

CHAPTER 1

INTRODUCTION

1.1 Nature of the Disease:

Diarrhoea is both an epidemic and endemic disease in Bangladesh. It is also an economic burden in the country. Annual average diarrhoeal incidence rate in Bangladesh is 3.5 episodes per child per year and 260,000 children die every year from diarrhoea in Bangladesh. The cost incurred by patient's and the community in providing control and care is very important for the country (BRAC, 1993).

Loose or watery frequent movement of the bowels is called diarrhoea. Even one big volume of loose motion can be defined as diarrhoea. Generally, during diarrhoea, patient loss more fluid through stool associated with vomiting. In some cases, mucous, blood or both may be seen in diarrhoea stool. This condition is known as dysentery. Diarrhoea and dysentery are associated with many pathogens including bacteria, virus, protozoa and helminths (Black and others, 1980). Diarrhoeal stool may range from loose, semi-liquid, to a liquid consistency which may contain mucous, blood or both.

The incidence of all diarrhoeal episodes show little seasonal variation, except for few specific entero-pathogens. During the hot months of April to September diarrhoea due to entero-toxigenic E-coli is highest. While shigellosis is more prevalent during cold months. Rotavirus is present throughout the year but has a peak during December.

Diarrhoeal disease are predominantly human diseases, usually common in children below 5 years of age, spread mainly by faecal oral route, facilitated by the social environments surrounding man. Typical cases are characterized by the sudden onset of profuse, effortless, watery diarrhoea followed by vomiting, rapid dehydration, muscular cramps and suppression of urine.

Fluid is essential for life, Seventy percent of our body is composed of fluids. All essential body components such as blood, muscle, fat, skin, bones etc, contain fluid in different proportions.

In diarrhoea, the body loses salts and fluid via the stool. In severe diarrhoea, the body loses fluid very quickly, a situation that causes dehydration. Lacking sufficient fluid, blood becomes thick. This affects its normal flow. Diarrhoea is in most cases manifested by:

- a) Loose motion generally associated with vomiting which causes dehydration. In the initial stage its sign and symptoms are:
- b) Strong thirst
- c) Progressive weakness

If diarrhoea is treated promptly and adequately with Oral Rehydration Salt (ORS), the following symptoms will not develop. However, without proper treatment, the patients condition may deteriorate, and the following symptoms may appear:

- d) Sunken eyes
- e) Sunken fontanelle (in babies under 18 months)
- f) Hoarse voice
- g) Dry tongue
- h) Loose skin
- i) Reduce urination
- j) Low body temperature
- k) Feeble pulse, gradually becoming imperceptible
- l) Rapid breathing
- m) Muscle cramps (especially in adults)
- n) Convulsion
- o) Unconsciousness

All the symptoms caused by loss of electrolytes (salts) from the body. Loss of body fluid reduces the blood volume, causing the blood to become concentrated or thickened, if this condition is not corrected by replacement of fluid the patients may die.

1. 2 Diarrhoea in Bangladesh

The greatest killer in Bangladesh, especially among children, are diarrhoeal diseases (International Cholera and Diarrhoeal Disease Research, Bangladesh, 1994). Diarrhoeal disease is a major cause of morbidity and mortality among children in the country (UNICEF, 1985). It is also responsible for a large number of death in Bangladesh (Black and others 1980). Morbidity rate is 15.38 per year and mortality 11.5 per year (Annual Report, 1993; ICDDR,B).

Survey conducted by ICDDR,B in the year 1994, indicates that between 20% and 30% of all deaths are due to diarrhoeal diseases. Eradicating these diseases is a difficult job. Social circumstances riverain environment, water supply, use of unhygienic latrine and the people themselves creates difficulties. Diarrhoea is one of major disease that leads high morbidity and mortality. It was estimated that about 1 billion episodes of diarrhoea occurs annually among children aged below 5 years and these episodes are responsible for 5 million child deaths in each year. Repeated attack of the disease leads to the aggravation of physical condition of the victim in the form of chronic malnutrition, growth retardation and poor resistance against other infectious diseases. The economic impact from diarrhoea, through seemingly of great, is yet to be assessed.

