty reduction. Despite this remarkable progress, a large part of Bangladesh's population remains food insecure. In recent years, the prevalence of under nutrition is in more vulnerable position in rural areas and urban slums, with the highest rates in the division of Sylhet (USAID).

Sylhet is one of the organizational divisions of Bangladesh located in the north-eastern part of the country. Haor is mainly located in this region. Haor region is deluge prone area and thus the crop production is hampered almost every year. So when the crop production fails, the households become insecure by food which could push thousands of families into deeper poverty (Mozdalifa 2012). Recent study on Haor region is significantly worse off. Here, about 55 percent of the under-five children (of age) are underweight against a national average of 41 percent (BDHS and Haor RIMS Survey, 2010). The districts of Sunamganj, and Habiganj are ranked as 'hot-spots' of

poverty. The people of Haorthus are forced to adopt extreme coping up mechanisms to face the food insecurity whereas reducing the quality and quantity of food intake has detrimental impact on the young children especially in terms of nutritional aspects (Mahmood 2011).

This research focuses on the socio-economic condition, food security, health situation and nutritional status of poor people in Sylhet division and finds out the association among income, food security, health and nutritional status.

1.2 Background

Bangladesh is a small country with 147,570 square kilometers which is surrounded by Indian Territory except for a short south-eastern frontier with Myanmar and borders the Bay of Bengal in the south. The population is estimated at 150 million people which made it the 7th most populous country in the world. In 2012, the population density of Bangladesh has been reported at 1015 per square kilometers and population growth rate was 1.32% per annum. (Shaheen and Islam 2012)

Bangladesh has made considerable progress in various arena of socio-economic development since its independence in 1971. Such progress has been achievable due to continuous and collective effort of common people, the government and the development partners. However, sadly, after four decades of independence, a high rate of poverty, food insecurity, malnutrition and poor health facilities are the realities. Although Country's food production and economic growth rate are magnificent compared to other developing countries, it is still striving to be listed as a Middle income Country (MIC). Food insecurity and hunger generally remain at high levels for a large part of Bangladesh's population (Shaheen and Islam 2012). About 40% of the population consume less than the minimum daily recommended amount of food (Household Income and Expenditure Survey, 2010) and around 26% of the population is chronically food insecure (FAO Hunger Portal 2011, data for 2007-08). Lack of access to agricultural land, arable land loss, rising sea levels, frequent flooding, and extreme weather patterns, due in part to climate change, compound the threats to food security in Bangladesh. Hunger and malnutrition trap poor people into an endless cycle of poverty that passes on to their children (Shaheen and Islam 2012). Undernourishment specially hurts the rural landless as they cannot depend on self-subsistence farming. Malnutrition is one of the major factor out of three that affect the rates of death and disease in children in Bangladesh. This country made substantial progress in reducing malnutrition and health sector in last few decades. Initiatives to prevent illness have significantly reduced six vaccine-preventable and diarrhoeal diseases that killed hundreds of thousands of children even two decades ago. The proportion of underweight children falling from 66.6 percent in 1990 to 36 percent in 2011 and the level of child stunting falling from 65.5 percent in 1990 to 41 percent in

2011.(UNICEF 2017 and Akkur Chandra das 2015). Despite progress, levels of malnutrition in Bangladesh are amongst the highest in the world (WHO) and this is a major cause of death and disease in children and women. In Bangladesh, malnutrition is caused by multiple factors. The immediate causes are diseases and inadequate intake of food. The underlying causes of malnutrition include the inability of households to grow and/or purchase sufficient food for their needs; poor maternal and child-care practices, including inadequate breastfeeding and complementary feeding for infants and young children and inadequate provision of food for adolescent girls and pregnant and lactating women. In-depth studies are required to formulate policies for eliminating the food insecurity and malnutrition in Bangladesh.

Sylhet division is one of the worst regions with high level of malnutrition. This study explored the situation of nutrition, health, food security and the relation among these terms in poor people of Sylhet division.

The sylhet division

Sylhet division is the Northeastern division of Bangladesh with 12,596 Sq. Km. and nine million populations. It has 8.5% of the total land area and 6.4% of the total population of Bangladesh. Whereas 23% of the country's population live in urban areas, it is 12.5% in Sylhet division. Sylhet is characterized by its diversity in social, economic and geographical outlines which made it the unique one from other areas of the country. Out of the total land of this division, plain land covers 57.5%, haor 30.2% and tea estates/forest/hilly areas 12.5%. Historically, Sylhet has a huge number of its population living abroad. Approximately 5% of the households in Sylhet division depend mainly on such remittances (Samir Ranjan Nath 2011).

The Sylhet Division is subdivided into four districts: Habiganj, moulvibazar, sunamganj and sylhet.

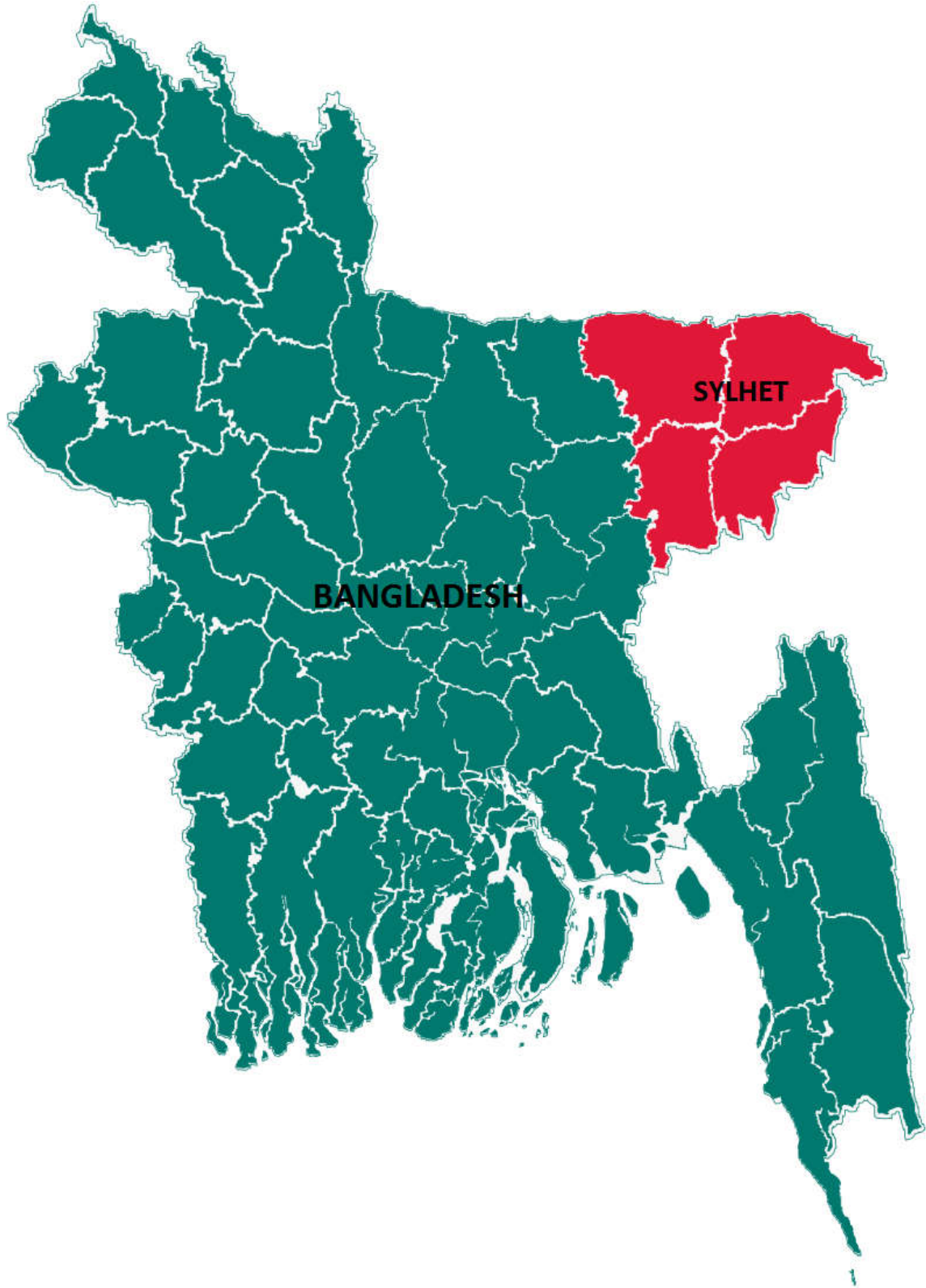


Figure 1.1: Map of Bangladesh (Indicated Sylhet Division)

Habiganj

Habiganj subdivision was established in 1874 under Sylhet district and was turned into a district in 1984. It consists of 4 municipality, 36 wards, 124 mahallas, 8 upazilas, 77 union parishads, 1241 mouzas and, 2143 villages. The district has higher literacy rate is 59.9% compared to national rate 51.8%. Habiganj district is one of the most disaster prone districts in Bangladesh with repeated happening of flooding, pre-monsoon flooding, river erosion, cyclones etc. Every year flooding affects the rice production, limits the working opportunities among farmers leaving households with food insecurity across 8 Upazilas of the district. Floods also damage embankments, roads and sanitation facilities every year. The overall flood situation of the north eastern haor basin deteriorated on August 2014. The district has a regular health system including Health centres Zila sadar hospital 1, Upazila health complex 7, Union sub-centers 18, Family Welfare Centers 51, satellite clinic 1; maternity 31 and veterinary hospital. On top of these government clinics there are 25 private clinics providing health care services. The district was identified with very high level (>40%) of underweight and stunted children in the under nutrition map jointly done by WFP, IFAD and BBS (2012) (INSHBD2015).

Moulvibazar

Moulvibazar is located in the North-East Corner of Bangladesh which is decorated with the largest number of tea gardens, large wetlands Hakaluki and Hail haors mixed evergreen reserve forest. There is a special combination of hill, plain land, forest and haors. Along with that, the lifestyle of expatriates, culture of tea-laborers, heritage of ethnic communities like Manipuri, Khasia, Tipra has made the district a unique one (LGED). Moulvibazar is prominent for agricultural sector. Moulvibazar is food excessive area of Bangladesh moreover, Nazir-Shail and aromatic rice production are remarkable than other districts of Bangladesh. More than 70% of tea gardens of Bangladesh are situated in this district. On the other hand, various fruits, flowers and many valuable trees are found all over the district(BBS). There is 43.8% of stunted and 36.7% of underweight children in Maulavibazar district which is above the WHO critical threshold level. (Undernutrition Maps of Bangladesh 2012). The district has a

regular health system including Health centres combined with District hospital 1, Upazila health complex 7, Union sub-centers 20, Union Health & Family Welfare Centers (under DGHS) 45, Union Health & Family Welfare Centers (under DGFP) 36, community clinics 179, MCWCs (belong to DGFP) 1 and Chest Disease (TB) Clinics/Hospital 1 (MOHFW).

