

## **Location and Utilization Pattern of Health Care Facilities: A Case Study of Chandpur Sadar Pourashava**

**Md. Abu Taleb**\*

**Md. Sala Uddin**\*\*

### **Abstract**

*District level health care facilities and their sub centers are the secondary level of health care facilities. The rate of utilization of these health facilities is medium and conditional to physical and cultural factors. Spatial aspects other than quality and quantity of services should be considered in assessing the performance of these health facilities. Firstly the study focused on the location pattern of the health care facilities in Chandpur sadar pourashava. In this study river is found as a factor in explaining the location pattern of the health care facilities. Secondly the study focused on the utilization pattern of health care facilities. An attempt has been made to identify the determinants of health care facilities use pattern of the study area. The determinants include physical (river) and socio-economic variables; this discourages attendance as the inconvenience factors. Many of the respondents did not use the nearest facility. This, in fact, is in line with findings elsewhere but it is at variance with the planning notion of providing 'neighborhood' or 'community' health facilities. The Study also found that, for the poorer respondents, the nearest facility was not a public facility and so they often had to make long journeys. The high income respondents traveled to doctors with whom a good relationship is already established and who are situated either in the study area or outside the study area.*

**Key words:** Location pattern, Utilization, Health care facilities, Service area;

### **Introduction**

Bangladesh is a small country with an area of 147,570 sq. kilometers. It has an estimated population of nearly 142.32 million and about half of the population is under 15 years of age. Nearly 40 percent of the population of Bangladesh live below poverty line (BBS, 2011). Health and population statistics show that over the last forty-five years infant mortality and maternal mortality has steadily declined in Bangladesh and life expectancy has steadily risen (Feldman1987),. The percentage of people having access to safe drinking water and sanitary facility have improved significantly. There has been a rise in Expanded Programme on Immunization (EPI) coverage of children under one year of age between 1990 and 2011. There has also been a reduction of death rate due to diarrhea during last one and half decades. On the other hand the population of Bangladesh has steadily grown from 44 millions in 1941 and 71 million in 1974 to an estimated number of nearly 142.32 million in 2011. There is no doubt that the present medical facility either in public or in private sector cannot satisfactorily cope with the requirements of patients belonging to all class of population (Mitra et. All, 1997).The private sector medical services have been expanding involving huge amount of money, on the other hand

---

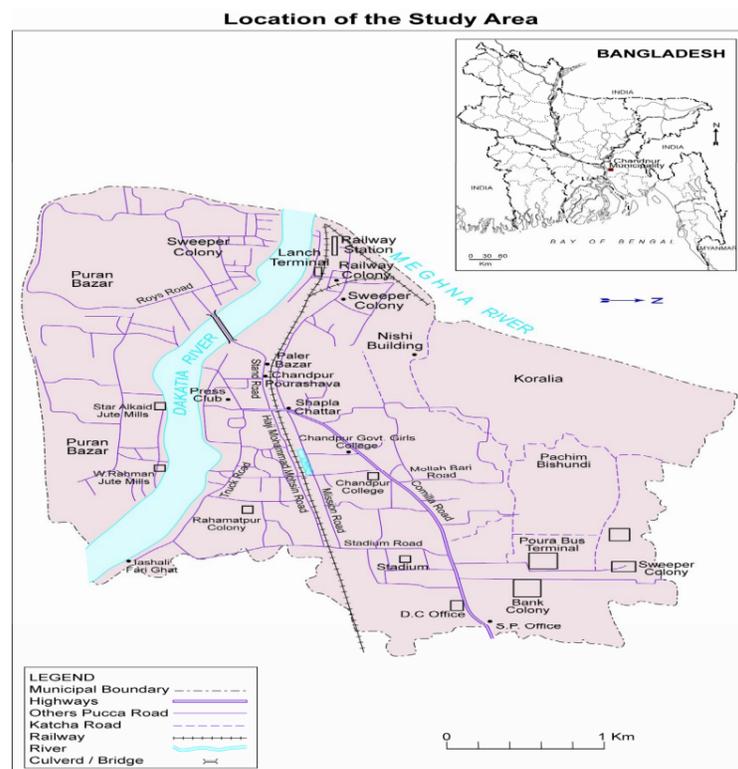
\*Lecturer in Geography and Environmental Studies, Manarat International University, Dhaka, Bangladesh

