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Providing Community-Based Effective e-Health Services in Bangladesh: An Analysis on Sylhet Sadar Upazila

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Abstract

E-Health is the new component of e-governance which can give cost-effective, efficient, less time-consuming services and a key strategy to meet people health related needs by using different electronic devices. The aim of this study is to identify the effectiveness of e-health services provided by community clinics situated in Sylhet sadar upazila and also discover the major challenges faced by community clinics to provide e-health services. In order to explain

and exploring the effectiveness of e-health services provided by Community Clinics social survey method has been used in this study. E-health initiative through community clinics are creating a great opportunity for the rural backward people to access primary treatment and helping them to connect with specialized doctors using electronic devices. For these purpose laptops, modems and others electronic devices are provided in every community clinic but the majority of service providers said the standards of these are not satisfactory. Service receivers (68.00%) said there has a limited access to consult with specialized doctors in their CC's means telemedicine facilities are not available. Inadequate ICT infrastructure, insufficient training program and other instruments create difficulty in terms of ensuring safe and effective health services in rural area. The government should provide sufficient training facility for the service providers, ensure sound development of ICT infrastructures and arrange different program to inform the public about the available facilities of community clinics can create a more effectual system of health care service delivery.

Keywords: effectiveness, e-Health, community clinics, ICT, telemedicine

1. Introduction

E-Health is the conspicuous service with a prominent effect on the advancement of health sectors in developing nations including Bangladesh. In 1996, The People Republic of Bangladesh Government had taken an initiative to provide better and effective health care services and for fulfilling this commitment the government gives more focus to establish community clinics at rural level. That initiative was taken place under the ministry of Health and Social Welfare in 1998. This is considered as a flagship program of present government for unique extension of Primary Health Care Services to the doorsteps of rural people. E-Health has huge potential to assure health care quality, accessibility, and affordability in developing country and can provide effective, efficient and need-oriented health care facilities to patients of rural backward area. (Hoque, Mazmum and Bao, 2014)

The Government of Bangladesh has taken a scheme to access health service through the internet as e-Health services in 2011. This recent initiative has become an integral part of the health system in our country as well as millions of people are now getting services from the community clinics using Information and Communication Technology. E-health is a system which provides healthcare service through various types of communications technologies, namely mobile (m-Health), telemedicine (The literature meaning of the term telemedicine is "healing at a distance".) (Rahman, 2016), the internet, clinical decision support and most importantly E-health records of all patients' health-related information (Karim, 2017), thus the government can easily realize the condition and status of health-related issues and take necessary initiatives to make the health system effectual and peoples demand oriented.

But the existing scenario of e-health services in the rural area do not properly meet the health sector related demand because of the insufficient ICT infrastructure, lack of awareness among people about the new concept, inadequate training program, shortage of manpower and little financial support from the Government (Khatun and Sima, 2015).Though the Community Health Care Provider (CHCP) is provided training on 'e-Health service' but they cannot spread the benefits of this service according to the necessary level rather they prefer to

provide service in the old system (CBHC, 2018). Therefore, we assume the effectiveness of 'e- Health' in community clinic as a problem and attempt to find out adequate information on this topic. Thus, the aim of this study paper is to know about the effectiveness of e-Health services provided by community clinics to the peoples of Sylhet area in Bangladesh. For identifying this we have to know about the present status of e-health services in CC means their physical facilities (infrastructures, e-equipments) availability and other managing capacity to give e-health services; satisfaction level (consult with special doctors or telemedicine service, get responsive behavior, communication and participation) of service receivers about these services and finally identifies the challenges of providing e-Health services in Community Clinics to the users.

2. Literature Review

In Bangladesh, providing affordable and adequate health care is a challenge due to poor healthcare infrastructure and high population density (Mostafa et al., 2010). In the light of these problems, the government has started a new era in the health sector by introducing Information and Communication Technology (ICT) for health service delivery. Over the past decade, the rapid advancement in Information and Communication Technology (ICT) has experienced tremendous change in health sector in many countries (Hoque *et al.*, 2014). Government in developing countries put much hope in e-Health systems due to improve the quality and access to health services (Nyella and Mndeme, 2010). E-health is the blessing of ICT and is probably the most prominent service that has a noticeable effect on the development of healthcare sector in developing countries (Sharifi et al., 2013, Alvarez, 2002, and Nessa, et al., 2008). The original focus of e-Health was on the delivery of health care, the transfer of health data, and e-commerce. The "idea" of e-health is about achieving better health, better decision-making, better communication, better prices, and better access to health information and health care (Suggs et al., 2015). Mobile health's are the components of e-governance, in the health sector that is considered to be cheaper, more efficient, inclusive, transparent health service and more population under existing health service network. Most of the service recipients were satisfied with the mobile phone aided health services as the service was more accessible and available. The laptop in the community clinics will be used for multiple purposes like for the telemedicine, updating community, health data, health education of people, training of health staffs. (Afroz, 2012)

The e-health infrastructure, network application, and service can play vital roles to overcome the national health care system challenges and rural people can get expert and expert opinion without even traveling physically to the hospitals (Rahman, 2016). The Community Clinic (CC)[1] is considered as one of the vital ladder to go up better health service system using