Sunamganj

Sunamganj district is position in the north-eastern borderline of Bangladesh. It is surrounded by khasia and jaintia hilly area of Meghalaya (Indian state) to the north, Habiganj district to the south, Sylhet district to the east, Netrokona district to the west. The area of this district is 3669.58 sq km. It consists of 4 municipalities, 11 upazilas, 82 union parishads, 1688 mouzas and, 2782 villages. The total population of shunamganj district is 2013738(male 1036678, female 977060) (<http://en.banglapedia.org>). Shunamganj is at major concerns which fall in severe chronic food insecurity. The major factors causing to the severe and moderate chronic food insecurity conditions are low valued livelihood strategies, poor sanitation and lack of infrastructure facilities. Other factors that contribute to aggravate the chronic food insecurity include inadequate financial access to food and climatic hazard such as excessive rainfall and pre-monsoon flash floods that significantly affect households' production of food (IPC 2015-18). The district has a regular health system including Health centers combined with District hospital 1, Upazila health complex 9, Union sub-centers 22, Union Health & Family Welfare Centers (under DGFP) 43, community clinics 217, MCWCs (belong to DGFP) 1 and Chest Disease (TB) Clinics/Hospital 1(MOHFW) . There is 46.1% of stunted and 40.9% of underweight children in Sunamganj district which is above the WHO critical threshold level. (Under nutrition Maps of Bangladesh 2012).

Sylhet

Sylhet is a major city in north-eastern Bangladesh which is located on the bank of river Surma and the district consists of 12 Upazilas and 5 Pourashavas and 105 unions with the city as Municipality . Sylhet is one of the oldest cities in Bangladesh having a great historical and cultural background and diversified inhabitants of Garo , Khasia,

Monipuri and Hazong. The district is surrounded by the Jaintia, Khasi and Tripura hills. The city has a population of 500,000 people having a high population density. It is one of the wide ranging cities in Bangladesh. Sylhet region is familiar for its tea gardens and tropical forests. At the centre there is a vast low lying flood plain, locally called Haors(LGED). Haor region is highly flood prone area and thus the crop production is hampered mostly every year. The food security atlas of World Food Program (WFP) Bangladesh categorize the Haor region as the highly food insecure areas of Bangladesh (Mozdalifa, 2012) which conducted with malnutrition.

Household food security status

Food insecurity is a complex and multidimensional phenomena. It varies through a continuum of successive stages as the condition becomes more severe. Each stage consists of characteristic conditions and experiences of food insufficiency to fully meet the basic needs of household members and of the behavioral responses of household members to these conditions. A variety of indicators is needed to capture the various combinations of food conditions, experiences, and behaviors that, as a group, characterize each such stage. The full range of food insecurity and hunger cannot be captured by any single indicator.

Instead, a household level of food insecurity or hunger must be determined by obtaining information on variety of specific condition. Household surveys are usually used to get this qualitative measure of food insecurity (NHDSBD 2011).

Child health

Bangladesh has made strong progress in the area of child health and now is on track to achieve millennium Development Goal 4, that is, reducing child mortality. Factors contributing to rapid decline in under-5 and infant mortality include impressive gains in the EPI (expanded program on immunization), vitamin A supplementation, breastfeeding practice, use of ORS (Oral Rehydration Solution), diarrheal disease control, control of acute respiratory tract infections that are accelerated by an

improvement in the knowledge, attitude and practice regarding health issues(NHDSBD 2011).

Nutritional status of the household members

Malnutrition is a public health problem in the developing third world countries. Young children and mother are mostly affected by malnutrition. Because of inability to cope with morbidity, malnourished children are much more vulnerable than the malnourished adult. Good health and nutritional status of mothers is crucial for the children as well as for themselves. Besides, good nutritional status of all age groups is also important for their healthy and productive life. Therefore, in most of the national and international health and/or nutrition survey,young children and mothers are commonly included to address this health issue(NHDSBD 2011).

1.3 Rational of the study

Food security is an important development goal of Bangladesh. The national food policy of Bangladesh has explicitly stated that it aims to ensure “ a dependable and sustained food security for all people of Bangladesh at all time,”(FPMU 2008).Other policy documents reiterated the importance of this goal.

The food security issues at the aggregate level receive more attention of researchers especially because these are linked to policies related to annual food production, import and public food distribution. In contrast, research on household food insecurity received less attention, although it has important implications for nutrition and health status of individuals, for overall household welfare and for aggregate demand for food.

Food security status of any household is related to its socio-economic status and demographic situation. Higher living standard of a household ensures good nutrient intake and proper health care facilities of its member. These factors are interrelated. The determinants of food security and nutritional situation of any community are diversified. One or many favorable or non favorable causes can play role behind food security, dietary nutrient intake, nutritional status and health status of any community. Each variable is different, of course, and the extent to which effect of one cause will

vary with the circumstances. Any food and nutrition related condition cannot be explained without finding the associated or influencing factors working behind it.

Sylhet is more prosperous and rich in terms of natural resources and general economic condition of the population but has worst social outcomes. Whereas, the rate of the population who live in below poverty line is higher than the national level. The division has the lowest human development index. In terms of health indicators it has the highest U5 mortality and fertility rates, and lowest rates of immunization (Samir Ranjan Nath 2011). Data on household food security situation, nutrition and health status in poor people of sylhet division is not available, even is not yet explored. Understanding the household level food security, nutrition and health status of studied population can provide evidence based information that can help the government to enrich formulation and implementation of appropriate policy measures to the poor population of sylhet division.

Therefore, this study attempts to investigate the nutritional status, health status and household food security condition in poor people of sylhet division. There is a lack of up to date information about food security situation, nutritional and health status of studied population. The findings of this study may help in shaping strategy of different Government and Non Government Organizations which are working in study area to improve the health, nutrition and food security.

1.4 Limitations of the study

- Respondents were hesitant to give information about their family income and what they ate yesterday.
- Could not apply updated procedure for calculating food security.
- Faced a great problem to measure the quantity of food.
- Data were collected from the interviewing household, so there was a gap between original and collected information.

1.5 Hypothesis of the study

- Nutritional and health status of poor people in sylhet division has increased.
- Food security condition of studied population has improved.

1.6 Objective of the study

General objective: To investigate the nutritional status, health status and household level food security condition in poor people of Sylhet division.

Specific objectives of the study are to:

- Assess the socio economic condition of the studied population.
- Investigate the dietary intake and nutrient intake pattern of the studied subjects.
- Reveal the food security situation of the studied population.
- Determine the health and nutritional condition of the studied population by using anthropometric measurements.
- Find out the association among food security status, income, health and nutrition.

CHAPTER: 2
LITERATURE REVIEW

2.1 Socio-economic status of people in Sylhet division

Poverty

40% of the population live below poverty line at the national level, it is 33.8% in Sylhet division (Samir Ranjan Nath). The HIES of 2005 reported that 40.0 per cent and 19.5 per cent people were poor corresponding to per capita daily calorie requirement of 2,122 kcals and 1,805 kcals respectively in national level. Households living below lower and upper poverty lines are 20.7% and 28.1% respectively among the people of sylhet division and 17.6% and 31.5% respectively among national level. Compared to other division, sylhet division has both the lowest headcount rate (25.1 percent) as well as the lowest number of poor people(5.7 percent of the country's poor).In sylhet division lowest poverty rate shown in sylhet district (24.1%) and highest poverty rate shown in sunamganj district (26.0%)(Poverty maps 2010).So poverty rate has come down to 28.1% from 33.8% in 2005 to 2010(HIES 2010).I didn't found any information of poor people depending on calorie intake in divisional level. In this study tried to overcome this limitation.

Housing

Poor people of Sylhet division usually made their house using tin, sun grass/bamboo and mud. Most of the houses were built with mud (53%) while few houses are made of sun grass and bamboo (18%).The electricity facility in our tea garden is not good. People of higher authority get the benefit of electricity but the tea workers hardly get this chance. Tea garden with town areas is enjoying the facility of electricity. Contrary to the national average of 31.5% of the households using electricity (BBS, 2003) only 13.4% of the tea garden households and 14.5% in ethnic minority community had electricity supply (Nath et al., 2005). In sylhet division 52.78% household have no electricity where 47.22 % have them. For drinking water 91.17% household use tube-well , 3.89% use supply water and 5.94 % use other source like pond, river, canal, well, indra etc in sylhet division(HIES 2010).I would like to find the contemporary information about housing quality.

Employment

At sylhet division, total work force is 7.3 percent among whole Bangladesh and its male are 7 percent and female are 8.4 percent, it shows that in sylhet tea garden area, women workforce are a bit more than male (Arifatul Kibria). Employment status of sylhet division is 92.20% on the contrary, the unemployment status is 7.80%(Wikipedia). Main occupation of people in sylhet division is agriculture 30.82% (Shakilah). The area around Sylhet is a traditional tea growing area. Sylhet has over 150 tea gardens, including three of the largest tea plantations in the world, both in terms of area and production. The area Nearly 300,000 workers, of which more than 75% are women, are employed on the tea estates. The industry accounts for 3% of global tea production, and employees more than 4 million people (Wikipedia).I would like to know the developmental status of employment sector which can reduce the poverty rate in sylhet division.

Income and expenditure

In 2010, The average monthly household nominal income was recorded at Tk. 11629 for Sylhet division and this exceeded the national average of Tk. 11479.The average monthly consumption expenditure was recorded in Sylhet Division at Tk.12003 and the income exceeded the national average of monthly household consumption expenditure at Tk. 11003.

In 2010,at sylhet division, using the lower poverty line, per capita income of the poor is TK.996.95 and using the upper poverty line, per capita income of the poor is TK.1045.37 which is increased from TK.596.40% And TK.667.50% compared to 2005. Per capita income of poor people in both case using the lower poverty line and upper poverty line are lower in Sylhet division than national average. In Sylhet division, per capita expenditure of the poor people in both case using the lower poverty line and upper poverty line are TK.1049.43 and TK.1116.95 which are higher than their per capita income and lower than national average.

In Sylhet division 19.97 percent of the households took loans from friends, financial or non-financial institutions. This is the lowest proportion comprising the other division

which reported in this Division with 20.45 percent in rural area and 17.50 percent in urban area. The average amount of loan taken per reporting household was Tk.22, 558 at divisional level which is Tk.24,175 in rural area and Tk.13,711 in urban area(HIES10).

Education

In Sylhet, the net enrolment rate is 80.5% at primary level and 64.2% at secondary level. Both the figures are much lower than the national averages of 86.4% and 77.7% respectively. Similarly, in terms of ever schooled population and the rate of primary and secondary education completers, Sylhet division lag much behind the national average as well as other parts of country. Sylhet is a worse performer in terms of literacy rate too. The literacy rate for 7+ populations is 40.7% and for adult population it is 44.4%. These rates are respectively 48.5% and 52.1% for the whole Bangladesh. There is no literate person in 30.8% of the households in Sylhet division compared to 21.5% for whole country (Samir Ranjan Nath).

Sex ratio

In 2011, male to female ratio for Sylhet was 99.1 males per 100 females. Male to female ratio of Sylhet fell gradually from 104.2 males per 100 females in 1991 to 99.1 males per 100 females in 2011 (World Data Atlas).

2.2 Nutritional status of people in Sylhet division

Sylhet division has the highest rate of children suffering from malnutrition and stunted growth. At least 44.6 percent children below the age of five in Sylhet have stunted growth, while 38.5 percent are underweight . Both stunting and underweight rates are the highest in the Sunamganj district as 46.1% and 40.9% .At the same time both stunting and underweight rates are lowest in moulvibazar district as 43.8% and 36.7%. In Sylhet division, stunting and underweight rates are not only high in the upazilas of the north eastern haor region, but in all upazilas stunting and underweight rates are above WHO critical threshold level, according to a new study titled “Undernutrition Maps of Bangladesh 2012”.