Table 1.1 Pattern of leading diseases among children under 5 years old in Bangladesh (1992)

Diseases	1 Year	1-5Years
Diarrhoea	584866 (22.80%)	1315890 (18.92%)
Skin disease	372671 (14.53%)	895848 (12.88%)
ARI	268060 (10.45%)	615540 (8.85%)
Intestinal worm infection	153122 (5.97%)	829484 (11.93%)
PUO	151569 (5.91%)	355479 (5.11%)

Source: Health Information Report, Bangladesh (1993).

Note: ARI= Acute Respiratory Infection
PUO= Pyrexia of Unknown Origin

Table 1.1 shows the disease pattern of paediatric patients under 5 years of age in Bangladesh. The leading number of disease is diarrhoea. Among under 1 year age group is 22.80% and 1-5 years is 18.92%. The principal gastro-intestinal diseases are diarrhoea (presumably infective), bacillary dysentery and gastroenteritis. The principal respiratory diseases are broncho pneumonia, bronchitis, asthma and upper respiratory infections.

Health reports (Health information report, 1993) have shown that the incidence rate of diarrhoeal diseases is higher in rural areas (6.99%) than urban areas (5.95%) due to poor material conditions of life and behavioral patterns regarding diet and hygiene. In some developing countries diarrhoeal diseases may have a rate of attack as high as once every month during child second year of life during which the infant mortality rate from diarrhoea is at its highest while diarrhoeal diseases in children under 5 years can be fatal.

Table 1.2 shows the diarrhoeal disease pattern in Bangladesh. Diarrhoeal incidence was increasing in trends through out the period. It has been observed that the higher incidence of diarrhoea was in the year 1990 among under one year age group which has been declining since 1991. The incidence was also higher among the 1-5 years age group in the year 1991 which has also been declining since the 1992 as a result of the introduction of oral rehydration therapy and strengthening of the PHC activities by the government of Bangladesh.

Table 1.2 Trend of diarrhoeal diseases among children under 5 years old in Bangladesh (1988-1992).

Age (Yrs)	1988	1989	1990	1991	1992
< 1	493239 (20.07)	471374 (20.28)	1188423 (26.34)	521495 (21.70)	584866 (20.80)
15	1013412 (16.44)	984060 (16.44)	849778 (11.25)	1212873 (19.05)	1315890 (18.92)

Source: Health information report, Bangladesh, (1993).

The most vulnerable group to diarrhoeal diseases were under 5 year old children and of them infants had relatively high proportional morbidity due to diarrhoea. Two main danger of the disease especially for young children are death and malnutrition. Most deaths from diarrhoea are usually caused by excessive loss of body fluids and electrolyte through the process of dehydration.

Diarrhoeal dehydration is caused by a variety of infectious agent whose actions alter intestinal function by different mechanism and leads to a progressive diminution of blood volume. When the fluid loss exceeds 10 per cent deficit of the body weight, shock generally occurs and death is usually the result. This process of dehydration is especially faster among children which makes them most vulnerable and at highest risk among all age groups

Table 1.3 Age specific incidence of diarrhoeal illness among under-five children, in a Thana health complex of Bangladesh.

Age in years	Number of children observed	Diarrhoeal episodes	
		Nos.	Attack rate per 100 Children per year
< 1	279	227	81
1-4	1522	852	56
0-4	1801	1079	60

Source: Research of diarrhoeal disease, ICDDR,B (1993)

Table shows, about 1079 diarrhoea episodes occurred among 1801 under five children in a Thana of Narayanganj district in the year 1992 (ICDDR,B 1993) Among these children the average attack rate was 60 per 100 population per year. The age-specific attack rate was greatest for under one year old (81%) and decreased with increasing age for 1-4 years-old (56%).