[1]Community Clinic (CC) is the innovation of Hon'ble Prime Minister Sheikh Hasina to extend Primary Health Care to the doorsteps of rural people all over rural Bangladesh. Thousands of people are getting services from the CCs & it has become an integral part of health system. http://www.communityclinic.gov.bd/

e-health components, methods and tools. Community Clinic is the lowest tier health facility at primary level established throughout the country including very hard-to-reach, remote and isolated areas. Basically, CC is the brain child of Prime Minister Sheikh Hasina. The construction of CC started in 1998. During 1998-2001, 10,723 CCs were constructed and about 8,000 started functioning. Health Assistants (HA) and Family Welfare Assistants (FWA) were service providers in addition to their domiciliary services. They had been trained on ESP (Essential Service Package) under Health and Population Sector Programme (HPSP). For management of CC activities, there was one Community Group (CG) for each CC having 9-11now 13-17 members headed by Land Donor/his or her representative. (Rahman, 2017 and CBHC, 2018)

From 2009-2015, 460.88 million visits were made to CCs for services of which 9.071 million emergency and complicated cases were referred to higher facilities for proper management. Among the service seekers about 80% are women and children. On average 9.5-10 million visits are in CCs per month and 38 visits per day per CC (Rahman, 2017). In many cases Medical Officers are visiting CCs periodically and providing services to the complicated cases (Rahman, 2017). But still the CC's cannot provide adequate e-health services in Bangladesh. Major studies are basically focuses on describing and exploring the facilities and opportunities of CC's to provide e-Health and a very few studies are focused on the effectiveness and challenges of CC's. No study is done on the basis of data collected from the CC's situated in Sylhet. So for exploring the effectiveness and challenges to provide e-health by the CC's under Sylhet Sadar area this study is necessary to carry out.

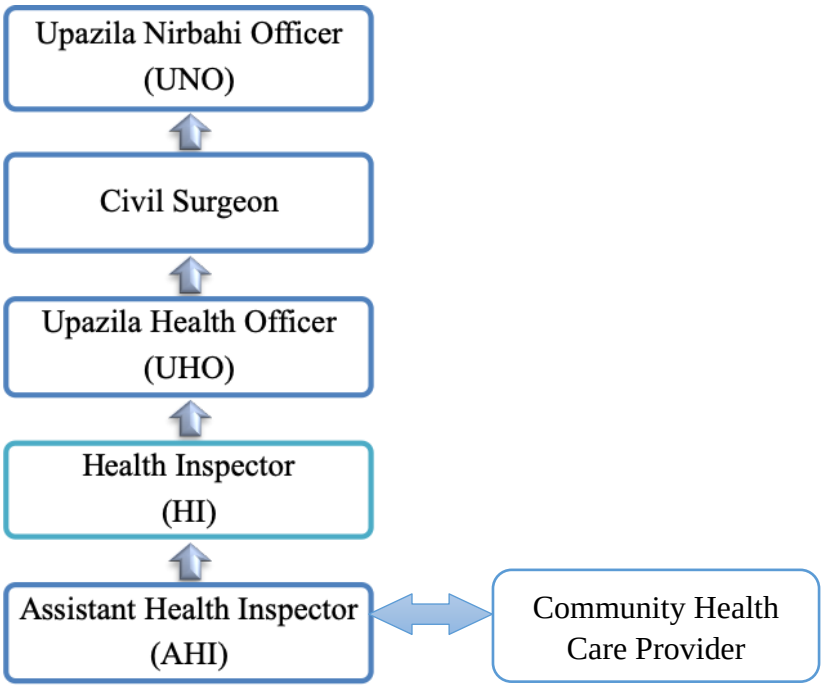

Figure 1. Official Management of CC

Source: Field Survey Community Clinics under Sylhet Sadar Upazila, Rahman, 2017 and Community-Based Health Care, 2018

3. Methodology

For explaining and exploring the effectiveness of e-Health services in community clinics social survey method has been used in this study. Based on deductive research strategy mixed method consisting of both qualitative and quantitative approaches has been followed in the study due to prior requirements of the research work. Multiple techniques like interview schedule and non-participative observation have been used for data collections. The self-administer structured interview schedule (both open and close-ended questions) has been used here.

There have been considered two data sources for conducting the study: Primary sources and Secondary sources. Sylhet Sadar Upazila has been considered as the area of the study. Among the 16 community clinics (dghs.gov.bd) of Sylhet sadar upazila, six community clinics named: *Nalkot* community clinic, *Sadarkhola* community clinic, *Laxmipasha* community clinic, *Jangail* community clinic, *Satero* Community clinic and *Bramhanchara* community clinic have been selected randomly (lottery method) for the study. In this research, a total number of 70 individuals (50 service receivers and 20 service providers) are selected as sample from the total population. After selecting the area randomly the service providers sample has been chosen purposively and service receiver samples are collected randomly by using simple random sampling. The name of service receivers are recorded in a record book of each Community Clinic. The record of *March'2018* month has been considered here as a sampling frame.