\*\*Senior Officer, Sonali Bank Limited, Chandpur Branch, Chandpur, Bangladesh.

the budgetary allocation in health sector from the government is not sufficient. Despite all these growth and advancement, millions of people of the country have been limited to the secondary and tertiary level medical services because of their poverty. Moreover thousands of the affluent have been going abroad each year for treatment and check-up. The Upazila Health Complexes were established to take health care services to the grass root people. But due to lack of adequate resources and improved management these facilities could not fulfill the growing demands of people.

### Study Area

Chandpur sadar pourashava (in Chandpur district) was selected as the study area. It was established in 1897. It has an area of 8.77 sq km and bounded by Tarpur Chandi union on the north, Ishali union on the south, Baghdadi union on the east and Meghna River on the west. The town has a population of 94821 where male are 50.77% and female are 49.23%. Literacy rate of the town people is 66.4% (BBS, 2011). Main rivers are lower Meghna and Dakatia. There are substantial number of health care centers in Chandpur sadar pourashava provided by the government, non-government, private and other organization. The number of doctors, nurses, medical assistants, beds and staffs available during the study in Chandpur sadar pourashava were 80, 162, 35, 392 and 725 respectively (Field survey, 2007).



### **Characteristics of the Respondents**

There are a lot of demographic and socio-economic characteristics of the studied population. Field survey (2007) indicates that 86.6% respondents were male whereas 13.4% respondents were female. Among the respondents 85.4 percent were Muslim, 13.4 percent were Hindu whereas only 1 percent was Christian. Of them 67.1 percent were married, 19.5 percent were unmarried, 6.1 percent were widow, 3.7 percent were widower and 3.7 percent were divorced. The survey finding showed that 22 percent had no education, 22 percent were Graduate. 17.1 percent had completed higher secondary certificate (HSC), 15.9 percent had completed class (1-5), 13.4 percent had completed post graduation and 3.7 percent had completed secondary school certificate (Uddin 2008).

### **Objectives**

The main objectives of this research are as follows:

- To find-out the location pattern of health care facilities in the study area;
- To determine the health care facilities provided by the study centers;
- To find-out the utilization pattern of health care facilities in the study area;

### **Materials and Methods**

The data for the fulfillment of the above objectives have been derived from both primary and secondary sources. Primary sample includes interviews and questionnaires. Questionnaire included questions on the measure of the socio economic condition of the care seekers (i.e. the respondents) like age, sex, education, income level etc. and health care utilization variables such as disease pattern, treatment seeking place, facilities available etc. which may be indicative of the measurement of utilization pattern of respondents. Secondary data have been collected from different sources like Ministry of health and family welfare, NIPORT, BBS, different published materials on this subject, Chandpur civil surgeon office, Daily news papers, P.G. hospital library, Department seminar, Public library, University science library, ICDDR,B library, Matlab and Internet sources. The questionnaire survey was also conducted in the different wards of Chandpur sadar pourashava to identify the different health care services available to the people. Information regarding services provided by the health centers was collected through direct interview as well as through questionnaire from the concerned health personnel's. . Observations were made on issues relevant to the service provided.

The collected data were processed through the Statistical Package for Social Sciences (SPSS) programme. Various types of charts and graphs are used to represent different aspects of the findings. The locational references of each health care centre are represented in the map and analyzed by two statistical methods namely Nearest Neighbor Index and Method of Circle.