2.3 Health status

The overall vaccination coverage in Bangladesh (including children who did not have EPI cards) was 98% for BCG, 91% for pentavalent 3, and 86% for measles. Similarly, the proportion of fully immunized children was 84%, the proportion of partially immunized children was 14%, and 2% of children had not yet received any vaccine from the EPI schedule. The proportion of children who had received timely vaccination was 24% for BCG, 46% for pentavalent 3, and 53% for measles, whereas 76%, 51%, and 36% of children had delays in receiving the BCG, pentavalent 3, and measles vaccines, respectively. The proportion of children who had received early vaccination was 3% for pentavalent 3 and 12% for measles. The proportions of partially vaccinated (30%) and non-vaccinated (8%) children were in the Sylhet division, while full vaccination coverage was 62% in this division.

The overall prevalence of diarrhea among children <5 years old in Bangladesh was found to be 5.71%. The highest diarrheal prevalence (8.62%) was found among children aged 12 to 23 months, followed by <1-year-old children (6.25%). The lowest prevalence of diarrhea (3.71%) was found among children aged between 36 and 47 months. Diarrhea prevalence was higher among male (5.88%) than female children (5.53%). Stunted children were found to be more vulnerable to diarrheal diseases (7.31%) than normal-weight children (4.80%). As regards diarrhea prevalence and age of the mothers, it was found that children of young mothers (those who were aged <20 years) suffered from diarrhea more (6.06%) than those of older mothers. In other words, as the age of the mother's increases, the prevalence of diarrheal diseases for their children falls. In terms of the divisions (larger administrative unit of Bangladesh), Sylhet region is mainly riverine area, where there is a risk of seasonal floods and other natural hazards such as tidal surges, cyclones, and flash floods which is conducted with occurring of diarrhea (Abdur Razzaque Sarker). Health status of the older people is a major concern in Bangladesh. In the urban and rural areas majority of the elderly population suffered from weakness (75% and 75%) followed by eye sight (95% and 65%), sleeping problem (45% and 45%), Blood pressure (40% and 25%) body pain (80% and 45%) and pain in joint (95% and 35%). In rural areas more older population

suffers from eyesight, hearing and denture, weakness, sleepless, mobility, blood pressure, stiff joint, constipation, pain in joint in back rheumatic(jiban kumar pal) .

2.4 Food security

Food security of Bangladesh is adversely affected by higher food prices. Income has increased but is not sufficient for poor people to adjust with high prices compared to lower income. Therefore, the amount of food insecure population has been increasing (Mozdalifa, 2012). Food insecure population is now estimated in Bangladesh to be 65.3 million people; nearly 45 percent of the total population of the country is now food insecure (< 2122 kcal per person per day), and one-quarter (23.9 percent) of the population is understood as rigorously food insecure consuming less than 1805 kcal per person per day (WFP, 2012). Inadequate domestic production, lack of food imports, aid and national food stocks causes food unavailability at national and household level (Mozdalifa, 2012). Therefore, 7 percent of households are facing acute suffering in accessing food regularly whereas up to 30 percent of the households encountered such conditions. Sometimes 12-15 percent of the households experience chronic under-consumption and frequently worries about food access whereas sometimes up to 30 percent confronts such food vulnerability (Mozdalifa, 2012). Though total food supplies are adequate in Bangladesh, poor people are restricted and vulnerable in accessing food. This is because poverty includes lack of education, employment, land access, microcredit issues, income imbalances, huge differences between the rural and urban areas, intra-household disparities and gender discriminations and all these features are responsible for vulnerability to access in food security (Mozdalifa, 2012). The people of Haor, thus, are forced to adopt extreme coping up mechanisms to face the food insecurity whereas reducing the quality and quantity of food intake has detrimental impact on the young children especially in terms of nutritional aspects. Haor RIMS survey showed that in the present year, two-thirds households with shortage of food repeatedly have to buy food on credit or by borrowing, and over 90 percent people, sometimes, reduce the quantity of consumption in a meal. Even nearly 60 percent people occasionally skip a meal (Mahmood, 2011).

The information about poverty, nutritional status, health situation, food security status is available in different studies. But if we want to overcome this situation we have to

know the causes of this situation. So we have to find out the interlinks between socio economic conditions, health and nutritional status, and food security situation.

CHAPTER: 3
METHODOLOGY

3.1 Study design

Quantitative method is used in this study. The study conducted among the poor people of sylhet division using secondary data from NHDSBD-2011 which is the fifth national survey addressing nutrition, health and demographic issue of the mass people of Bangladesh.

3.2 Study period

The study conducted during the period of June 2015 to October 2017. Data entry and analyses were accomplished in this period.

3.3 Study area

The study was conducted on both the urban and rural areas of sylhet division including Habiganj, Shunamganj, Maulavibazar and Sylhet district.

3.4 Study population

The concern of this study is about poor people of sylhet division. Poor populations are determined by calorie intake. Those populations who take less than 2100kcal are called poor in this study (WB).

3.5 Sampling design

Secondary data collected from the Nutrition, health and demographic survey of Bangladesh – 2011 was used in the study. A two stage stratified random sampling technique was employed in drawing sample of the NHDSBD-2011 under the framework of integrated Multipurpose sample (IMPS) design developed on basis of the sampling frame on the Population and Housing Census 2001. In the first stage out of the 1000 PSUs, 251 PSUs were drawn, which selected from seven division including Chittagong Hill Tracts. The number of PSUs in selected from each district is proportional to the total number of PSUs of the corresponding district. Seventy percent PSUs was selected from rural strata and 30% from urban strata, thus making 176 rural

PSUs and 75 urban PSUs. In the second stage, 30 households were selected from each of the rural PSUs and urban PSUs (located in the municipal areas). Considering the diversity of the household characteristics in the PSU is very low, 30 households were randomly selected from the frame of each selected PSU to have the representative households of the particular PSU area of BBS. From the 1000 PSUs (Primary Sampling Unit) selected by BBS for whole Bangladesh, 14 PSUs comprising 350 households of Sylhet division was taken in this investigation. Among 350 households the study covered 1918 population.

3.6 Sampling technique

Simple random sampling techniques were used in this study.

3.7 Questionnaire development

The major components included in the questionnaire were:

- socioeconomic condition,
- family food security situation,
- morbidity pattern,
- nutritional status etc.

The draft questionnaire was prepared and circulated to the member of Technical advisory committee, who reviewed and approved the questionnaire on 15th January 2011. The questionnaire was prepared in English and after approval it was translated into bangle. It was then pre-tested in February 2011 for finalization.

3.8 Data collection and processing:

The method of data collection was made by individual interviewing and observation in case of some information .Data collection was started on 25th march, 2011 and completed on the 24th march,2012. Nutritional status was measured by both direct (Anthropometric) and indirect (dietary intake) methods. Anthropometric data will analyze by WHO standard and Angmohan.com(ASIAN) for the classification of

malnutrition. For reporting of height for age, weight for age and weight for height relative to the WHO reference percentile and Z score were used. SPSS (version 21) was applied for data entry and analysis. Food security was calculated by the information of food shortage which is provided by interviewed population.

3.9 Physical activity in adult population:

In this study, physical activity level (PAL) was estimated by using the formula that is $PAL = \text{Total Energy Expenditure (TEE) of a person} / \text{Basal Metabolic Rate (BMR) of that person at individual level}$.

Basal metabolic rate (BMR) is the minimal rate of energy expenditure compatible with life. It is measured in the supine position under standard conditions of rest fasting, immobility thermo neutrality and mental relaxation. Depending on its use, the rate is usually expressed per minute, per hour or per 24 hours and in the present study BMR is expressed as BMR per day or per 24 hours.

After BMR, physical activity is the most variable and the second largest component of daily energy expenditure. Total energy expenditure (TEE) is defined as the energy spent, on average, in a 24 hour period by an individual or a group of individuals. TEE for 24 hours expressed as a multiple of BMR. Energy expenditure for a specific physical activity is calculated as the product of duration in minute involved in that activity, PAR value of that particular activity and the BMR of that person. Thus energy expenditure for each activity in 24 hours has to be calculated to get TEE in 24 hours.

CHAPTER: 4

RESULT AND DISCUSSION

4.1 Household population:

A household consists of one or more people who live in the same dwelling and also share meals or living accommodation and may consist of a single family or some other grouping of people (Wikipedia). A member of the household is the person who lives in the household. A visitor is someone who is not a member of the household but stayed in the night before the interview.

Table 4.1.1 present the percent distribution of households by district. Highest study households are from Sylhet district, it is 125 out of 350 households. From the rest district the number of household is same.

Table 4.1.1: Percent Distribution of Households by District

District	N	%
Hobigonj	75	21.4
Moulavibazar	75	21.4
Shunamgonj	75	21.4
Sylhet	125	35.7
Total	350	100.0

Data source: NHDSBD 2011

Table 4.1.2 shows the household population includes 1918 persons comprising 71% rural and 29% urban male and female. Female constitute 51.04% of the total population. The overall proportion of the younger age groups is substantially larger than the older age groups for each sex and in both urban and rural areas. More than 47% of the household population is under 15 years of age and 23% is under 5 years. Persons above 60 years account for just 4.3% of total population. Persons aged 15-59 years, who are the productive human, account for 48.2% of the total population.

Table 4.1.2: Percent Distribution of Household population by Age, Sex and Residence

Age group	Urban			Rural			All		
	Male	Female	All	Male	Female	All	Male	Female	All
<5	25.8	19.1	22.4	24.3	23.1	23.7	24.7	22.0	23.3
5-9	14.6	15.6	15.1	14.7	17.1	15.9	14.7	16.6	15.7
10-14	7.1	10.3	8.7	9.4	7.6	8.5	8.7	8.4	8.6
15-19	5.2	7.1	6.2	5.4	4.4	4.9	5.3	5.2	5.3
20-24	3.4	10.6	7.1	4.8	12.6	8.8	4.4	12.1	8.3
25-29	8.6	13.5	11.1	7.7	12.2	10.0	8.0	12.6	10.3
30-34	8.2	6.7	7.5	8.9	7.0	8.0	8.7	6.9	7.8
35-39	8.6	5.3	6.9	9.4	4.7	7.0	9.2	4.9	7.0
40-44	6.7	3.5	5.1	5.2	2.2	3.7	5.6	2.6	4.1
45-49	2.6	1.4	2.0	2.7	0.4	1.5	2.7	0.7	1.7
50-54	4.5	0.7	2.6	2.2	2.4	2.3	2.9	1.9	2.4
55-59	1.9	1.1	1.5	1.0	1.4	1.2	1.3	1.3	1.3
60-64	0.7	1.4	1.1	0.6	2.2	1.4	0.6	1.9	1.3
65-69		1.8	0.9	0.6	0.9	0.7	0.4	1.1	0.8
70-74	0.4	1.4	0.9	1.5	1.4	1.5	1.2	1.4	1.3
75-79	0.4		0.2	0.4		0.2	0.4		0.2
80+	1.1	0.4	0.7	1.2	0.3	0.7	1.2	0.3	0.7
Total Population	267	282	549	672	697	1369	939	979	1918

Data source: NHDSBD 2011

4.2 Socio-economic profile of households

Table 4.2.1 presents the basic information of respondents. Results show that about 48.4% of respondent have no education. Total results show that women are more educated than men. 6.7% of respondents did not complete primary education while 22% female completed their primary education. Almost 18% of respondents did not complete secondary education while 5.7% of respondent completed secondary or higher level education.