A service provider ensures the feasible service delivery through adequate training, experiences, infrastructures (especially electric supply), equipments (electronic devices: modems or other internet connection medium, laptops, high speed internet network,. telemedicine etc.), financial support but in that case, knowledge, participation and awareness of the patients are essential which helps to ensure effective e-Health service. Communication is the main binding mortar for e-health service providing. “To maintain the quality of health care services and delivery of clinical care and medical information using Information and Communication Technology” is usually known as telemedicine (Kay, Santos & Takane, 2011). Good infrastructural facilities like computer, high-speed internet connection ensure the effectiveness of e-Health service because, without these facilities, it is impossible to provide ICT based e-Health service. Besides this, a proper management system is also needed to monitor the service delivery through information and communication technology which helps to ensure the effectiveness of this service. Data has been gathered by considering these variables.

The analytical framework of this study is shown in the next page:

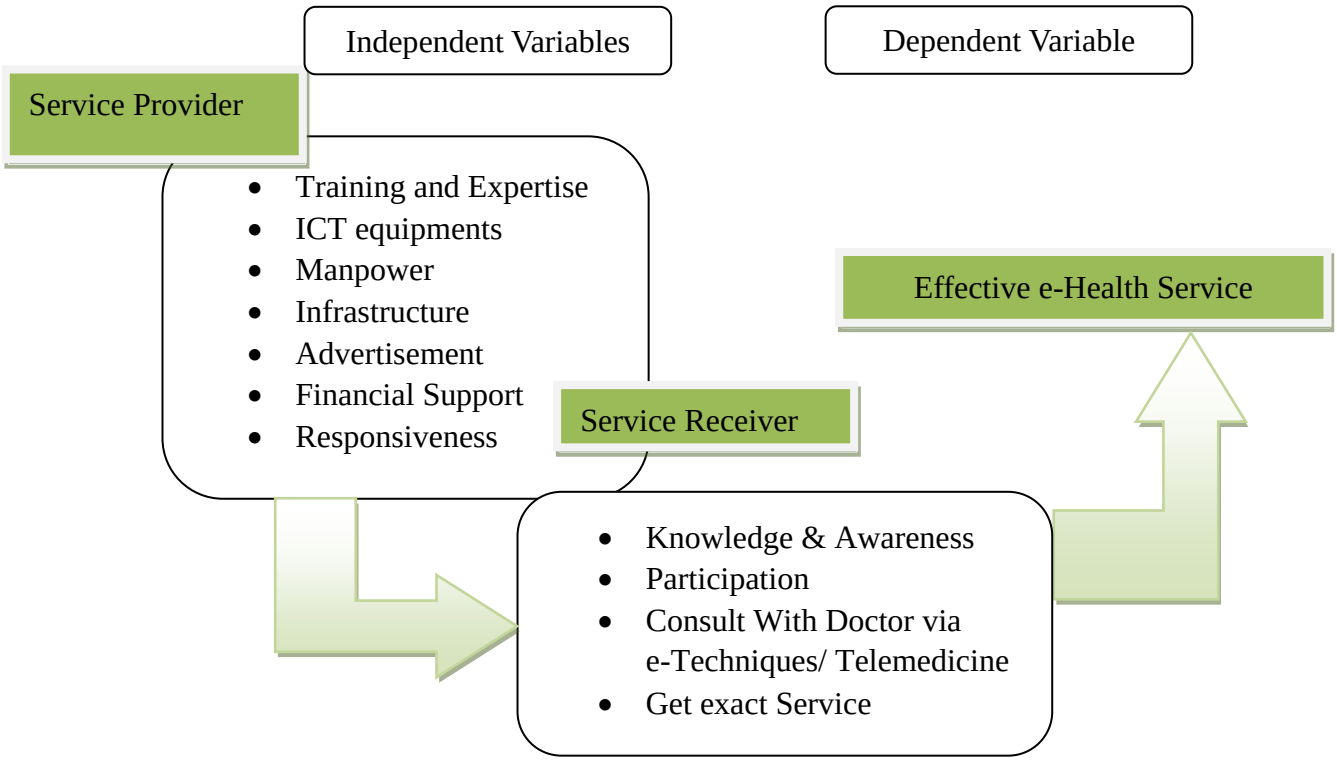

Figure 2. Analytical Framework of the Study

4. Result and Discussion

A survey has been conducted to know about the effectiveness of e-Health service on rural area people at *Sylhet Sadar* by the researcher from service receivers (n= 50) and service providers (n=20) through the structured interview schedule. The questions, asked to the service receiver, focused on knowledge on e-Health service, satisfaction, opportunities to contact the specialized doctors, satisfaction on technological equipment of their clinic etc. On the other hand, the service providers were asked questions focusing on training on using e-Health-related equipment's, human resources, ICT equipment's, responsiveness of local people etc. The study results are articulated here:

4.1 Present Status of e-Health Services

4.1.1 The Infrastructural Facilities of Community Clinic's (CC's) and Man Power

The installation of the electricity line and solar panel has been provided by the government in every Community Clinic, but it is found in the study that electricity supply is not enough in the CC's.