## Results and Discussion

**Location Pattern of the Health Care Facilities in the Study Area:** Most of the health care centers are located at Comilla road, Stadium road, Haji Mohammad Mohossin road, Stand road, Chowdhury Ghat, Nutun bazaar, Kalibari, Baponibagh, and Jor Pukur Par. Two statistical methods have been used for the dispersion analysis of the health care facilities in the study area. The methods are given below:

**Nearest Neighbour Index:** The nearest neighbour idea is a useful technique for giving a rough appraisal of spacing features of dots. It serves as a descriptive method, with appropriate numerical information to allow a comparison of two or more distributions. The concept of nearest neighbour analysis was first put forward by plant ecologist, Clark and Evans, who were concerned chiefly with the spatial pattern of various species of plants and trees on the earth ( Hussain 1985). The analysis compares the existing distribution with the expected distribution that might occur under random conditions. The essence of the concept of nearest neighbour analysis is randomness (Cumper, 1984). The index ranges from 0-2.15. At first the health care facilities were grouped according to the ownership such as Governmental, Organizational and Private health care facilities. Expected mean distance ( $D_{ran}$ ) for each of the three groups is calculated by using the following formula:

$$D_{ran} = \frac{1}{2\sqrt{\frac{N}{A}}}$$

Here,  $D_{ran}$  = Expected mean distance  
 $N$  = Total number of health centers  
 $A$  = Total area of the study area in sq km.

Observed mean distance ( $D_{obs}$ ) for each of the three groups is calculated by using the following formula:

$$D_{obs} = \frac{\sum X}{N}$$

Here,  
 $D_{obs}$  = Observed mean distance  
 $\sum X$  = Sum of the distance  
 $N$  = Total number of health centers

Then the value of R is calculated of each of the group by using the following formula

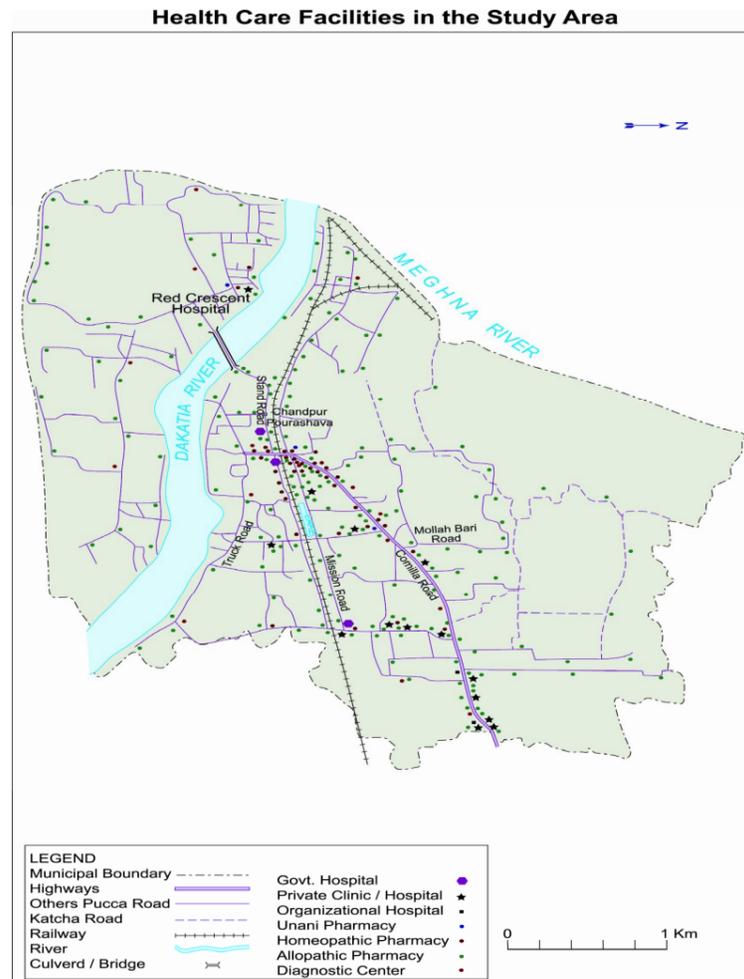
$$R = \frac{Dobs}{Dran}$$

Here,

R = Nearest neighbour index

Dobs = Observed mean distance

Dran = Expected mean distance



Source: Survey Department, Chandpur sadar pourashava. Map-2

**Calculation (From Map-2)****For private clinic/hospitals**

$$Dobs = \frac{\sum X}{N} = \frac{15.32}{14} = 1.09 \text{ cm}$$

According to map scale 3.1 cm = 1 km so, 1.09 cm =  $\frac{1.09}{3.1} \text{ km} = 0.35 \text{ km}$