Considering the occupational status, the most common occupation of total respondent is day laborer (18.9%) and the second most common occupation is business (9.6%) while 98.3% of women are housewife. Monthly income of 50% respondent is low while 44.8% live in on lower middle income range.

About 80.4% of the respondents are aged between 20 to 40 years where 93.8% of women are in this group. Almost all respondent are currently married (99.3%). The vast majority of the respondents (97.7%) are Muslims and the remaining are Hindus (2.3%).

Table 4.2.1: Distribution of The Household's Male and Female Respondent by Age, Marital status, Education, Occupation, Income and Religion.

Characteristics	Male		Female		Total	
	N	%	N	%	N	%
Age						
15-19	0	0.0	9	2.6	9	1.3
20-30	114	32.7	248	70.9	362	51.8
31-40	150	43.0	80	22.9	230	32.9
41-50	62	17.8	12	3.4	74	10.6
>50	23	6.6	1	0.3	24	3.4
Marital status						
Unmarried	2	0.6	0	0.0	2	0.3
Married	346	99.1	348	99.4	694	99.3
Widow	1	0.3	2	0.6	3	0.4
Education						
No education	182	52.1	156	44.6	338	48.4
Primary incomplete	17	4.9	30	8.6	47	6.7
Primary complete	72	20.6	77	22.0	149	21.3
Secondary incomplete	52	14.9	73	20.9	125	17.9
Secondary complete and higher	26	7.4	14	4.0	40	5.7
Occupation						
Business	66	18.9	1	0.3	67	9.6

Day labor including earth cutting	129	37.0	3	0.9	132	18.9
Farmer/fisherman	24	6.9	0	0.0	24	3.4
Services	27	7.7	1	0.3	28	4.0
Rickshaw/van driver	26	7.4	0	0.0	26	3.7
Motor driver	29	8.3	0	0.0	29	4.1
Elderly/Physically disabled	4	1.1	0	0.0	4	0.6
Job less	0	0.0	0	0.0	0	0.0
Housewife	0	0.0	344	98.3	344	49.2
Others	44	12.6	1	0.3	45	6.4
Income						
Low income(7000 tk or less)	174	49.9	176	50.3	350	50.1
Lower middle income(7001 tk - 28000 tk)	157	45.0	156	44.6	313	44.8
Upper middle income (28001 tk - 85000tk)	14	4.0	14	4.0	28	4.0
High income (85001tk Or more)	4	1.1	4	1.1	8	1.1
Religion						
Muslim	341	97.7	342	97.7	683	97.7
Hindu	8	2.3	8	2.3	16	2.3

Data source: NHDSBD 2011

4.3 Housing pattern of the studies area

Table 4.3.1 presents information on household characteristics. It is seen that 54.3% of households have access to electricity and the second most common lighting arrangement is kerosene light (40.9%). One of the most practical indication of the extent of crowding in households is the number of rooms used for sleeping. Crowding in one sleeping room facilitates the risk of infection. It has been shown that 42.6% households use only one room and 41.1% households use two rooms for sleeping.

The most common roof material is tin and 88.3% of households live with tin roofs. The most common wall material is concrete(33.7%) and the second most common wall

material is bamboo fencing/palm leaf/bamboo(25.4%).The type of floor material is an indicator of economic standing of the household as well as an indicator of potential exposure to disease causing agents. The most commonly used floor material in sylhet are clay(75.1).

Almost 75% households have separate kitchen for cooking. Those, who have no separate kitchen, usually cook in open space or share with others or do it in the living room.78.9% households use wood as fuel for cooking. 86.3% households use wood burner which do not have any system for ventilating the indoor pollution from cooking fumes.

Table 4.3.1: Household Characteristics – Percent Distribution of HH by Housing Characteristics by Residence

Household Characteristics	Urban	Rural	Total
Arrangement of lighting in the house			
Kerosene light	22.0	48.4	40.9
Electric light	77.0	45.2	54.3
Kerosene + electricity	0.0	0.0	0.0
Solar light	1.0	6.0	4.6
Generator light	0.0	0.4	0.3
No of bed room of the house			
One	50.0	39.6	42.6
Two	35.0	43.6	41.1
Three	8.0	12.8	11.4
Four	5.0	2.4	3.1
Five and above	2.0	1.6	1.7
Roof materials of the house			
Bamboofencing/palm leaf/bamboo	3.0	6.4	5.4
Tin	94.0	86.0	88.3
Concrete	2.0	5.2	4.3
Taly	0.0	0.4	0.3
Others	1.0	2.0	1.7

Main material of the house wall			
Bamboofencing/palm leaf/bamboo	31.0	23.2	25.4
Tin	24.0	21.6	22.3
Concrete	34.0	33.6	33.7
Mud wall	10.0	18.4	16.0
Others	1.0	3.2	2.6
Main material of the house floor			
Wood	0.0	0.0	0.0
Bamboo	0.0	0.8	0.6
Concrete	27.0	21.6	23.1
Ceramic tiles	1.0	1.2	1.1
Clay	72.0	76.4	75.1
Separate kitchen in the house			
Yes	66.0	78.4	74.9
No	34.0	21.6	25.1
If no separate then alternatives			
Open space	38.2	72.2	59.1
Share with others	29.4	16.7	21.6
In the living room	32.4	11.1	19.3
Others	0.0	0.0	0.0
Type of fuel used for cook			
LPG	0.0	1.6	1.1
Natural gas	19.0	6.8	10.3
Kerosene	3.0	1.2	1.7
Wood	73.0	81.2	78.9
Kharkuta	5.0	9.2	8.0
Type of burner used for cook			
Natural gas burner	17.0	8.0	10.6
Kerosene burner	2.0	0.4	0.9
Wood burner	77.0	90.0	86.3
LPG	2.0	1.2	1.4

Friend burner	1.0	0.0	0.3
Electric burner	0.0	0.0	0.0
Others	1.0	0.4	0.6

Data source: NHDSBD 2011

4.4: Food intake

Table 4.4.1 shows the food consumption (gm/person/day) by food groups and income level. It revealed that food consumption (gm/person/day) by food groups is conducted with income level. The consumption of every food group except pulse is increased with rising income level.

Table 4.4.1: Food Consumption (gm/person/day) by Food Groups and Income Level

Income	Cereal	Vegetable	Pulse	Meat	Fish	Sugar	Total
Low income (≤ 7000 tk)	349.7	192.5	12.0	8.2	89.5	10.7	662.6
Lower middle income to high(≥ 7001 tk)	351.7	221.6	10.6	22.2	129.5	16.3	751.9
Overall	350.7	206.9	11.3	15.2	109.4	13.5	707.0

Data source: NHDSBD 2011

4.5: Calorie and other nutrient intake

Table 4.5.1 and table 4.5.2 show the calorie, macro and micro nutrient intake (per capita per day) by sex and income level (per capita per month). It shows that calorie and all nutrient intakes are lower in low income people than lower middle to high income people. As follows, intake of calorie and all nutrients in women is lower than male.

Table 4.5.1: Calorie and Macro Nutrient Intake (per capita per day) by Sex and Income level

Income(tk/capita/month)	Sex	Energy	Protein	Fat	Carbohydrate
		(kcal)	(gm)	(gm)	(gm)
Low income (7000tk or less)	Male	2088	58	20	417
	Female	1746	52	18	343
	Total	1907	55	19	378
Lower middle income to high (7001tk -high)	Male	2053	61	25	398
	Female	2010	59	27	378
	Total	2031	60	26	388

Data source: NHDSBD 2011

Table 4.5.2: Micro Nutrient Intake (per capita per day) by Sex and Income Level (per capita per month)

Income(tk/capita/month)	Sex	Calcium	Iron	Vitamin-C	Carotenes	Ratinol
		(mg)	(mg)	(mg)	(µg)	(µg)
Low income (7000tk or less)	Male	459	28	59	3788	709
	Female	434	24	58	3782	728
	Total	446	26	58	3785	719
Lower middle income to high (7001tk -high)	Male	591	30	74	4152	819
	Female	570	26	73	4188	813
	Total	580	28	74	4171	816

Data source: NHDSBD 2011

Table 4.5.3 shows calorie and macro nutrient intake (per capita per day) by sex, residence and income level (per capita per month).It reveals that intake of calorie and

macro nutrient is lower in Sylhet than other division of Bangladesh. Nutrient intake is increased with rising income level in Bangladesh.

Table4.5.3: Calorie and Macro Nutrient Intake (per capita per day) by Sex, Residence and Income Level (per capita per month).

Income (tk/capita/month)	Sex	Energy(Kcal)		Protein(gm)		Fat(gm)	
		Sylhet	Whole Bd except Sylhet	Sylhet	Whole Bd except Sylhet	Sylhet	Whole Bd except Sylhet
Low income (\leq 7000tk)	Male	2088	2305	58	59	20	28
	Female	1746	2005	52	54	18	25
	Total	1907	2148	55	56	19	26
Lower middle to high income (\geq 7000tk)	Male	2053	2460	61	68	25	35
	Female	2010	2163	59	62	27	35
	Total	2031	2300	60	65	26	35

Data source: NHDSBD 2011

4.6 Physical activity in adult population

Table 4.6.1 presents the distribution of adult male and female population by mean PAL value according to male adult, the highest mean PAL value was observed among elderly/physical disabled (PAL=3.9) and the second highest mean PAL observed among Rickshaw/van driver(PAL=3.0), followed by day labor including earth cutting (PAL=2.1), farmer/fisherman (PAL=2.0). On the other hand, the lowest PAL value observed among jobless(PAL=1.3), followed by businessman(PAL=1.5), service holder and motor driver(PAL=1.6). Among the female adults, the highest mean PAL value was observed among businessman/service holder(PAL=2.9) and the second highest PAL observed among day labor including earth cutting(PAL=2.7). On the other hand the lowest PAL was observed for housewife(PAL=2.1) which is higher than the overall PAL value of male and about 98% of female respondents were housewives. This result indicates that energy expenditure of women is higher than male.

Table 4.6.1: Distribution of Adult Male and Female Population by Mean PAL Value According to Occupation and Sex

occupation	N	%	Mean PAL	SD
Male				
Business	25	24.5	1.5	0.5
Day labor including earth cutting	38	37.3	2.1	0.8
Farmer/Fisherman	15	14.7	2.0	0.7
Services	9	8.8	1.6	0.7
Rickshaw/Van driver	6	5.9	3.0	0.6
Motor driver	5	4.9	1.6	0.7
Elderly/Physically disabled	1	1.0	3.9	.
Job less	1	1.0	1.3	.
Others	2	2.0	1.3	0.7
Total	102	100.0	1.9	0.8
Female				
Housewife	325	98.2	2.1	0.6
Business/Services	2	0.6	2.9	0.1
Day labor including earth cutting	3	0.9	2.6	0.9
Others	1	0.3	2.7	.
Total	331	100.0	2.1	0.6

Data source: NHDSBD 2011

Table 4.6.2 presents the percent distribution of adult male and female according to PAL value by residence and sex. The result shows that average adult people including male and female living urban area are more active than the average people living in rural area. The overall result shows that female were more active than males.