A total of 276 surveys between 1981 and 1986 on diarrhoea morbidity, mortality and treatment under taken in 60 developing countries indicated that, an average, young child suffers an average of 3.5 episodes of diarrhoea per year. Results of these surveys have also shown that over one third of all deaths in children below 5 years of age is associated with diarrhoea. It was also mentioned that there were more than 750 million episodes of acute diarrhoea among children under 5 years of age each year in developing countries. Among all the infectious diseases, diarrhoeal illness have the greatest adverse effects on growth performance among young children through nutrient loss by the infectious process in the intestine and lack of intake due to loss of appetite in children who are already having nutritional deficiencies diarrhoea among young children accounts for four or five million deaths annually (ICDDR,B; 1991).

Therefore, compensation through Oral Rehydration Therapy (ORT) or hospital treatment would be essential to save the children from death. Such facilities are available in health care system and this also involves cost from the patients side. Therefore, this indirectly plays an important role in the management of diarrhoea.

In spite of scientific advances in the management of diarrhoeal disease, it continues to remain a major problem, especially in Bangladesh like other developing countries which have high diarrhoeal morbidity and mortality.

1.3 Diarrhoea Control in Bangladesh

Bangladesh lies between 20° 34 and 26° 38 north latitudes and 88° 00 and 92° 41 east longitudes and is bounded by the Bay of Bengal on the South and by India on the other three sides-East, North and West, except for a short border with Burma on the south east. It is more or less a flat country with a vast network of waterways flooding much of the land area during the monsoon. The country has a sub-tropical climate with mean annual temperature varying between 57° F and 80° F and annual rainfalls from 47 inches in the West to 136 inches in the South-East and 200 inches in the hilly region of the North-East.

Bangladesh emerged as a sovereign state on December 16, 1971. It is one of the least developed countries in the world with the land area of 147570 sq.km. and a large population of approximately 113.2 million. This presents a formidable challenge to economist, demographers and policy makers. According to 1991 census, population density stands 755 per sq.km. with 85 percent living in the rural areas. Population growth has declined from 2.48 percent to 2.05 percent between 1974 to 1991. Even with the declining rate, the problem of population growth is recognized as the most important national problem.

The total land utilization in 1990-91 was 85832 acres of which 5 percent was forest and 40 percent was cropped area, while 9 percent was not available for cultivation. Bangladesh remains a poor country with a per capita GNP of US \$ 210 and a GDP annual growth rate of 4.1%

despite devastation of war at its birth and regular buffet by natural disaster. In 1983/84, 66% of the urban population and 57% of the rural population were below poverty line (daily calorie intake less than 2122 k. cal/day/ person). Food grain production in the country was 9 million metric tons in 1960 which increased to 19.3 million metric tons in 1992 and has thus reached self sufficiency in terms of food grain production.

For communicable disease control program provision of latrine and safe water supply for drinking and washing are necessary. The report of pilot comprehensive health survey 1993 conducted by Bangladesh Bureau of Statistics (BBS) observed that only 10% of rural households use sanitary latrine while it is 45% in the urban area. As regards sources of water supply for drinking, cooking and washing, it was seen that 96% of the rural households get water supply from tubewell and 39% of the urban households use tubewell water. On the contrary, more urban household (61%) use tap water than rural household (8%) where this system of water supply is lacking.

Labor force of the country stands at 50.2 million; of which 65% are in agriculture, 16% in industry, 19% in services which leave approximately 1.2% of the population as unemployed.

Level of literacy among population is quite low, particularly among females. According to 1991 census, literacy rates of women and men at the national level reached 25% and 39% respectively of which 20% women and 42% men were from the rural areas and 44% women and 63% men in urban areas.

Life expectancy in Bangladesh is 56 years for male and 54 years for females. The infant and under five mortality has shown a slight downward trend over the years. The successful implementation of the EPI program in recent years along with increasing awareness and use of the ORT has increased child survival to a large extent. However, morbidity and mortality rates are still unacceptably high and much need to be done in the area of health and nutrition if the goals for the 1990 are to be met.