Table 1. Responses about the Infrastructure Facilities

Infrastructural Support		Frequency	Percent
	Good	7	35.00
	Moderate	3	15.00
	Low	10	50.00
	Total	20	100.0

Source: Data collected from service providers of CC's under Sylhet Sadar, n=20

According to the service providers, though there is a provision for the electricity supply through installing a solar panel to cope with the shortage but for the corruption of higher level authority and local management body, it is not implemented yet. Besides non-participative observation result shows that, there is an acute problem of water supply and sanitation in most of the community clinics. The blood pressure measurement machine remains dysfunctional most of the time.

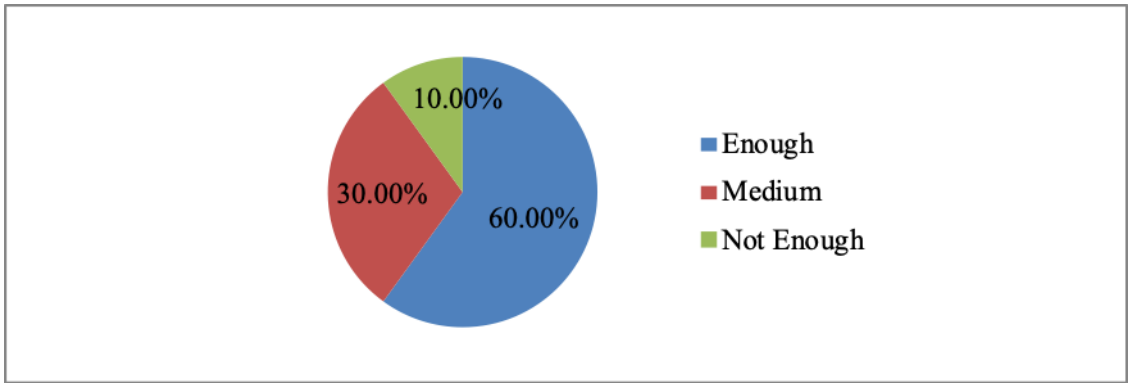

Figure 3. Manpower of CC's to Provide e-Services

Source: Data collected from service providers of CC's under Sylhet Sadar, n=20

Service providers are asked to know about personnel whether it is enough to provide service. As the figure shows, most of the respondents (60.00%) are said they have enough manpower, only 30.00% are in neutral state and few respondents (10.00%) are said there are lacks of personnel or manpower in the CC's to provide e-health services.

4.1.2 Quality of Technical Equipments for Providing e-Health Services

For promoting e-Health services, every community clinic is provided technical equipment's. The CHCP (Community Health Care Provider) is appointed for the purpose of providing health care services to the mass people via internet service. For that reason, the Community

Clinic is facilitated with a laptop and a modem for internet connection.

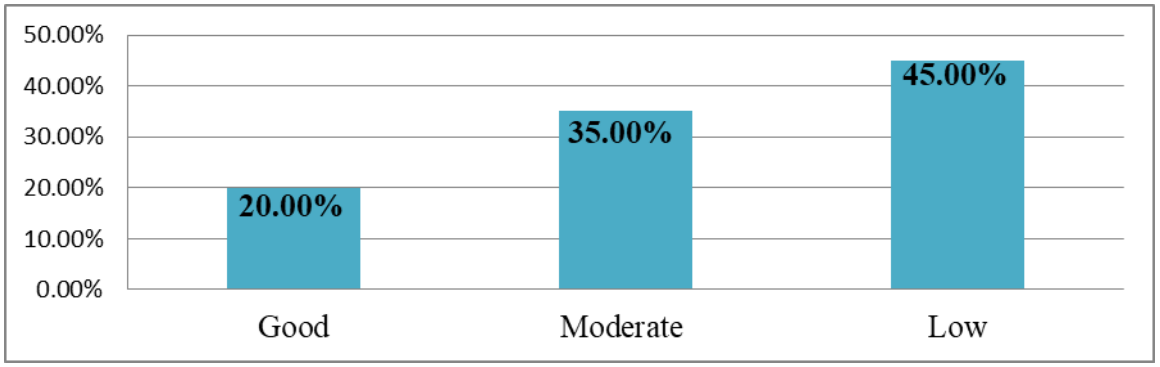

Figure 4. Technical Equipment's Quality

Source: Data collected from service providers of CC's under Sylhet Sadar, n=20

But according to the service provider (CHCP), the quality of this technical equipment is not good. As because of the shortage of electricity supply, they cannot operate the laptops properly (45.00%). The laptops are old model comparing to the present. The modems provided to the clinics are very low quality as most of the time it remains useless and higher authority is not aware of the fact.

4.1.3 Training and Expertise Knowledge

Though CHCP, mainly responsible for providing e-Health service thus he/she has been given training on e-Health service. But according to them, the training module should be developed and the training on e-health should be arranged on a regular basis.

Table 2. Training Facilities on e-Health Services

Training facilities		Frequency	Percent
	Good	6	30.0
	Moderate	8	40.0
	Low	6	30.0
	Total	20	100.0

Source: Data collected from service providers of CC's under Sylhet Sadar, n=20

Initially, they have imparted 2- 3 days training on health-related software on how to submit the monthly report through email. But according to the service provider (40.00%), it is known that the trainer of e-Health service does not give proper training and it give an adverse effect in developing their skill to provide effective services.