Table 4.6.2: Percent Distribution of Adult Male and Female According to PAL Value by Residence and Sex.

PAL value	Urban		Rural		Total	
	Male	Female	Male	Female	Male	Female
Low PAL (< 1.40)	34.6	3.2	30.3	11.9	31.4	9.4
Sedentary or Light activity (1.40 - 1.69)	11.5	13.7	13.2	6.4	12.7	8.5
Active or Moderate activity (1.70 - 1.99)	11.5	15.8	15.8	20.8	14.7	19.3
Vigorous activity (2.00 - 2.40)	11.5	43.2	19.7	36.9	17.6	38.7
High PAL (> 2.4)	30.8	24.2	21.1	24.2	23.5	24.2
Total	100.0	100.0	100.0	100.0	100.0	100.0

Data source: NHDSBD 2011

4.7 Energy Balance

The following table present data on mean energy consumption, energy expenditure and energy balance of adult population by occupation and it indicates that both male and female are in negative energy balance (male: -203 ;female: -207).But the result is interpreted by occupation. Among male adults, day labor including earth cutting, service, rickshaw/van driver and elder/physical disabled categories are in negative energy balance whereas person involved in business ,Farmer/fisherman, job less and other are categories are mostly in positive energy balance .Among female adults, housewife, business/service, Day labour including earth cutting and other categories are in negative energy balance.

Table 4.7.1: Mean Energy Consumption, Energy Expenditure and Energy Balance (in kcal) of Adult Population by Occupation

Occupation	Energy consumption (EC)	Energy Expenditure (EE)	Energy balance (EC-EE)	Number of male or Female
Male				
Business	2615	2240	375	73
Day labor including earth cutting	2788	3009	-220	115
Farmer/Fisherman	3181	2851	330	26
Services	2147	2492	-346	31
Rickshaw/Van driver	2484	4485	-2001	28
Motor driver	2323	2362	-39	27
Elderly/physically disabled	2256	4367	-2111	24
Job less	2358	2171	187	14
Others	2444	2078	366	31
Total	2591	2794	-203	369
Female				
Housewife	2241	2377	-136	414
Business/Services	1932	3500	-1568	5
Day labour including earth cutting	1922	2900	-978	6
Elderly/physically disabled	1663	0	1663	31
Others	1524	2666	-1141	8
Total	2183	2390	-207	464

Data source: NHDSBD 2011

4.8.1 Food security

The concept of food security is a broader horizon encompassing a large number of aspects like agro-economic, infrastructural and social along with health and nutrition. Food security refers to physical and social access by all people at all times to enough food for a healthy productive life (FAO, 2000). Conversely, food insecurity exists when

people lack transiently or persistently, access to sufficient quantities of safe and nutritious food required for normal growth and development and for an active and healthy life (NHDSBD 2011).

The most popular process of measurement of food insecurity is the process by FANTA. In this process used HFIAS generic question which are asked to the household. Each of the question in the following is asked with a recall period of four weeks (30 days). The respondent is first asked an occurrence question – that is, whether the condition in the question happened at all in the past four weeks (yes or no). If the respondent answers “yes” to an occurrence question, a frequency of occurrence question is asked to determine whether the conditional happened rarely (once or twice), sometimes (three to ten times) or often (more than ten times) in the past four weeks.

In this study, used some question to determine the food insecurity. These questions were prepared by simulating BDHS 2011. There is some difference from those questions which is used by FANTA.

Table 4.8.1.a provides the answer of the question which were asked to all respondents, was whether they ever face any type of food shortage at any time of the year. The result shows that 76.3% of all households never ever faced any kind of food shortage which indicating that these households are apparently food secured at least in term of quantity of food. On the other hand 14% households sometimes and 9.7% households often face food shortage. Urban households are more likely to face food shortage than rural households.

Table 4.8.1.a: Ever Face Food Shortage at Household Level by Residence

	Urban		Rural		Total	
	Number	%	Number	%	Number	%
Never ever	74	74.0	193	77.2	267	76.3
Sometimes	16	16.0	33	13.2	49	14.0
Often	10	10.0	24	9.6	34	9.7
Total	100	100.0	250	100.0	350	100.0

Data source: NHDSBD 2011

To assess the food insecurity condition among the households who experience food shortage, the following questions are asked. Table 4.8.1.b shows that 79.5% households sometimes and 13.3% households often remain anxious about the next meal. 66% households face the food shortage in a specific time of the year. 29% households feel that all members of their family often and 57% sometimes are not getting balanced food, which indicates current food insecurity. 5% households often and 70% households sometimes borrow food from neighbors to manage their food shortage situation.

This table also shows that adult of 5% households often and 76% households sometime eat food less than 3 times a day due to shortage of food. Children of 1.2% households often and 18% households sometimes have to eat less than three times a day and 6% households said that the duration of this condition remain 3 to 10 days.

Table 4.8.1.b: Food Security Situation in Household Experiencing Food Shortage (Percent distribution)

Food security	Urban	Rural	Total
Remain anxious about what will eat in the next meal			
Often	7.7	15.8	13.3
Some times	80.8	78.9	79.5
Never ever	7.7	5.3	6.0
NA	3.8		1.2
Total	100.0	100.0	100.0
Face this food shortage in any specific time of the year			
Yes	30.8	82.5	66.3
No	69.2	17.5	33.7
Total	100.0	100.0	100.0
Feel that all member of the family is not getting balanced food			
Often	23.1	31.6	28.9
Some times	61.5	54.4	56.6
Never ever	11.5	7.0	8.4
Others	3.8	7.0	6.0

Total	100.0	100.0	100.0
Borrow food from neighbor			
Often	3.8	5.3	4.8
Some times	69.2	70.2	69.9
Never ever	26.9	24.6	25.3
Total	100.0	100.0	100.0
Eat food less than 3 times a day due to shortage of food			
Often	0.0	7.0	4.8
Some times	76.9	75.4	75.9
Never ever	23.1	17.5	19.3
Total	100.0	100.0	100.0
Child have/had to eat less food (Less than three times a day)			
Often	0.0	1.8	1.2
Some times	11.5	21.1	18.1
Never ever	84.6	77.2	79.5
Others	3.8	0.0	1.2
Total	100.0	100.0	100.0
Duration of children getting less food to eat(Less than three times a day)			
2 days	0.0	1.8	1.2
3 to 10 days	3.8	7.0	6.0
Not applicable	96.2	91.2	92.8
Total	100.0	100.0	100.0

Data source: NHDSBD 2011

4.8.2: Percent distribution of food security status of household

Table 4.8.2.a present the percent distribution of the status of food security of household by their income. It reveals that 80.3% households are food secured in Sylhet division and status of food security is associated with income. Range of food insecurity is higher in low income population than lower middle to high income population.

Table 4.8.2.a: Percent Distribution of Food Security Status of Household by Income.

Food security	Low income (7000tk or less)		Lower middle income to high income (7001tk to Hi)		Total	
	N	%	N	%	N	%
Food secure	124	70.5	157	90.2	281	80.3
Mildly Food Insecure	39	22.2	14	8.0	53	15.1
Moderately Food Insecure	10	5.7	1	0.6	11	3.1
Severely Food Insecure	3	1.7	2	1.1	5	1.4
Total	176	100.0	174	100.0	350	100.0

Data source: NHDSBD 2011; Chi-square value= 23.2; p value=0.02

Table 4.8.2.b shows the percent distribution of household's food security by residence. It indicates that food security situation is almost the same in all district of Sylhet division, except Sunamgonj district, in Bangladesh. In Sunamgonj district 68% households are food secured. 28% households are suffering from mildly food insecurity and 4% suffering from moderately food insecurity.

Table 4.8.2.b: Percent Distribution of Households' Food Security Status by Residence

Situation of food security	Hobigonj		Moulivabazar		Sunamgonj		Sylhet		Sylhet division		Whole Bangladesh except Sylhet	
	N	%	N	%	N	%	N	%	N	%	N	%
Food secure	64	85.3	62	82.7	51	68.0	104	83.2	281	80.3	4683	79.1
Mildly Food Insecure	11	14.7	7	9.3	21	28.0	14	11.2	53	15.1	1016	17.2
Moderately Food Insecure	0	0.0	4	5.3	3	4.0	4	3.2	11	3.1	180	3
Severely Food Insecure	0	0.0	2	2.7	0.0	0.0	3	2.4	5	1.4	45	0.8
Total	75	100	75	100	75	100	125	100	350	100	5924	100

Data source: NHDSBD 2011

4.9: Health

Bangladesh has achieved impressive improvements in population health status by achieving MDG 4 by reducing child death and rapidly improving on other key indicators including maternal death, immunization coverage and survival from some infectious diseases such as diarrhea. To assess the health status I collected some information about immunization coverage, diarrheal management, prevalence of anemia and prevalence of communicable diseases.

4.9.1: Vaccination coverage for children (age ≤ 5 years)

The information of the status of vaccination coverage of the children has been collected from mothers of under 5 children. In table 4.9.1.a it was found that 87.6% of under five years children has been immunized. It has been seen that vaccination coverage of rural area is higher than the urban area. Taking the vaccine of measles is lower than other vaccine. Other vaccination (BCG, Polio and Hepatitis) coverage is 87% or higher. Only 12.4% of children aged ≤ 5 years have not received any childhood vaccination.

Table 4.9.1.a: Percent Distribution of Vaccination Coverage for Children (age ≤ 5 years) by Location of Residence.

Vaccine coverage	Has immunized but incomplete according to age			Completed all doses according to age		
	Urban	Rural	Total	Urban	Rural	Total
BCG	91.8	93.9	93.3	91.8	93.9	93.3
Polio	91.8	91.5	91.5	91.8	91.5	91.5
DPT	89.7	91.1	90.7	87.6	90.7	89.8
Measles	78.4	76.4	77.0	76.3	76.0	76.1
Hepatitis 1	87.6	91.5	90.4	87.6	91.5	90.4
Hepatitis 2	87.6	91.5	90.4	87.6	91.5	90.4
Hepatitis 3	87.6	91.5	90.4	87.6	91.5	90.4

Data source: NHDSBD 2011

4.9.2 Feeding practice during diarrhea

Table 4.9.2.a presents the feeding practice of under 5 years children during diarrhea and residence. 8.6% of under 5 years children are suffering from diarrhea before two weeks of survey. According to the mothers of under 5 years children, it has been revealed by the analysis of feeding pattern of diarrheal children, only 13.3% take more food than normal time, 46.7% have no changes in their feeding pattern, 23.3% take less food than normal time. It is alarming news that 3.3% of under 5 years children take no food during diarrhea. It is observed that rural children are at more vulnerable situation in sylhet division.

Table 4.9.2.a: Percent Distribution of Children Aged ≤ 5 Years, Who Had Diarrhea in The Two Weeks Preceding The Survey by Feeding Practice During Diarrhea and Residence.