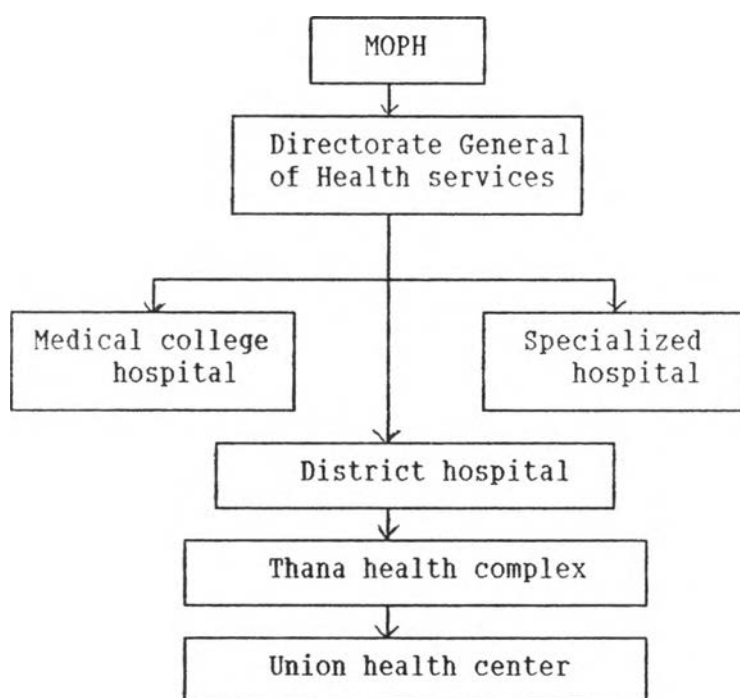
The health sector in Bangladesh is a composite of public and private. The pattern of hospitals are the teaching hospital, general hospital, specialized hospitals at the national level. There are teaching hospital running from 250-800 bed facilities. Each District headquarter has one District hospital, which is 50-100 bed. There are 460 Thana and each Thana has 31 bedded hospital having inpatient and outpatient facilities which is known as "Thana health complex". There are 4800 unions out of this only 2800 have health centers, which are known as "Union health center" functioning with only outpatient department (OPD) facilities (Figure 1.1).

The Health services of Bangladesh follow the administrative pattern of the country. At the national level the highest administrative authority is Ministry of public Health and Family planning which is responsible for policy making and macroplanning.

Under the Ministry there are two Director general one for Health services and one for family planning. The Director general of Health services is responsible for implementation of Health policies and programs. Deputy Directors one for each division. The chief of Health services in the district is Civil Surgeon who is supported by a number of officers and staff. The Civil Surgeon is responsible for overall management of health in District except in case of medical college, hospitals, which are headed by concerned Principals/Directors. In the Thana, Thana health and Family planning officers is responsible for Health care delivery in the thana and below. At the Union level, there are Health and Family Welfare Centers. One medical officer/medical assistance is incharge of this Union facility.

Tertiary hospitals provide the most specialized and sophisticate services and where most clinical research, education and training take place. They are usually located in large urban areas. The bed facilities of specialized hospitals range from 30-300.

Figure 1.1 Organizational Structure of Health Services of Bangladesh.



Note: MOPH (Ministry of public health)

District hospitals:

District hospitals generally are 50-250 bedded, serve 231,000 to 5840,000 inhabitants and include department of Medicine, Surgery, Pediatrics, Obstetrics and Gynecology and Dentistry. They also provide basic Anesthesia, Radiology and Clinical laboratory services. The District Hospital is the first level of referral hospital from Health centers and Health complexes. All the District hospitals are situated

in urban areas. They mainly provide inpatient care, but also typically provide some outpatient care. Because of their location, communication, and availability of equipment people consume their services beyond the hospital capacity and thus create excess demand and overutilization. The average bed occupancy rate of the District hospitals is 112%. Since most of the people live in the rural areas, where the Thana health complexes are the nearest hospitals free treatment facilities are provided to the rural population. However rural people prefer using the District hospital instead of their Thana health complex.