4.1.4 Service Seekers Knowledge about e-Health Services

As this study has been conducted at *Sylhet Sadar* area, it has been found that most of the people (About 40.00%) in this area have little knowledge about the e-health services and

cares provided by Community Clinic's (figure-5). That means they are not actually known about the facilities and treatments of CC's. Whereas it is the main concern of establishing CC to improve the health related knowledge and give the health benefits to the doorstep of local people.

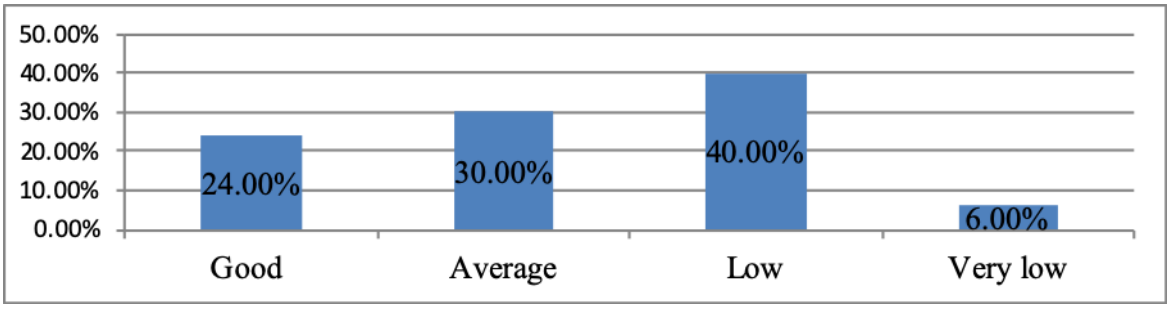

Figure 5. Knowledge about e-Health services

Source: Collected data from service receivers of CC's under Sylhet Sadar, n=50

The significant reason behind the cause is the lack of advertisement by the authority on e-health services. Another reason behind that - is an ignorance of the mass people although the government is trying to increase the level of knowledge about e-Health at community clinics.

4.1.5 The Medium of Knowledge about e-Health Service

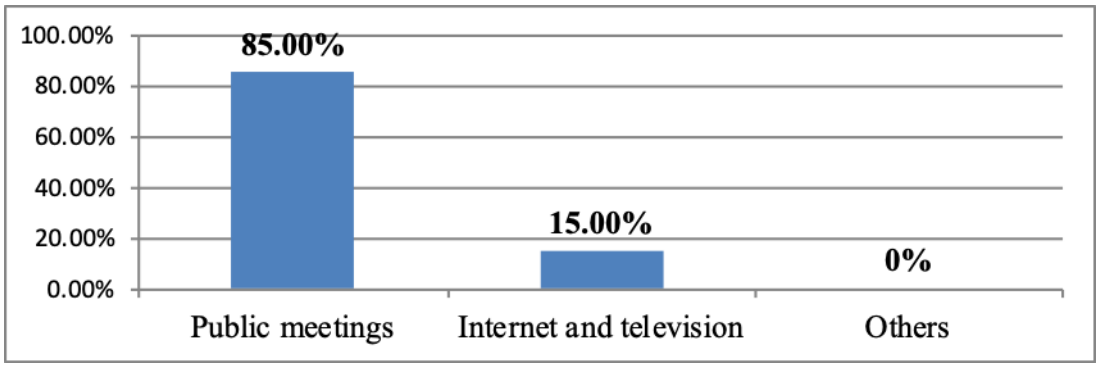

Figure 6. Information Medium of e-Health Services

Source: Collected data from service receivers of CC's under Sylhet Sadar, n=50

Since most of the people especially the old aged are uneducated in the village area, so the ways to know about the services through public meetings (85.00 percent), and by the field level health worker provide the knowledge to rural people and during a visit of Community clinics for getting treatment they can know about it. Rests of the 15 percent respondents said they are known about this service from the internet and television and other means (Figure: 06).

4.1.6 Responsiveness and Participation of People

Table 3. Responsiveness of Mass People According to the Service Provider

Responsiveness of mass people		Frequency	Percent
	Very responsive	13	65.0
	Responsive	3	15.0
	Average	4	20.0
	Total	20	100.0

Source: Data collected from service providers of CC's under Sylhet Sadar, n=20

The service providers were asked about the responsiveness of mass people about e-Health service whatever they are interested or not in taking service through this. In that case, the providers stated that the receivers are very responsive (65%) to take service through internet but because of the shortage of fund and low-quality technical equipment, it is impossible to provide service through e-Health.

4.1.7 Financial Support

The service providers get a minimum amount of extra financial support besides their salary to provide e-Health service. From the field the study explore that they get 400- 600 taka (BDT) as an internet utility bill, stationary and transport bill and it is almost impossible to manage e-Health at community Clinic with this little amount.