Diarrheal management	Urban	Rural	Total
As before	55.6	42.9	46.7
Gave less than regular	22.2	23.8	23.3
Gave more than regular	22.2	9.5	13.3
Did not give any food	0.0	4.8	3.3
Others	0.0	19.0	13.3

Data source: NHDSBD 2011

4.9.3: Prevalence of anemia (Hb level)

Table 4.9.3.a shows that percent distribution and degree of anemia (Hb level) among non pregnant women of age 13 - 40 years by age (13 -40 years) and residence. In Sylhet division 95.7% of women are anemic, 100% women of age 13 -18 are anemic. Almost the same results are shown in urban and rural areas of all districts in Sylhet division except Moulavibazar. 100% women are suffering from any level of anemia in urban and rural areas of Moulavibazar district.

Table 4.9.3.a: Percent Distribution and Degree of Anemia (Hb level) Amongst Non Pregnant Women (NP) of Age 13-40 Years by Age and Residence.

Anemia prevalence		Severe anemia	Moderate anemia	Mild anemia	Any level of anemia	Number of women
		NP < 7.0 g/dl	NP (7.0-9.9) g/dl	NP (10.0-11.9) g/dl	NP < 12.0 g/dl	
Sylhet division (age)	13-18	25.0	62.5	12.5	100.0	8
	>18-40	24.0	56.5	15.0	95.5	200
Hobigonj	13-18	0	50.00	50.00	100.0	2
	>18-40	10.00	67.50	20.00	97.5	40
Moulvibazar	13-18	50.00	50.00	0.00	100.0	2
	>18-40	31.58	52.63	15.79	100.0	38
Sunamgonj	13-18	100.00	0.00	0.00	100.0	1
	>18-40	37.74	50.94	7.55	96.23	53
Sylhet	13-18	0.00	100.00	0.00	100.0	3
	>18-40	17.39	56.52	17.39	91.3	69
Sylhet Division (Residence)	Urban	24.6	59.6	12.3	96.5	57
	Rural	23.8	55.6	15.9	95.4	151
	All	24.0	56.7	14.9	95.7	208
Hobigonj	Urban	28.6	71.4	0.0	100.0	7
	Rural	5.7	65.7	25.7	97.1	35
Moulvibazar	Urban	62.5	25.0	12.5	100.0	8
	Rural	25.0	59.4	15.6	100.0	32
Sunamgonj	Urban	24.0	68.0	4.0	96.0	25
	Rural	51.7	34.5	10.3	96.6	29
Sylhet	Urban	5.9	58.8	29.4	94.1	17
	Rural	20.0	58.2	12.7	90.9	55

Data source: NHDSBD 2011

4.9.4: Prevalence of common diseases of old age people

The percent distribution of common diseases of old age people by residence is shown in table 4.9.4.a The result is 28.8% of the old age people have gastric and hazy vision problem, 10.2% have pain in knee, 8.5% have heart problem (whom all are living in rural area), 5.1% have diabetes and digestive problem (prevalence of diabetes and digestion problem, both are higher in urban old age people than in rural age people), 3.4% have hearing problem and 1.7% have teeth problem. Prevalence of diabetes (16.7%) and heart problem (25%) both are higher in Hobigonj district. 100% urban old population of Sunamgonj district are suffering from teeth problem. Hazy vision problem is higher in Moulavibazar district (41.2%) respectively in Hobigonj (33.3%), Sylhet (23.8%), Sunsmgonj (11.1%). 55.6% old people of Sunamgonj district are suffering gastric problem. So it is observed that almost 72% old people are suffering from various diseases in Sylhet division.

Table 4.9.4.a: Percent Distribution of Common Diseases of Old Age People (self-reported) by Residence.s

Prevalence of chronic disease		Diabetes	Heart problem	Pain in knee	Teeth problem	Digestion problem	Hazy vision	Hearing problem	Gastric	Others
Sylhet Division	Urban	6.7	-	6.7	6.7	13.3	40.0	13.3	13.3	-
	Rural	4.5	11.4	11.4	-	2.3	25.0	-	34.1	11.4
	Total	5.1	8.5	10.2	1.7	5.1	28.8	3.4	28.8	8.5
Hobigonj	Urban	16.7	-	-	-	16.7	50.0	-	16.7	-
	Rural	16.7	50.0	-	-	-	16.7	-	-	16.7
	Total	16.7	25.0	-	-	8.3	33.3	-	8.3	8.3
Moulavibazar	Urban	-	-	-	-	20.0	40.0	40.0	-	-
	Rural	-	8.3	-	-	-	41.2	-	16.7	33.3
	Total	-	5.9	-	-	5.9	-	11.8	11.8	23.5
Sunamgonj	Urban	-	-	-	100.0	-	-	-	-	-
	Rural	-	-	25.0	-	-	12.5	-	62.5	-
	Total	-	-	22.2	11.1	-	11.1	-	55.6	-
Sylhet	Urban	-	-	33.3	-	-	33.3	-	33.3	-
	Rural	5.6	5.6	16.7	-	5.6	22.2	-	44.4	-
	Total	4.8	4.8	19.0	-	4.8	23.8	-	42.9	-

Data source: NHDSBD 2011

4.10 Nutritional status:

In order to function at an optimum level (to grow and develop, work and be active and go through pregnancy and breast feeding), the human body needs appropriate and adequate nutrition. Under nutrition is a leading cause of lifelong harm to productivity and earning potential and to lower educational attainment through impaired physical and mental development. It also leads to poor health through reducing immunity and increasing susceptibility to diseases. In contrast, well nourished people are a key resource for national development. That's why I calculated the nutritional status of house hold members by collected anthropometric data in my study.

4.10.1: Percent distribution of undernourished children (aged <5 to 10 years)

Table 4.10.1.a shows the nutritional status of less than 5 years children as measured by stunting, wasting and underweight indicator. The result is 51% boys and 46% girls are stunted, 20% boys and 23% girls are wasted, 51% boys and 45.8% girls are under weight, 20% children are severely stunted as follow 7.3% are severely wasted and 21% are severely underweight. Almost same result shows at Hobigonj and Sylhet district and slightly different scenario are observed in Moulavibazar and Sunamgonj district. In Moulavibazar, wasted and underweight children are higher and stunted children are lower and in Sunamgonj, stunted children are higher and wasted children are lower compared with other district of Sylhet division.

Table 4.10.1.a: Percent Distribution of Undernourished children Aged <5 by Anthropometric Indicator of Nutritional status: Height for Age (stunting), Weight for Height (wasting), and Weight for Age (underweight) by Residence.

Cut of points (Z-scores)		Hight for age (stunting)		Weight for hight (wasting)		Weight for age (underweight)	
		Male	Female	Male	Female	Male	Female
Sylhet Division)	Severe (<= -3 SD)	22.4	17.6	9.0	5.6	18.6	23.4
	Mild & Moderate (<= -2SD)	28.6	29.0	11.0	17.9	32.4	22.4
	Normal (> -2SD)	49.0	53.4	80.0	76.5	49.0	54.2
	Mean (Z- scores)	-1.9	-1.8	-1.1	-1.0	-1.9	-1.9
	Total (<=-2SD and <=-3SD)	51.0	46.6	20.0	23.5	51.0	45.8
Hobigonj	Severe (<= -3 SD)	13.2	20.9	5.3	8.9	17.9	28.3
	Mild & Moderate (<= -2SD)	31.6	34.9	13.2	15.6	30.8	21.7
	Normal (> -2SD)	55.3	44.2	81.6	75.6	51.3	50.0
	Mean (Z- scores)	-1.8	-2.1	-1.1	-1.0	-1.8	-1.9
	Total (<=-2SD and <=-3SD)	44.7	55.8	18.4	24.4	48.7	50.0
Moulavibazar	Severe (<= -3 SD)	22.7	10.8	11.4	5.4	26.7	21.1
	Mild & Moderate (<= -2SD)	31.8	13.5	15.9	24.3	37.8	26.3
	Normal (> -2SD)	45.5	75.7	72.7	70.3	35.6	52.6
	Mean (Z- scores)	-2.1	-1.6	-1.5	-0.9	-2.4	-1.9
	Total (<=-2SD and <=-3SD)	54.5	24.3	27.3	29.7	64.4	47.4
Sunamgonj	Severe (<= -3 SD)	23.1	28.3	7.5	0.0	12.5	25.5
	Mild & Moderate (<= -2SD)	30.8	32.6	2.5	15.2	37.5	17.0
	Normal (> -2SD)	46.2	39.1	90.0	84.8	50.0	57.4
	Mean (Z- scores)	-1.9	-2.2	-0.7	-0.7	-1.9	-1.9
	Total (<=-2SD and <=-3SD)	53.8	60.9	10.0	15.2	50.0	42.6
Sylhet	Severe (<= -3 SD)	26.7	11.9	10.3	7.4	17.5	20.0
	Mild & Moderate (<= -2SD)	24.0	31.3	11.5	17.6	27.5	24.3
	Normal (> -2SD)	49.3	56.7	78.2	75.0	55.0	55.7
	Mean (Z- scores)	-2.0	-1.4	-0.9	-1.2	-1.7	-1.9
	Total (<=-2SD and <=-3SD)	50.7	43.3	21.8	25.0	45.0	44.3

Data source: NHDSBD 2011

Table 4.10.1.b shows the nutritional status of 5 to 10 years children as measured by stunting, wasting and underweight indicator. Overall Nutritional status of 5 to 10 years children of Sylhet division is - 18.5% children are severely stunted, as follows 4.5% wasted, 16.2% underweight. In term of stunting (Hight for age), almost same result shows in all district of Sylhet division. The lowest prevalence (boys 16.3% and girls

16.3%) of wasting is observed in Sylhet district. The prevalence of underweight children is higher in Moulavibazar (boys 76.2% and girls 50%) and lower in Sunamgonj (boys 28.6% and girls 38.5%). Boys are at most vulnerable satiation than girls in this group.

Table 4.10.1.b: Percent Distribution of Undernourished Children Aged 5to10years by Anthropometric Indicator of Nutritional Status: Height for Age (stunting), Weight for Height (wasting), Weight for Age (underweight) by Residence.