Thana health complexes:

All Thana health complexes are 31 bedded and almost all are situated in rural areas. The bed occupancy rate is 23%. However some health complexes which are nearer to the highway, due to good communication and road accidents the bed occupancy rate is higher. Over all, bed occupancy is rate is 52% in the country. The Thana health complexes provide drugs free of charge, but due to fixed budget allocation to there from government the quality of drugs is very poor, and also is not sufficient to run to the services for a whole year.

There are 8 doctors and other staff working in each Thana health complex, but due to the urban orientation doctors and other staff has least interest to stay in the rural areas. Also the hospitals are not equipped with modern equipments. Because of all these factors people has least confidence about the services provided by the hospital.

Health center:

Approximately 9-10 villages makes an union. Right now, 2800 Union health centers have been established. These Union health centers have only out patient department (OPD). Which takes care of only the mild cases. Each union has about 25,000 population. Some domiciliary services are also run by health workers.

Organisation of the anti- diarrhoeal program:

The Ministry of health is the authority to administer and operate of all health facilities. Most of the population receive anti-diarrhoeal treatment care through medical doctors, trained health assistants and other categories of health care of staff in the public health sector. Besides Public health sector like Thana health complexes, Union health centers etc, the private health practitioners and traditional healers also work in the field of diarrhoea management. But they are not able to manage the large number of dehydrated cases, which occur as a result of diarrhoeal attack. This large number of patients create different types of management problem such as need to create additional space for patients, the necessity for additional staff, drugs and others as well as more financial support for these additional activities.

The government of Bangladesh is in cooperation and collaboration with different national and international non-government organizations like UNICEF, ICDDR, B, WHO, BRAC etc in the campaign against diarrhoea. These organizations started the national oral rehydration program in 1982. The main objective of this program is to reduce mortality and morbidity from acute diarrhoeal diseases. The aim of this program is to extend the coverage of the whole country to lower the mortality from diarrhoeal diseases especially in rural and hard to reach village areas, where the medical care services are not sufficient.

In each union and village the union medical assistants, health inspectors, assistant health inspectors, health assistants and family welfare assistants are responsible for training and distribution of oral rehydration salt packets. From the union level downwards, local bodies, village committees and village health volunteers are working in the same field along with the government health personnel. These personnel educate the people regarding the preparation and use of oral rehydration salts besides other activities. Every village has 9-11 volunteer members from the villagers to form a committee and they are not government personnel. The village elders and oral rehydration workers on that committee work side by side to nominate the village voluntary health workers. Diarrhoea control consists of prevention of morbidity and mortality. For morbidity prevention, major efforts have been allocated to provision of safe and adequate water supply, promotion of breastfeeding and proper weaning, and health education for personal hygiene including use of latrine are undertaken as supplementary measures. For mortality prevention, the use of Oral Rehydration Therapy has been employed as the principal intervention.

The target of the National Diarrhoeal Disease Control Program is to cover 68,000 villages all over the country by the year 1995.

1.4 Problem and Rationale:

The population of Bangladesh is mainly rural based. The total population of Bangladesh is still increasing at a high rate that hindering development process of the country. Beside this, some of the health problems like diarrhoea, malnutrition, high birth rate and mortality rate etc. are creating another burden to the country.

Epidemics of diarrhoea are characteristically abrupt and often create an acute public problem. It has a high potential to spread fast and cause death. Diarrhoeal disease causes a heavy economic burden on health services, as children with diarrhoea occupy about 35% of all paediatric beds in Bangladesh.