$$Dran = \frac{1}{2\sqrt{\frac{N}{A}}} = \frac{1}{2\sqrt{\frac{14}{8.77}}} \quad (\text{As the total area of the study area is 8.77 sq km})$$

$$= \frac{1}{2\sqrt{1.6}} = \frac{1}{2.6} = 0.38 \text{ km}$$

$$R = \frac{Dobs}{Dran} = \frac{0.35}{0.38} = 0.90$$

**For organizational hospitals**

$$Dobs = \frac{\sum X}{N} = \frac{3}{2} = 1.5 \text{ cm}$$

According to map scale 3.1 cm = 1 km so, 1.5 cm =  $\frac{1.5}{3.1} \text{ km} = 0.48 \text{ km}$

$$Dran = \frac{1}{2\sqrt{\frac{N}{A}}} = \frac{1}{2\sqrt{\frac{2}{8.77}}} \quad (\text{As the total area of the study area is 8.77 sq km})$$

$$= \frac{1}{2\sqrt{.23}} = \frac{1}{0.96} = 1.04 \text{ km}$$

$$R = \frac{Dobs}{Dran} = \frac{0.48 \text{ km}}{1.04 \text{ km}} = 0.46$$

**For government hospitals**

$$Dobs = \frac{\sum X}{N} = \frac{6.3}{3} = 2.1 \text{ cm}$$

According to map scale 3.1 cm = 1 km so, 2.1 cm =  $\frac{2.1}{3.1} \text{ km} = 0.68 \text{ km}$

$$Dran = \frac{1}{2\sqrt{\frac{N}{A}}} = \frac{1}{2\sqrt{\frac{3}{8.77}}} \quad (\text{As the total area of the study area is } 8.77 \text{ sq km})$$

$$= \frac{1}{2\sqrt{.34}} = \frac{1}{1.16} = 0.86 \text{ km}$$

$$R = \frac{Dobs}{Dran} = \frac{0.68}{0.86} = 0.79$$

The obtained results are given by the following table

**Table-1**

Class	Dobs value (km)	Dran value (km)	R- value
Private clinic/ hospitals	0.35	0.38	0.90
Organizational hospitals	0.48	1.04	0.46
Government hospitals	0.68	0.86	0.79

Source: Calculation

The obtained R value (Table-1) of the private, government and organizational hospitals are 0.9, 0.46 and 0.79 respectively. This value indicates that the private clinic /hospitals are randomly distributed, the organizational hospitals (the observed mean distance is two times less than expected mean distance) are clustered distribution and the government hospitals are clustered to randomly distribute.

**Method of Circle:** Method of Circle is one kind of measures which describes dispersion about any chosen location (including the median centre) can be obtained by grouping points in terms of their distance from the selected location. The circles on the map (Map-3) are centered on the pourashava head quarter and have the radius of .5, 1, 1.5, 2, 2.5 and 3 km. Dispersion analysis of health care facilities of Chandpur sadar pourashava in relation to pourashava head quarter. At first the health care facilities were grouped according to the ownership such as Governmental, Organizational and Private health care facilities. Then some circles were drawn by using the pourashava head quarter as a center of these circles. Then the existing cumulative percentages were determined of each of the health care facilities in each of the circle.