Cut of points (Z-scores)		Hight for age (stunting)		Weight for hight (wasting)		Weight for age (underweight)	
		Male	Female	Male	Female	Male	Female
Sylhet (Division) Overall	Severe (≤ -3 SD)	18.5	18.5	6.3	2.7	18.6	13.8
	Mild & Moderate (≤ -2 SD)	27.8	29.4	18.8	17.7	34.5	31.7
	Normal (> -2 SD)	53.7	52.1	75.0	79.6	46.9	54.5
	Mean (Z- scores)	-1.9	-1.8	-1.3	-1.0	-2.1	-2.0
	Total (≤ -2 SD and ≤ -3 SD)	46.3	47.9	25.0	20.4	53.1	45.5
Hobigonj	Severe (≤ -3 SD)	29.6	20.7	3.6	3.8	32.1	10.3
	Mild & Moderate (≤ -2 SD)	18.5	20.7	25.0	23.1	28.6	27.6
	Normal (> -2 SD)	51.9	58.6	71.4	73.1	39.3	62.1
	Mean (Z- scores)	-2.1	-1.7	-1.5	-1.2	-2.3	-1.9
	Total (≤ -2 SD and ≤ -3 SD)	48.1	41.4	28.6	26.9	60.7	37.9
Moulavibazar	Severe (≤ -3 SD)	14.3	14.3	14.3	0.0	33.3	7.1
	Mild & Moderate (≤ -2 SD)	38.1	14.3	28.6	23.1	42.9	42.9
	Normal (> -2 SD)	47.6	71.4	57.1	76.9	23.8	50.0
	Mean (Z- scores)	-1.9	-1.6	-2.2	-1.4	-2.6	-1.9
	Total (≤ -2 SD and ≤ -3 SD)	52.4	28.6	42.9	23.1	76.2	50.0
Sunamgonj	Severe (≤ -3 SD)	0.0	4.0	7.1	0.0	0.0	7.7
	Mild & Moderate (≤ -2 SD)	35.7	44.0	14.3	20.0	28.6	30.8
	Normal (> -2 SD)	64.3	52.0	78.6	80.0	71.4	61.5
	Mean (Z- scores)	-1.2	-1.5	-1.2	-1.0	-1.7	-1.7
	Total (≤ -2 SD and ≤ -3 SD)	35.7	48.0	21.4	20.0	28.6	38.5
Sylhet	Severe (≤ -3 SD)	19.6	25.5	4.1	4.1	10.0	20.4
	Mild & Moderate (≤ -2 SD)	26.1	31.4	12.2	12.2	36.0	31.5
	Normal (> -2 SD)	54.3	43.1	83.7	83.7	54.0	48.1
	Mean (Z- scores)	-1.9	-2.1	-0.9	-0.9	-2.0	-2.1
	Total (≤ -2 SD and ≤ -3 SD)	45.7	56.9	16.3	16.3	46.0	51.9

Data source: NHDSBD 2011

4.10.2: Nutritional status of households aged 11 to above 60 years

Table 4.10.2.a presents the nutritional status of household aged 11 to 19 years of both sexes by residence. Nutritional status of 11 to 19 years of male is more vulnerable than female in both urban and rural area. Overall nutritional status of 17.6% boys and 46.2% girls are normal while 82.4% boys and 50% girls are under weight, 3.8% girls are overweight while no boys are in this group. It is observed that there is no obese adolescent in Sylhet division. Almost same results are observed in all district of Sylhet division except Hobigonj (100% male and 50% female are underweight).

Table 4.10.2.a: Percent Distribution of Nutritional Status (BMI criteria for ASIAN) of Households Aged 11 to 19 years by Sex and Residence.

Residence	BMI categories	BMI (kg/m ²) cut off points	Urban		Rural		Total	
			Male	Female	Male	Female	Male	Female
Sylhet Division	Under weight	<17.5	72.7	46.7	85.0	52.1	82.4	50.0
	Normal	17.5-22.99	27.3	50.0	15.0	43.8	17.6	46.2
	Over weight	23.00-27.99	-	3.3	-	4.2	-	3.8
	Obese	>=28	-	-	-	-	-	-
Hobigonj	Under weight	<17.5	100.0	66.7	100.0	37.5	100.0	50.0
	Normal	17.5-22.99	-	33.3	-	50.0	-	42.9
	Over weight	23.00-27.99	-	-	-	12.5	-	7.1
	Obese	>=28	-	-	-	-	-	-
Moulavi Bazar	Under weight	<17.5	100.0	22.2	80.0	54.5	85.7	40.0
	Normal	17.5-22.99	-	66.7	20.0	45.5	14.3	55.0
	Over weight	23.00-27.99	-	11.1	-	-	-	5.0
	Obese	>=28	-	-	-	-	-	-
Sunamgonj	Under weight	<17.5	50.0	42.9	100.0	50.0	88.9	46.7
	Normal	17.5-22.99	50.0	57.1	-	50.0	11.1	53.3
	Over weight	23.00-27.99	-	-	-	-	-	-
	Obese	>=28	-	-	-	-	-	-
Sylhet	Under weight	<17.5	66.7	62.5	73.7	57.1	72.0	58.6
	Normal	17.5-22.99	33.3	37.5	26.3	38.1	28.0	37.9
	Over weight	23.00-27.99	-	-	-	4.8	-	3.4
	Obese	>=28	-	-	-	-	-	-

Data source: NHDSBD 2011

Table 4.10.2.b present the percent distribution of nutritional status (BMI criteria for ASIAN) of households aged 15 to 49 years by sex and residence. The overall nutritional status of 15 to <49 years of male 64.5% and female 65.1% have normal BMI, male 17.4% and female 19.1% is under weight, male 14.0% and female 13.2% is overweight, male 4.1% and female 2% is obese in Sylhet division. Females stay at more vulnerable situation than male in both urban and rural areas of Moulavibazar and Sylhet district in productive group. The prevalence of thinness is highest (men 25% and women 19.6%) in Hobigonj district. Considering total overweight and obesity (BMI \geq 28), prevalence is highest in Moulavibazar (male 31.6% and female 14.2%) and lowest in Hobigonj (men 9.7% and women 15.2%).

Table 4.10.2.b: Percent distribution of Nutritional status (BMI criteria for ASIAN) of households aged 15 to 49 years by sex and residence.

Residence	BMI categories	BMI (kg/m ²) cut off points	Urban		Rural		Total	
			Male	Female	Male	Female	Male	Female
Sylhet Division	Under weight	<17.5	15.4	18.9	17.9	19.2	17.4	19.1
	Normal	17.5-22.99	50.0	62.2	68.4	67.3	64.5	65.7
	Over weight	23.00-27.99	23.1	16.5	11.6	11.7	14.0	13.2
	Obese	\geq 28	11.5	2.4	2.1	1.8	4.1	2.0
Hobigonj	Under weight	<17.5	12.5	21.2	30.4	18.6	25.8	19.6
	Normal	17.5-22.99	50.0	60.6	69.6	67.8	64.5	65.2
	Over weight	23.00-27.99	37.5	12.1	-	8.5	9.7	9.8
	Obese	\geq 28	-	6.1	-	5.1	-	5.4
Moulavi Bazar	Under weight	<17.5	-	27.8	12.5	16.1	10.5	20.7
	Normal	17.5-22.99	-	63.9	68.8	66.1	57.9	65.2
	Over weight	23.00-27.99	33.3	8.3	18.8	14.3	21.1	12.0
	Obese	\geq 28	66.7	-	-	3.6	10.5	2.2
Sunamgonj	Under weight	<17.5	37.5	14.3	17.6	19.2	24.0	17.5
	Normal	17.5-22.99	37.5	64.3	64.7	76.9	56.0	72.5
	Over weight	23.00-27.99	25.0	17.9	17.6	3.8	20.0	8.8
	Obese	\geq 28	-	3.6	-	-	-	1.3
Sylhet	Under weight	<17.5	-	10.0	15.0	20.5	12.8	18.4
	Normal	17.5-22.99	85.7	60.0	67.5	64.1	70.2	63.3
	Over weight	23.00-27.99	-	30.0	12.5	15.4	10.6	18.4
	Obese	\geq 28	14.3	-	5.0	-	6.4	-

Data source: NHDSBD 2011

Table 4.10.2.c present percent distribution of Nutritional status (BMI criteria for ASIAN) of households aged 49 to 60 years by sex and residence. It was revealed that 28.6% male and 29.0% female aged 49 to 60 is underweight , as follows 57.1% male and 51.6% female have normal BMI, 14.3% male and 16.1% female are overweight. Prevalence of under nutrition or thinness is highest (men 50% and women 36.4%) in Habigonj district and lowest (men 25% and women 16.7%) in Sylhet district. There is no obese male in this age group (49 to 60 years) in Sylhet division.

Table 4.10.2.c: Percent Distribution of Nutritional Status (BMI criteria for ASIAN) of Households Aged 49 to 60 years by Sex and Residence.

Residence	BMI categories	BMI (kg/m ²) cut off points	Urban		Rural		Total	
			Male	Female	Male	Female	Male	Female
Sylhet Division	Under weight	<17.5	42.9	60.0	14.3	23.1	28.6	29.0
	Normal	17.5-22.99	42.9	40.0	71.4	53.8	57.1	51.6
	Over weight	23.00-27.99	14.3	-	14.3	19.2	14.3	16.1
	Obese	>=28	-	-	-	3.8	-	3.2
Hobigonj	Under weight	<17.5	66.7	60.0	-	16.7	50.0	36.4
	Normal	17.5-22.99	33.3	40.0	100.0	50.0	50.0	45.5
	Over weight	23.00-27.99	-	-	-	33.3	-	18.2
	Obese	>=28	-	-	-	-	-	-
Moulavi Bazar	Under weight	<17.5	33.3	-	-	25.0	20.0	25.0
	Normal	17.5-22.99	33.3	-	100.0	25.0	60.0	25.0
	Over weight	23.00-27.99	33.3	-	-	25.0	20.0	25.0
	Obese	>=28	-	-	-	25.0	-	25.0
Sunamgonj	Under weight	<17.5	-	-	-	50.0	-	50.0
	Normal	17.5-22.99	-	-	100.0	50.0	100.0	50.0
	Over weight	23.00-27.99	-	-	-	-	-	-
	Obese	>=28	-	-	-	-	-	-
Sylhet	Under weight	<17.5	-	-	33.3	16.7	25.0	16.7
	Normal	17.5-22.99	100.0	-	33.3	66.7	50.0	66.7
	Over weight	23.00-27.99	-	-	33.3	16.7	25.0	16.7
	Obese	>=28	-	-	-	-	-	-

Data source: NHDSBD 2011

Nutritional status of the older people (age ≥ 60 years) by sex and residence is presented in table 4.10.2.d. It is observed that 61.9% old male and 55.2% old female are underweight. As follows only 38.1% male and 27.6% female have normal BMI. There were no obese old people in Sylhet division.

Table 4.10.2.d: Percent distribution of Nutritional status (BMI criteria for ASIAN) of households aged above 60 years by sex and residence.

Residence	BMI categories	BMI (kg/m ²) cut off points	Urban		Rural		Total	
			Male	Female	Male	Female	Male	Female
Sylhet Division	Under weight	<17.5	60.0	57.1	62.5	54.5	61.9	55.2
	Normal	17.5-22.99	40.0	14.3	37.5	31.8	38.1	27.6
	Over weight	23.00-27.99	-	28.6	-	13.6	-	17.2
	Obese	≥ 28	-	-	-	-	-	-
Hobigonj	Under weight	<17.5	66.7	66.7	75.0	100.0	71.4	83.3
	Normal	17.5-22.99	33.3	-	25.0	-	28.6	-
	Over weight	23.00-27.99	-	33.3	-	-	-	16.7
	Obese	≥ 28	-	-	-	-	-	-
Moulavi Bazar	Under weight	<17.5	100.0	33.3	60.0	50.0	66.7	42.9
	Normal	17.5-22.99	-	33.3	40.0	50.0	33.3	42.9
	Over weight	23.00-27.99	-	33.3	-	-	-	14.3
	Obese	≥ 28	-	-	-	-	-	-
Sunamgonj	Under weight	<17.5	-	100.0	-	60.0	-	66.7
	Normal	17.5-22.99	-	-	100.0	40.0	100.0	33.3
	Over weight	23.00-27.99	-	-	-	-	-	-
	Obese	≥ 28	-	-	-	-	-	-
Sylhet	Under weight	<17.5	-	-	66.7	40.0	57.1	40.0
	Normal	17.5-22.99	100.0	-	33.3	30.0	42.9	30.0
	Over weight	23.00-27.99	-	-	-	30.0	-	30.0
	Obese	≥ 28	-	-	-	-	-	-

Data source: NHDSBD 2011

4.11 Association between nutrition, health and food security

Child immunization coverage and child diarrheal management is not associated with their households income and food security situation. Related table of immunization and diarrheal management are listed on annex.