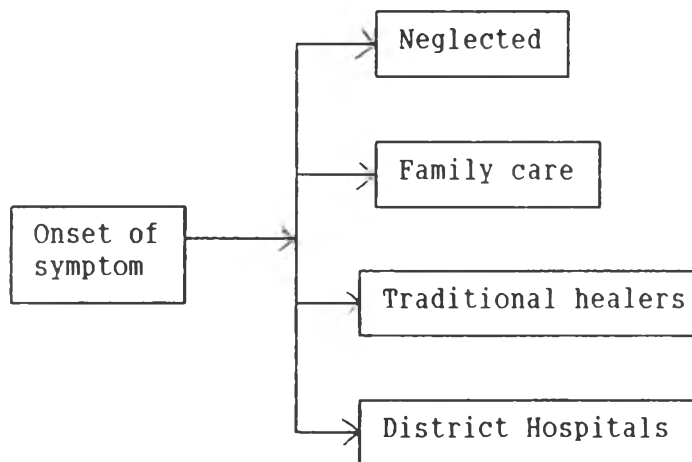
Rural poor people are mainly affected by diarrhoea. Most of the rural people use river, ponds and canals water for their household purpose. Some people know that if canal or river water is boiled it turn into safe drinking water, but due to their traditional habit they use polluted (without boiling) water for other household purposes. Poor

general hygiene, particularly among the rural population is the major cause for the prevalence of high rates of diarrhoeal diseases in Bangladesh.

Association between socio-economic and behavioral factors of the community with this diseases is well known. Provision of protected water supply and latrines are also not to the expected level. These in turn remain to be risk factors for the contraction of this disease. Under these circumstances, effective implementations of diarrhoeal disease control programs is a difficult task. Further, scarcity of financial and other resources also challenge the policy makers in the process of planning and decision making.

The health seeking behavior of receiving health care in rural people are different especially in low income groups. They are used to going to the traditional healers, Quacks, Homeopath etc. After recognizing an illness, a patient's family first responds to the symptoms by preparing home remedies, which are generally folk or traditional medicines. If the symptoms persist and the patient develops complications, they then move to the District hospital instead of Thana health complexes, even though the Thana health complexes are the nearest hospitals, having inpatient facilities which provides service free of charge. People do not have to pay anything if they receives health services in the Thana health complex. Also, they know that if they use them Thana health complex instead of District hospital they may save lot of money because most of the District hospitals are located at a greater distance from their homes and usually District hospitals are overcrowded with patients. The bed occupancy of District hospital is about 112%. In that case, rural people spend more waiting time to get the services, but still they prefer to move to the District Hospital instead of Thana health Complex (Figure 1.2).

Figure 1.2 Health seeking behavior of rural people in diarrhoeal cases.



All the Thana health complexes have to face many problems like low range of services, insufficient and inadequate trained manpower

etc. Thana health complexes are not equipped like District hospital. Knowledge and skills of the health assistants, who work in the remote areas of the villages are deficient often in health care matters related to the health needs of the community they serve. There are inadequate provisions of medicines, surgical equipments, laboratory and diagnostic facilities. There is no effective referral and follow up system for inpatient's care. The quality and quantity of health care services are low. This is mainly due to lack of appropriate clinical and managerial orientation of the care providers.

Inadequate housing facilities leading to doctor's absenteeism. Beside these, the health care system faces major constraints like transportation, communication and lack of community participation in local health care which is another impediment to adequate use of available manpower and facilities. Allocation of financial resources are inadequate for whole year.

So in the absence of an effective health care delivery system, the people become disappointed and as a result on the consumer's side utilization of Thana health complexes is being neglected.

Information on the economic aspects of the programs and effectiveness is essential for the planners to review the situation and plan further line of action. Examination of cost effectiveness of alternatives may help in designing and implementing efficient programs.

It is observed that many patients receive diagnosis and treatment from District hospital that is at a long transport away from their local health facilities. The main reasons are as follows:

- a) The health seeking behavior is different in rural people.
- b) Some patients have limited confidence in local personnel and believe District hospital will provide more effective service.
- c) Where diagnosis and investigation facilities is not immediately available some patients may go to the district hospital.

Patient's visit to the District hospital will determine the costs they incur in consuming treatment. It has been suggested that the extent of the travel to District hospital cause a considerable financial burden to many patients in relation to daily wage rate and also adds a significant additional cost to the cost of treatment. Various studies have been carried out in analyzing the cost incurred by providers in treating diarrhoeal cases (WHO, Thailand 1991 and Bangladesh, 1994). While less marked variations in consumer's cost are expected between different service points.