$$\text{Existing cumulative percentage} = \frac{C_p}{\sum P} \times 100$$

Here,

$C_p$  = Number of points of a specific circle

$\sum P$  = Total number of points

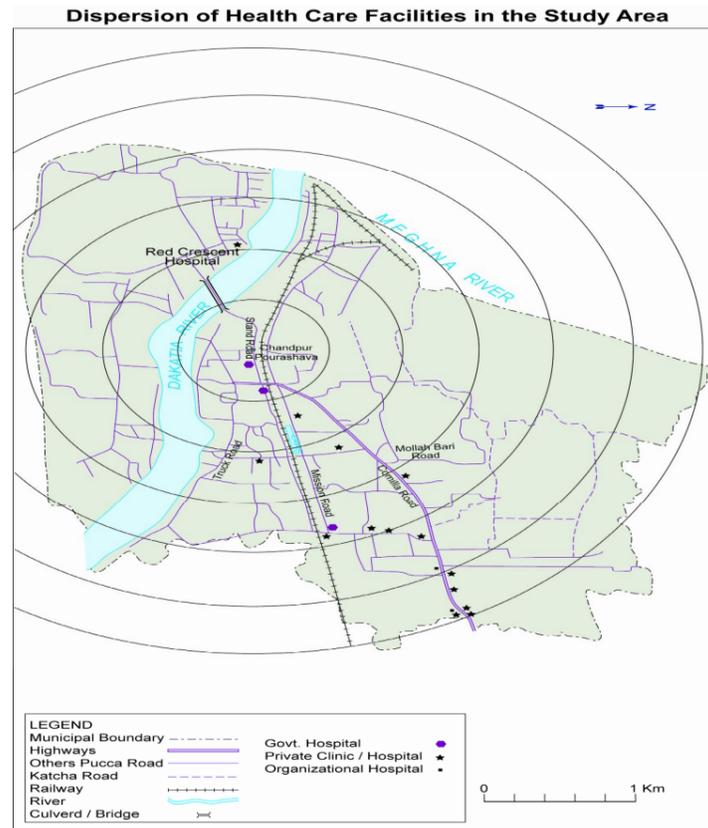
At last the cumulative percentage of normal distribution were determined by using the following formula

$$\text{Normal or expected \%} = \frac{r^2}{\sum r^2} \times 100$$

Here,

$r$  = Square of radius of a specific circle

$\sum r^2$  = Sum of square of each circle



Source: Survey Department, Chandpur sadar pourashava. Map-3

**Table-2: Calculation for the distribution of government, organizational and private health care facilities in relation to Chandpur sadar pourashava.**

Circle no	Circle distance (Km)	Cumulative no of points of P.C.	% of points of C.P.C.	Cumulative no of points of G.H	% of points of C.G.H	Cumulative no of points of O.H.	% of points of C.O.H.	ND* of the points in %
1	0.5	00	00.00	02	66.67	00	00	2.78
2	1.0	01	07.14	02	66.67	00	00	11.11
3	1.5	04	28.57	02	66.67	00	00	25.00
4	2.0	08	57.12	03	100	00	00	44.44
5	2.5	09	64.26	03	100	01	50	69.44
6	3.0	14	100.00	03	100.00	02	100	100.00

Source: Map-3

(\*ND= Normal Distribution)

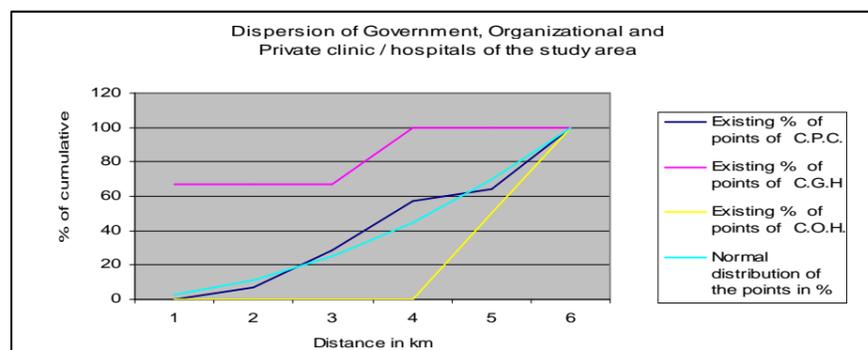


Figure-1: graph on existing and expected percent

From Figure-1 it is observed that the private clinics / hospitals are more uniformly distributed than government and organizational hospitals. The figure indicates that the government hospitals are concentrated near the central point. The concentration of organizational hospitals are 50% within 2.5 km and 100% within 3 km from the central point.

#### Service Provided by the Health Care Centre in the Study Area

The hospitals of this area deal with comparatively more complicated diseases, which is beyond the scope and capacity of the primary level. Most of the hospitals in the study area are curative in nature. These hospitals are assigned to provide some specialist services particularly in internal medicine, general surgery, obstetrics and gynecology and pediatrics.