Table 4.11.1 present the relation between prevalence of anemia and household income .No association found among this two variable.

Table 4.11.1: Percent Distribution and Degree of Anemia Amongst Non Pregnant Women (aged 13-40) by Household Income.

Prevalence of anemia	Income					
	Rank1	Rank2	Rank3	Rank4	Rank5	Total
Severe Anemia	28.3	14.3	25.9	21.1	28.6	24
Moderate Anemia	64.2	54.3	51.9	63.2	46.4	56.7
Mild/Any level of Anemia	7.5	31.4	22.2	15.8	25	19.2
Chi-Square Value	11.26					
p value	0.2					

Data source: NHDSBD 2011

In the table 4.11.2, it is observed that there is no association found between anemic non pregnant women and the situation of food security of their family. So that, food insecurity is not the cause of anemia of non pregnant women in Sylhet division.

Table 4.11.2: Percent Distribution of Prevalence of Anemia Among Non Pregnant Women (aged 13-40) by the Situation of Food Security

Prevalence of anemia	Food secure	Mildly Food Insecure	Moderately/severely Food Insecure	Total
Severe Anemia	27.2	13.5	15.4	24.0
Moderate Anemia	50.6	75.7	76.9	56.7
Mild/Any level of Anemia	22.2	10.8	7.7	19.2
Chi-Square Value	10.05			
p value	0.04			

Data source: NHDSBD 2011

There is no relation found between common diseases of old people and their households income and food security .Related table of this topic is shown on annex.

Table 4.11.3 shows the nutritional status of children aged ≤ 5 by income. It is proof that malnutrition such as stunting of ≤ 5 years children is associated with income. Children in highest income, households are less suffering from stunting and it increases with decreasing income .

Table 4.11.3: Percent distribution of Malnourished Children Aged ≤ 5 Years by Anthropometric Indicator: Height For Age (stunting) by Household Income.

Cut of point (Z-score)	Income				
	Rank-1	Rank-2	Rank-3	Rank-4	Rank-5
Total stunting ($< -2SD$ and $\leq 3 SD$)	64.8	56.3	47.7	37.1	32.8
Severe ($\leq - 3SD$)	35.2	15.6	20.2	12.9	10.3
Mild & Moderate ($\leq -$ $2SD$)	29.5	40.6	27.5	24.3	22.4
Normal ($> -$ $2SD$)	35.2	43.8	52.3	62.9	67.2
χ^2	29.65532				
P value	0.000243				

Data source: NHDSBD 2011

In the table 4.11.4 it is observed that malnutrition in form of stunting is associated with food security. Children in severely food insecure households are 100% stunted and it is decreased with food security.

Table 4.11.4: Percent Distribution of Nutritional Status (stunting) aged ≤ 5 Years by Food Security.

Cut of points (Z-scores)	Food secure	Mildly food insecure	Moderately food insecure	Severely food insecure
Total stunting	46.1	55.2	61.5	100.0
Severe (≤ -3 SD)	18.8	20.9	46.2	20.0
Mild & Moderate (≤ -2 SD)	27.3	34.3	15.4	80.0
Normal (> -2 SD)	53.9	44.8	38.5	0.0
X2 value	15.0			
P value	0.02			
P value	0.02			

Data source: NHDSBD 2011

The relation between nutritional status of adolescent households and income is shown in table 4.11.5 and the result is no association found between income and the percent of malnourished adolescent households.

Table 4.11.5: Percent Distribution of Nutritional Status of HH (aged 11-19) by BMI (ASIAN) and HH Income.

BMI (kg/m ²) cut off points	Income					
	Rank1	Rank2	Rank3	Rank4	Rank5	Total
Normal	26.3	28.6	42.9	32.6	40.0	34.9
Malnourished	73.7	71.4	57.1	67.4	60.0	65.1
Chi-square value	2.034					
P-Value	0.730					

Data source: NHDSBD 2011

Table 4.11.6 reveals that nutritional status of 10-19 years and households food security situation are not consistent.

Table 4.11.6: Percent Distribution of Nutritional Status of Adolescent Households by Food Security.

Cut of points (Z-scores)	Food secure	Mildly food insecure	Moderately/severely food insecure	Total
Normal	35.9	27.8	37.5	34.9
Malnourished	64.1	72.2	62.5	65.1
Chi-square value	0.473			
P-Value	0.789			

Data source: NHDSBD 2011

CHAPTER: 5
KEY FINDINGS & CONCLUSION

5.1 Key findings

Aim of this study was to evaluate nutrition, health and food security of poor people in Sylhet division. In order to address it, attempt has also been taken to evaluate the socio-economic condition, nutritional status, health status and food security situation of poor people in study area.

Socio-economic condition: It is revealed that About 80.4% of the respondents are aged between 20 to 40 years where 93.8% of women are in this group. Almost all respondent are currently married (99.3%). Considering the occupational status, the most common occupation of total respondent is day laborer (18.9%) and the second most common occupation is business (9.6%) while 98.3% of women are housewives. Monthly income of 50% respondent is low while 44.8% live in on lower middle income range.

Nutritional status: It is observed that 51% boys and 46% girls are stunted, 20% boys and 23% girls are wasted, 51% boys and 45.8% girls are under weight, 20% children are severely stunted as follow 7.3% are severely wasted and 21% are severely underweight. Nutritional status of 5 to 10 years children is - 18.5% children are severely stunted, as follows 4.5% wasted, 16.2% underweight. Boys are in more vulnerable satiation than girls in this group.

Health status: it was found that 87.6% of under five years children have been immunized. 8.6% of under 5 years children are suffering from diarrhea before two weeks of survey. 100% women of age 13 -18 are anemic and almost same result shows in urban and rural area in Sylhet. it is observed that almost 72% old people are suffering from various diseases.

Food security situation: 76.3% of all households never ever faced any kind of food shortage which indicating that these households are apparently food secured at least in terms of quantity of food. On the other hand 14% households sometimes and 9.7% households often face food shortage. At the same time, 80.3% households are food secured in Sylhet division and status of food security is associated with income. Range of food insecurity is higher in low income population than lower middle to high income population.

Relation among nutrition, health, food security and income of studied population:

Calorie and all nutrient intakes are lower in low income people than lower middle to high income people. As follows, intake of calorie and all nutrients in women is lower than male. It reveals that intake of calorie and macro nutrient is lower in Sylhet than other division of Bangladesh. Nutrient intake is increased with rising income level in Bangladesh. From the analysis it is proved that malnutrition such as stunting of ≤ 5 years children is associated with income. Children in highest income, households are less suffering from stunting and it increases with decreasing income. It also revealed that malnutrition in form of stunting is associated with food security. Children in severely food insecure households are 100% stunted and it is decreased with food security. There is no association found between prevalence of anemia and income level. So, occurrence of anemia is not dependent on income level of household.

5.2 Recommendation

- A long time follow up study is needed to know proper picture.
- Nutrition education programmes need to be conducted to teach these population.
- Same types of study should be conducted among other divisions of Bangladesh.
- Appropriate intervention program should be launched to improve the nutrition and health situation.

5.3 Conclusion

Half of the household live in low income family and almost same result shown about education (48.4% illiterate) which is associated with malnutrition of under 5 years children. 82% of adolescent boys and 50% of adolescent girls are underweight in this region. 100% of adolescent girls are suffering from various levels of anemia and shows 95% for non pregnant women. Energy consumption is not so good (1976kcal/day/person) which indicates the absolute poverty. Overall both male and female are in negative energy balance (male: -203; female: -207). It's a good news that 80% households are food secure but another 20 % are at various level of food insecurity.

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Annex

Annex 1

Table: Percent distribution of vaccination coverage for under 5 years children by household income.

Vaccination Coverage	Income					
	Rank1	Rank2	Rank3	Rank4	Rank5	Total
Has immunized but incomplete according to age						
BCG	93.4	91.5	92.1	92.2	98.2	93.3
Polio	89.5	89.8	92.1	92.2	94.5	91.5
DPT	88.2	88.1	91.0	92.2	94.5	90.7
Measles	75.0	72.9	78.7	73.4	85.5	77.0
Hepatitis 1	89.5	86.4	89.9	90.6	96.4	90.4
Hepatitis 2	89.5	86.4	91.0	90.6	94.5	90.4
Hepatitis 3	89.5	86.4	91.0	90.6	94.5	90.4
Completed all doses according to age						
BCG	93.4	91.5	92.1	92.2	98.2	93.3
Polio	89.5	89.8	92.1	92.2	94.5	91.5
DPT	88.2	86.4	89.9	90.6	94.5	89.8
Measles	75.0	72.9	76.4	71.9	85.5	76.1
Hepatitis 1	89.5	86.4	89.9	90.6	96.4	90.4
Hepatitis 2	89.5	86.4	91.0	90.6	94.5	90.4
Hepatitis 3	89.5	86.4	91.0	90.6	94.5	90.4

Data source: NHDSBD 2011

Annex 2**Table: Percent distribution of children aged ≤ 5 years, who had diarrhea in the two weeks preceding the survey its management by household income.**

Prevalence of Diarrhea and its management	Income				
	Rank-1	Rank-2	Rank-3	Rank-4	Rank-5
As before	40.0	25.0	50.0	40.0	80.0
Gave less than regular	40.0	-	16.7	20.0	20.0
Gave more than regular	10.0	50.0	-	20.0	-
Did not give any food	-	-	16.7	-	-
Others	10.0	25.0	16.7	20.0	-

Data source: NHDSBD 2011

Annex 3

Table: Percent distribution of common diseases of old age people by household income, expenditure and education.

Prevalence of chronic disease	Income					Total
	Rank-1	Rank-2	Rank-3	Rank-4	Rank-5	
Diabetes	-	-	-	17.6	-	5.1
Heart problem	25	-	-	11.8	6.3	8.5
Pain in knee	12.5	20	15.4	5.9	6.3	10.2
Teeth problem	-	-	7.7	-	-	1.7
Digestion problem	12.5	-	-	5.9	6.3	5.1
Hazy vision	12.5	60	15.4	29.4	37.5	28.8
Hearing problem	12.5	-	7.7	-	-	3.4
Gastric	12.5	20	38.5	23.5	37.5	28.8
Others	12.5	-	15.4	5.9	6.3	8.5
Chi-Square Value	29.66					
p value	0.59					

Data source: NHDSBD 2011

Table : Percent distribution of common diseases of old age people (self-reported) by food security.

Prevalence of chronic disease	Food secure	Mildly Food Insecure	Moderately Food Insecure	Severely Food Insecure	Total
Diabetes	6.0	-	-	-	5.1
Heart problem	8.0	16.7	-	-	8.5
Pain in knee	8.0	16.7	50.0	-	10.2
Teeth problem	2.0	-	-	-	1.7
Digestion problem	6.0	-	-	-	5.1
Hazy vision	26.0	50.0	-	100.0	28.8
Hearing problem	4.0	-	-	-	3.4
Gastric	32.0	-	50.0	-	28.8
Others	8.0	16.7	-	-	8.5
Chi-Square Value	12.7				
p value	0.97				

Data source: NHDSBD 2011