4.2 Satisfaction Level of Service Seeker

4.2.1 Responsive Behavior of Service Provider

The patients were asked on cordiality and responsive behavior of the service providers. As table 4 shows, majority (52.00%) are strongly agreed with this statement because the service providers are responsive to their patients and only 48.00% are agreed with this.

Table 4. Service Provider Responsiveness to Mass People

Responsiveness & Cordiality of Service Provider	Frequency	Percent
Very Cordial	24	48.00
Cordial	26	52.00
Not Cordial	0	0
Total	50	100.00

Source: Collected data from service receivers of CC's under Sylhet Sadar, n=50

4.2.2 Opportunity to Consult With Specialized Doctor

In the rural and remote area, most of the people come to the nearest community clinic for taking health services. But in the Community Clinic, no certified doctor is appointed. So, in this case, the CHCP tries to connect the patient with specialized via mobile phone although laptop and internet connection is installed in every Community Clinic.

But according to the service receiver, it is not enough for getting effective services. The CHCP is making an arrangement to contact with the specialized doctor via Skype, Messenger, Viber etc. A service provider said the reason behind these laps is lower non supportive e-technical equipments, and also for the busy schedule of specialized doctors. For this reason, most of the service seekers are dissatisfied (68.00%) regarding the e-Health services for lack of opportunities to consult with specialized doctors through using different social media (figure:07). This is the main service of e-health to heal or getting care from the distance through using ICT technologies which is called telemedicine. But the present CC's are failed to provide it.

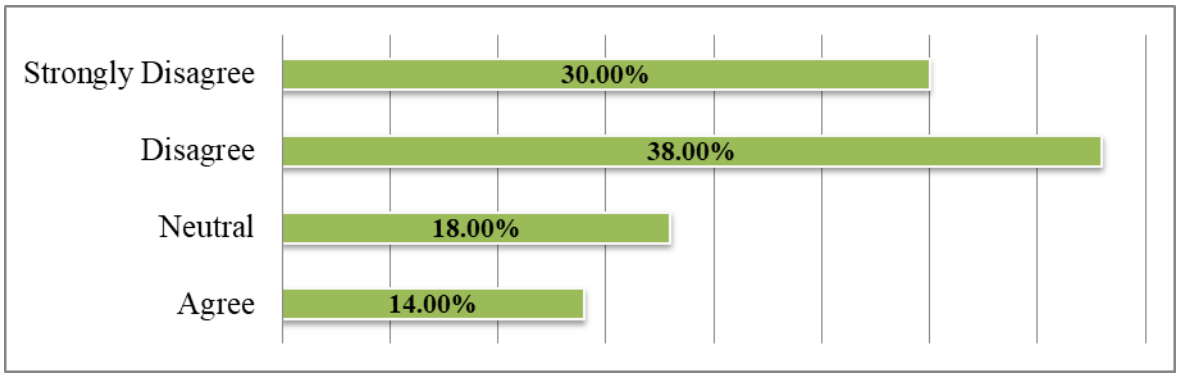

Figure 7. Agreed level to consult with a specialized doctor via e- techniques

Source: Data collected from service receivers of CC's under Sylhet Sadar, n=50

4.2.3 Fulfill Health-Related Demand of Mass People

According to the respondents (both service provider and service receiver), they neither agree nor disagree (54 percent service receiver and 50 percent service provider) about the statement that e-health service is fulfilling their demand. The significant cause behind that the service providers are not well trained on using technical equipment according to the service receiver.

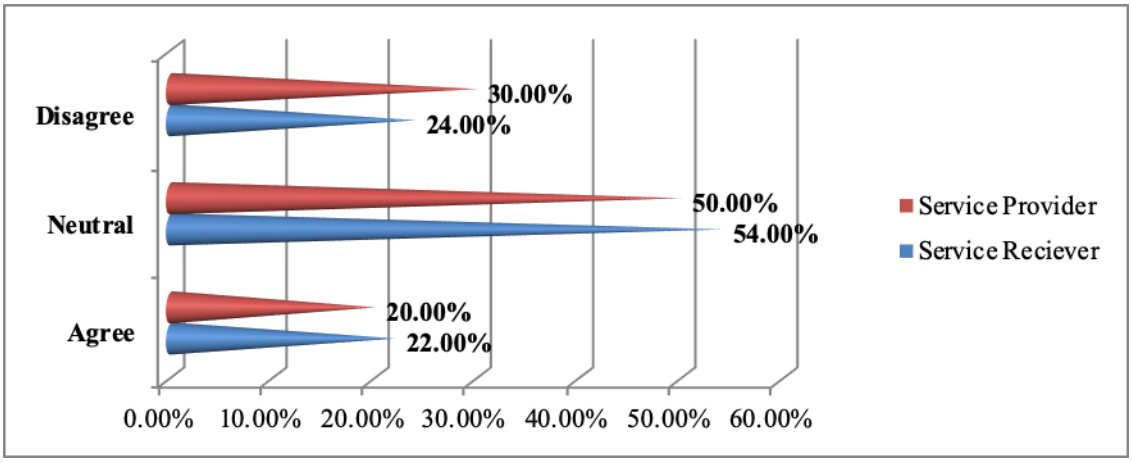

Figure 8. Fulfill the Health-related Demand

Source: Collected data from service receivers and Service receivers of CC's under Sylhet Sadar, n=70

On the other hand, according to the service provider, for being low standard equipment and careless attitude of higher officials, they are unable to provide a standard level service.