**Table-3: Service provided by the health care centre in the study area are given below:**

Type of hospital	Available diagnostics and other facilities	Services provided by the hospital
Government Hospitals	CT angiogram, USG. stress thaleum test, X-Ray, Alta sonogram, E.C.G, CT Scan, Therapy, Pathological lab (Urine, stool, cough, blood etc.)	Child disease, General Surgery, Gout, Fever, Anemia, Measles, Elderly disease, Circumcision, Hypertension, Gastric, Diabetes, Chest pain, Tuberculosis, Influenza, Diarrhoea, Hepatitis, ENI problem, Stroke, Eyes problem, Gynecology & obstetric problem, Headache, Skin problem, Accident & injuries disease, Cytica, Rheumatic fever, Immunization, Dental disease etc.
Organizational Hospitals	Computer to determine the eyes problem, Different types of instruments related with eyes. Alta sonogram, E.C.G, Pathological lab (Urine, stool, cough, blood etc.),	Eye disease & injuries, Antenatal & postnatal care to mothers, Child disease, General surgery, Gynecological problem, Immunization etc.
Private Clinic/Hospitals	Altra sonogram E.C.G, Pathological lab (Urine, stool, cough, blood etc.)	Surgery, Child disease, Delivery, Gout, Fever, Scabies, Anaemia Measles, Elderly disease, Asthma Circumcision, Hypertension, Gastric, Diabetes, Chest pain, Influenza, Diarrhoea, Hepatitis, ENT problem, Stroke, Appendicitis, Headache, Dysentery, Chicken pox, Cardiovascular disease etc.

Source: Field survey, 2007

Chandpur sadar hospital arrange the Expanded Programme on Immunization (EPI) with the help of Canadian International Development Agency (CIDA), United Nations Children's Fund (UNICEF), United States Agency for International Development (USAID), World Health Organization (WHO), Government of Japan, Rotary International (RI). Some medicine is provided free of charge. Food is also provided free for indoor patients. Matrimongol hospital provides services for pregnant women (during Antenatal & postnatal period). It provides services under Emergency Operation Camp (EOC). Chandpur Tuberculosis (TB) Hospital provides services only for Tuberculosis patients.

The diagnostic facilities provide services only for outpatients for laboratory (Urine, stool, cough, blood, E.C.G, Alta sonogram, X-Ray, Therapy etc) tests. They have no surgical or bed facilities. The diagnostic centers provide services under the supervision of Chandpur sadar hospital. After the introduction of modern system of medicine the traditional system of health care has been gradually decreasing. Now-a-days the old and comparatively less educated patients avail of the traditional health care facilities (Uddin 2008).

### **Health Care Utilization Pattern in the Study Area**

Present study observed that 30.8 percent patients availed government hospitals for their treatment due to its being free of cost and easy access. Only 13.5 percent patients avail private clinics / hospitals due to the availability of expert and good behavior. About 25 percent patients avail Allopathic pharmacy, 5.8 percent patients availed homeopathic Allopathic pharmacy and kabiraj whereas only 1.9 percent patients used Unani. Occupations of the cases also have influence in utilization of health care facilities. Among the Rikshaw-pullers 33.3 percent used government facilities, kabiraj and homeopathic medicines. 100 percent driver/ transport labour, fishermen and hotel boy usages government facilities whereas 20 percent service holder use it. 60 percent students availed government facilities whereas 75 percent housewives, 40 percent advocates, 50 percent hawker and 16.7 percent day labourers use government facilities. 100 percent small business men /women, 60 percent government service holders, 60 percent private employees, 66.7 percent teachers, 20 percent students and 25 percent housewives met private doctors during the last 6 months (Uddin 2008).