The cost incurred by the consumers are determined by many factors and it is worthwhile to have insight into this cost component.

Further, if the services are utilized at the nearest possible service points, the consequence of delay can be avoided. Inpatient's care can also be avoided if the correct treatment is received promptly.

In Bangladesh, where the incidence of diarrhoeal diseases continues to occur round the year, and where these diseases rank first among the top five diseases that cause mortality and mortality among children, it is essential to review the disease control situation. Though diarrhoeal control has been integrated in to Primary health care (PHC), majority of the people still seek care for diarrhoea at hospitals. Information on the reasons why the people seek hospital services may be useful to replan the disease control strategy.

Further, the financial burden imposed on the rural people in comparison with urban people need to be assessed. This is expected to serve as a guideline to improve the services at peripheral level and to promote prevention through effective strategies. A detailed cost analysis of receiving care at hospitals is of urgent need so as to tackle the situation. A methodology to do cost analysis from the prospective of consumers is also worth while to be developed. It will be useful to understand the health care seeking behavior of rural patients. If rural patients make extensive use of out station hospitals this could lead to underutilization of some facilities and overutilization of the others. Whether cost is a significant problem on the consumers side, it is important to be determined first and then consideration given to take action and improve rural health facilities as much as possible.

1.5 Research questions:

1. Primary:

- a) What are the cost incurred by diarrhoea inpatients from rural and urban areas in using District hospital ?
- b) What are the financial burden borne by the rural population seeking care in District hospital instead of Thana health complex and Health center ?

2. Secondary:

- a) How about the satisfaction perceived by the people towards the health care services at different service point ?
- b) What is the health seeking behavior in diarrhoea management in relation to socio-economic status of the people ?

1.6 Objectives of the Research :

1.6.1. General Objective:

To identify the cost difference between rural and urban diarrhoeal in-patients and the reasons of preferring the District hospital by the by rural patients instead of their nearest rural health facilities.

1.6.2. Specific Objectives:

- a) To find out the costs incurred by urban and rural diarrhoeal inpatients in different components for their treatment in the District hospital.
- b) To find out the reasons behind preferring the District hospital by the rural diarrhoeal inpatients.
- c) To assess the perceived satisfaction of health care delivery at different service points.

1.6.3. Hypothesis:

With the above state of knowledge the hypothesis is that:

- a) People from rural area incur different costs from the urban people while receiving inpatient care for diarrhoeal management at District hospitals.
- b) There is an association between occupation of the respondents and their satisfaction towards health services.
- c) There is an association between the educational status of the respondents and their satisfaction towards health services.

1.7 Benefit of the Study

- a) This study will give some information about the cost per case of rural and urban diarrhoeal patients especially.
- b) It will provide information about the cost per case of rural patient between Thana health complex and District hospital.
- c) It will elucidate the reasons why rural patients do not use the rural health facilities when they have diarrhoea.

- d) Policy guidelines that government can take to improve the health complex services in rural areas will be provided.
- * Cost analysis through this study will help the health service providers to find out the points of intervention for the improvement of health services for the effective utilization of the limited resources.
 - * This study will invite the attention of the health service provider to take action in the view to increase the satisfaction of rural people towards the rural health facilities. Ultimately rural people will utilize the rural health facilities for the treatment of their patient instead of District hospital, where they have to incur more cost.
- e) Finally it will stimulate further health economic studies in the department of health.

1.8 Scope and limitation of the study

This study should ideally be conducted in a District which is more diarrhoea prone. This would be more ideal in order to achieve the objectives of the study. However due to some constraints and limitations like time frame and budget. Thus, the Narayanganj District Hospital Bangladesh was selected as study place to utilize the scope of getting the required numbers of study population that is children below 5 years of age coming to the hospital for the treatment of diarrhoeal diseases. So far the desire and need of the research it was possible to collect with in three weeks.