4.2.4 Safe and Effective Health Care

The respondents were asked whatever this system is able to provide safe and effective health care. As figure 9 illustrated that, major portion of the respondents (56.00%) are neutral in this matter as most of the service providers are interested to provide service manually and rest (44.00%) are agreed with this statement.

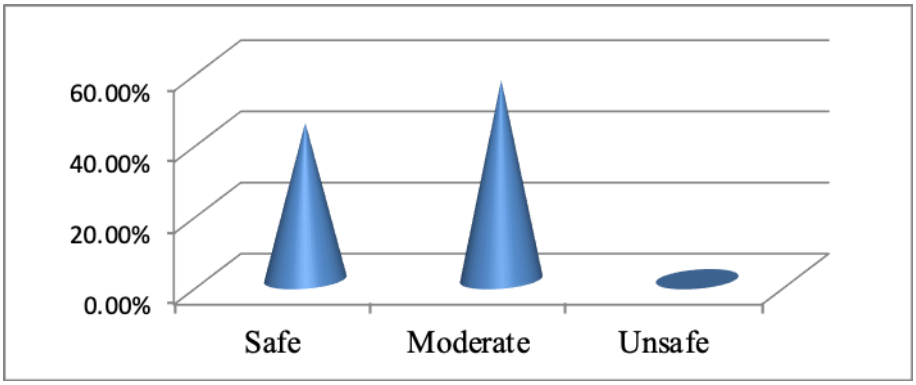

Figure 9. Safe and Effective Health Care by CC's

Source: Collected data from service receivers of CC's under Sylhet Sadar, n=50

4.2.5 Meeting Health-Related Objectives of the Government

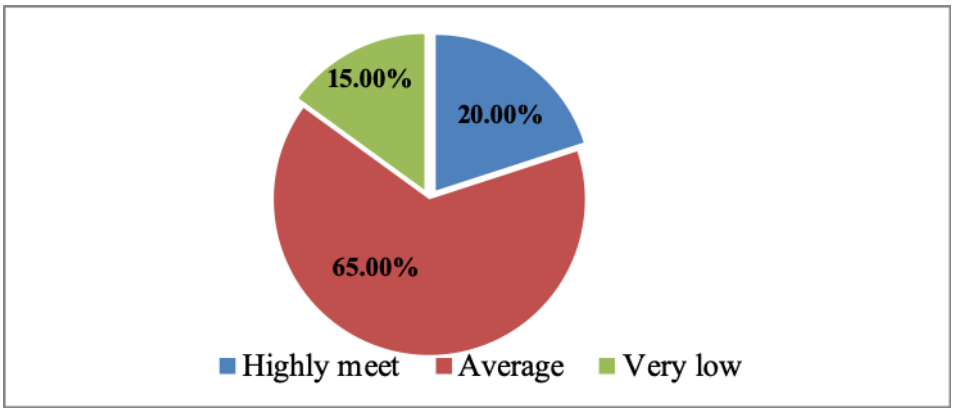

Figure 10. Meeting the objectives of Health policy declared by Governments

Source: Data collected from service providers of CC's under Sylhet Sadar, n=20

It is wanted to know from the service provider whether e-Health service in Community Clinic is helpful to meet the objectives of health policy declared by Government. Most of them (65.00%) remain neutral in this case. They have told the reason behind that is lack of importance and interest of higher official though they have been trying their best to provide services to the mass people.

4.2.6 Level of Satisfaction

In this study, it is tried to find out the level of satisfaction about the e-Health services. The service receiver responses as they are neither satisfied nor dissatisfied (Average) about the service. Because there are shortages and low standard technical equipment is used in CC's. But the service providers are cordial to provide service within the limitations and receivers are satisfied with their behavior and personality (Figure-11).

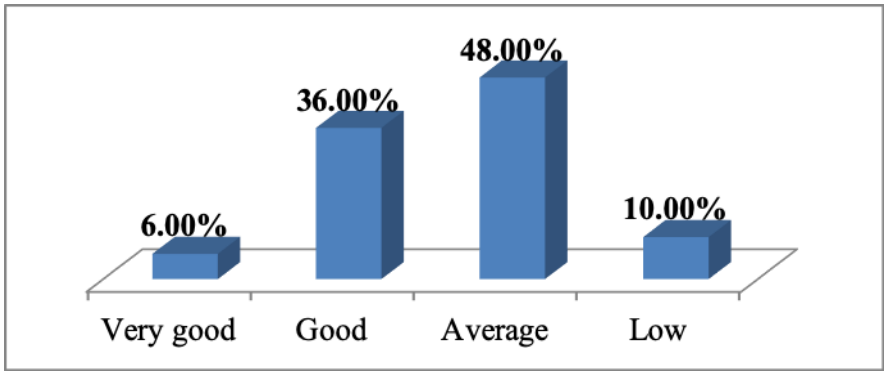

Figure 11. Satisfaction level of service receiver on e-Health

Source: Data collected from service receivers of CC's under Sylhet Sadar, n=50

E-Health is a blessing to bring doctor and rural patients closer and reducing the gap between them believed by a good portion of the service receiver (36.00%) that is one third or more of the total sample. Other 60.00% believe it's on an average way, they are not so confident about

this issue. According to the service receiver (66 percent means two third of the sample), e-Health initiative is very significant to bring a change in the health service system. This service is also useful to reduce the gap between urban and rural area's health service.