### **Points of Satisfaction and Dissatisfaction**

The survey results reveal that most of the patients were not satisfied with the service. Some of them were dissatisfied with nature of attention given to them some were dissatisfied because of wastage of time & costs, of treatment many other were not satisfied with the behavior of the physicians & staff working in the hospital. They also sometimes become reluctant to avail the service facilities of the govt. Delia long distance and unavailability of transport from their houses. In most cases poor and illiterate people were deprived in health care facilities, due to the lack of health awareness, poverty, ignorance about their rights and inequalities in health care facilities. Regarding waiting period, 5 percent patients were highly satisfied, 10 percent were satisfied, 15 percent accepted the delay, 20 percent were highly dissatisfied and 50 percent were dissatisfied. In terms of costs of treatment, 8.3 percent were satisfied, 24.9 percent accepted as normal, 16.6 percent were highly dissatisfied, and 49.8 percent were dissatisfied. At the point of behaviour 7.1 percent were satisfied, 14.2 percent were ok, 35.5 percent were highly dissatisfied no percentage for highly satisfied (Uddin 2008).

### **General Health Knowledge and Awareness of the Respondents**

To know the knowledge about the awareness of preliminary health care some questions had been asked to the respondents. The survey report shows that the respondents are well alert about their health and they know the primary care needed for them.

**Table-4: General health knowledge and awareness of the respondents**

Question types	Frequency		Percent	
	Known	Not Known	Known	Not Known
Knowledge about HIV/AIDS	42	36	53.8	46.2
Use of contraceptive	62	14	81.6	18.4
Need for Washing Hand before meal	76	4	95.0	5.0
The need for boiling drinking water	72	8	90.0	10.0
Importance of Breastfeeding infants	66	14	82.5	17.5
Pregnant mother's need to TT shots	37	45	45.1	54.9
Pregnant mother's need for check up	66	14	82.5	17.5
Vaccination requirement of children's	67	14	82.7	17.3
How to prepare oral saline?	74	7	91.4	8.6
Preventions of night blindness	43	38	53.08	46.92

Source: Field survey, 2007

### Conclusions

There seems to be a distinct spatial variation in the patterns of attendance between low and high income people, between low and high education level. The low income peoples mostly avail of public health care facilities and they are experiencing much longer travel to primary care services than other respondents. The high income people mostly use the private doctor's facilities. The poorer households have no choice to undertake frequently lengthy journey often to crowded hospitals or public clinics. In the study area most of the respondents use Rikshaw as mode of transportation. There are some high income respondents with private vehicles at their disposal. Long waiting at the health centers discourages the people who consider it as potential loss of wages or work hours. Many of the respondents did not use the nearest facility due to reason not explained. This is understandable in the context of Bangladesh, in mixed health care system, spatial proximity does not necessarily equate with social or economic access. The reasons given by respondents for not using the nearest facility are varied. If the poor class of patients do not use public health facility nearby, they need to travel a long distance to get treatment which in many cases become impossible. The high income respondents traveled to doctors with whom a good relationship is already established and who are situated either in the study area or outside the study area.

**References**

- BBS. (2011), *Statistical pocket book of Bangladesh*, 2011, Statistics Division, Ministry of Planning, Government of the Peoples Republic of Bangladesh.
- CUMPER, G.E. (1984), *Determinations of Health Levels in Developing Countries*, England: Research Studies Press Ltd. England.
- FELDMAN, S (1987), Overpopulation as Crisis: Redirecting Health Care Services in Rural Bangladesh, *International Journal of Health Services*, Vol. 17, pp. 113-131.
- HUSSAIN, S.H. (1985-1986), "Location of Rural Health Care Facilities: A Case Study of Dhamrai Upazila Health Complex", *Oriental Geographer*, Vol. 29 & 30, pp. 47-56.
- MITRA, S.N. AND S. ISLAM. (1996), *Diarrheal Morbidity and Treatment Survey 1994/95*. Dhaka Mitra Associates and Social Marketing Company.
- MITRA, S.N, A. AL-SABIR, A. R. CROSS, AND JAMIL. K (1997), *Bangladesh Demographic and Health Survey 1996-97*. Calverton, Maryland: National Institute for Population Research and Training (NIPORT), Mitra and Associates, and Macro International Inc.
- UDDIN, M.S. (2008), "Location and utilization pattern of health care facilities: A case study of Chandpur sadar pourashava" an unpublished thesis submitted to the department of Geography and Environment, University of Dhaka.