The following diagram has been shown the total result of this study:

Variables (Service Provider)	**Analyzed Result**		**Variables (Service Receiver)**	**Analyzed Result**
ICT Equipments	Moderate		Knowledge and Awareness	Low
Manpower	Enough (Good)		Participation	Good
Training and Expertise of Service Provider	Moderate	⇨	Chance to Consult with Doctor via e-Techniques	Low
Infrastructure	Low(specially electricity)		**Get Exact Service**	
Advertisement	Through public meeting (80.00%)		Fulfill health related demand	Moderate
			Safe and Effective Health Care	Moderate
Financial Support	Low		Satisfaction	Moderate
			Meet Health Related Objective of the Government	Moderate
			Responsiveness	Good

Dependent Variable:

Effective e-Health Service: Low Moderate Level means Not Effective

Figure 12. Findings of the Study

4.3 Challenges to Provide 'e-Health Services'

During analyzing the collected information, this study found several challenges regarding e-Health related issues these are stated below-

4.3.1 Inferior Infrastructure, E-Technical Support and Communication Gap

Community Clinics have ICT infrastructural support but for electricity problem and lower speed network of Internet sometimes it's difficult to serve people timely. For the same reason, the medical reports about the patient are not submitted on time. Besides most of the community clinics have a shortage of other medical equipment such as pressure measurement machine, diabetic measurement machine etc.

4.3.2 Fail to Give Telemedicine Facilities

The main reason behind the establishment of CC's to provide telemedicine facilities means prescribed by specialized doctors from the distance by using ICT. But Major portion (68.00%) of the respondents said they are failed to consult with specialized doctors and not get telemedicine service. Non supportive ICT equipments or infrastructure (slow internet connections, old model of laptops etc) and busy schedule of specialized doctors are the main reason behind this. Without this ineffectiveness of service provider and unconsciousness and knowledge gap of service seeker sometimes create this problem.

4.3.3 Financial Constraint

the study explore that the service provider get 400- 600 taka (BDT) as an internet utility bill, stationary and transport bill besides their salary and it is almost impossible to manage e-health related cost at community Clinic with this little amount. For these reason sometimes people are suffer because they have to provide more cost for getting services (service receiver statement).

4.3.4 Shortage of Training

It is quite difficult to ensure safe, effective and global standard health facilities in a community clinic because of the inadequate arrangement of ICT and other necessary training programs, Another reason is the lack of cordiality of a trainer; they do not get proper information and technical training (30.00%).

4.3.5 Little Knowledge of People

According to the study people are very responsive (65.00%) about the services provided by CC's but they have not clear knowledge about the e-Services provided by the community clinic. People are not informed well about the e-health services provided by the government as deficiency of advertisement as well as the unawareness among the villager. Thus they are not known about the telemedicine.

5. Concluding Remarks

Effectiveness of e-Health in community clinic focus on the proper serving of e-Health services in a community clinic in the Sylhet area. E-health services create a new and more effective system of service delivery which increases the capacity of the service providers to provide cost-effective, time effective, safe and affordable health services if it provides in an efficient way. After analysis and discussion the study reveals the e-health services are provided by the CC's in a sound way and people are partially satisfied with these services.

But total effectiveness not achieved yet for some challenges which are described above. Communication through e –Techniques can bring the rural or periphery area patients with the urban specialized doctors for better treatment which is the main motto of establishing e-Health. But the infrastructure basically electricity and poor quality of electronic devices and internet access are the main constrains to make the CC's to give telemedicine service and make e-health service effective. Without these training inadequacies, poor qualified trainer, and challenges in financial perspective of the CHCP sometimes causes lower performance of CC's. Thus the study may finalize that the effectiveness of e-Health service provided by the CC's are on low level. Information and Communication Technology infrastructure is an important component to implement e-health effectively in a community clinic. The government should build adequate ICT infrastructure including high-speed internet facility with lower cost, IPS, Solar panel, 24 hours electricity facilities, Tab etc. to make the successful implementation of e-health service. More practical and applied Training for Community Health Care Provider (CHCP) and even patients which are necessary for disseminating them with e-Health and breaking their fears to come for receiving e-Health service and that will be introduced a sound e-Health system at community level. There not presented any adequate written and formal e-Health policies or theory in our country. Formulation and implementation of rules and policies are needed for an effective e-health system. The importance of legal support, national standards and policies are also a great concern by the government to facilitate e-Health by solving the obstacles. The policymaker and government in Bangladesh should develop comprehensible national e-Health policy and strategies based on real scenario and opportunities of the nations to enable the acceptance of e-Health and also implement it properly.

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