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A Study on Hobiganj Adhunik Zila Sadar Hospital**

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# **Impact of ICT on Health Services in Bangladesh: A Study on Hobiganj Adhunik Zila Sadar Hospital**

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## **Abstract**

Using Information and Communication Technologies (ICT) is a key strategy to meet the demand for health services in the 21st century. ICT in health services can provide services to the door steps of the people. It helps to meet increasing demands, rising costs, limited resources, workforce shortages and the national and international dissemination of best practices. ICT health service can also ensure efficiency and effectiveness in the health management system. In this study, the simple random sampling method has been applied to primary data collected from Hobiganj Adhunik Zila Sadar Hospital. The study finds that the existing ICT health services do not meet the demand of the people. Traditional and insufficient equipment is one of the main problems. The study also finds some other challenges, including unskilled manpower, inadequacy of ICT infrastructure, and a lack of financial support from the government. Despite these deficits, the study finds that the use of ICT has a positive impact on the provision of health services in Bangladesh. The Government should take additional steps with regards to improving the health policy, legal framework and training to further strengthen ICT in Bangladesh's health sector.

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## I. Introduction

Health is one of the fundamental rights of human beings. The Government of Bangladesh (GoB) has a constitutional obligation to ensure public health to all its citizens. Section 15(A) of the Bangladesh Constitution ensures basic medical utilities for the people of all strata, while Section 18(A) of the Bangladesh Constitution emphasizes the development of health and nutrition status. The Ministry of Health and Family Welfare (MoHFW) controls the whole health care system of Bangladesh. The National Health Policy of 2011 (NHP-2011) provides that every citizen has the basic right to get adequate health care (see: GoB, MoHFW, 2011a).

The main objective of the NHP-2011 is to ensure good health for all citizens of the state. The specific objectives are: (1) to ensure primary and urgent treatment for all, (2) to ensure availability of good service from the health centers, and (3) to motivate people to receive health service as their basic right to prevent diseases. The NHP-2011 also addressed 19 basic policies, including for example, establishing one community clinic for the each six thousand people to ensure health service for everybody. The policy further identified 16 strategies to fulfill the objectives of this policy, like for example, to ensure proper distribution of property for solving health problem of the poor, old aged and the physical and mental disable people. The policy also identified various challenges for which proper development of health service is disrupted.<sup>1</sup> Lastly, the policy proposes some strategies to ensure the proper development by overcoming the existing limitations in health sectors, including the introduction of Information and Communication Technology (ICT) in the health sector.

Furthermore, in April 2011, the Planning Wing of the Ministry of Health and Family Welfare of the GoB issued the *Strategic Plan for Health, Population, and Nutrition Sector Development Program 2011-2016* (see: GoB, MoHFW, 2011b), of which Section 5.5 (pages 38-39) describes Bangladesh's eHealth strategy in the context of strengthening health systems and governance overall. Priorities include: improving collection of information on core health indicators; strengthening existing departmental health information systems; expanding eHealth initiatives; and promoting innovation through private-public partnerships.

Using ICT is a unique concept to provide better health service. The use of ICTs in health is not merely about technology but a means to reach a series of desired outcomes. ICT helps to provide a) better treatment decisions, b) higher quality and safer care, c) information about alternative choices, d) better responses to health needs, e) support to effective, efficient, and equitable health system, and f) increased awareness of health risks. ICT also helps to strengthen the ability to monitor health service in the remote area, improve the efficiency of health service, support more effective health research, facilitate collaboration and cooperation, enable remote consultation and improve the dissemination of health services.

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<sup>1</sup> Some of the challenges identified by the NHP-2011 are: 1) weak management system, lack of materials and of quality in health service, 2) lack of people's awareness and quality service in case of maternity and child treatment, 3) lack of proper initiative in controlling contagious diseases, 4) lack of proper initiative to control and prevent new diseases and viruses, 5) limited resources to control the diseases created for the environmental consequences like, dengue, malaria etc., 6) improper human resource development and management, 7) lack of research on health sector, 8) lack of people awareness in health sector, 9) improper implementation of health related laws, 10) lack of quality service provided by the hospitals, clinic and health related hospitals, and so on.

The broad objective of this study is to know the role of ICT on health services in Bangladesh. More specifically, the study aims at examining the facilities (infrastructure and logistic support) provided by the Government to hospitals to ensure ICT service for people. It does so by analyzing the ICT practices in Hobiganj Adhunik Zila Sadar Hospital (henceforth Sadar Hospital), a hospital that provides health services to any kind of diseases in Hobiganj district of Bangladesh. We explore the role of ICT in the hospital's health service and major challenges of e- health services provided by the hospital. This research also describes some of the key functions and management systems of the hospital. This will allow us to a) find out the major constraints to provide ICT services more properly and b) give some recommendations based on this field study of Sadar Hospital.

Data has been collected from both, primary and secondary sources. The survey method has been used to collect data from service providers and service recipients of Sadar Hospital by following both, structured and unstructured questionnaires. A simple random sampling method has been applied. A total of 65 respondents have been selected for the purpose of research from the patients, nurses, field workers, doctors and administrators. Among these 65 respondents, 35 are service recipients and 30 are service providers. Furthermore, the literature was analyzed to get a better conception on e-health services provided in developing countries more generally and especially in Bangladesh.

## **II. Review of the Relevant Literature**

Given the relevance of ICT in the health sector, a sizeable literature has emerged during the last few decades looking into various aspects of ICT in health sectors of mostly industrialized countries. More recently, the literature has expanded to cover developing countries and there are by now even a few publications focusing on Bangladesh. Following a chronological order, this literature review summarizes first some of the most relevant general literature, especially those focusing on developing countries, and then reviews the main publications that focus on Bangladesh.

### **II.1. Recent Cross-country Studies**

Simba and Mwangi (2004) examine how developing countries took action to strengthen and modernize their Health Management Information Systems (HMIS) using existing ICT during the mid-1990s to the early 2000s. Due to poor economic and communication infrastructure, the process has been limited to national and provincial or regional levels, leaving behind the majority of health workers in remote or rural areas. Simba and Mwangi recommend that developing countries need to make deliberate efforts to address constraints threatening to increase in technology gap between urban minority and rural majority by setting up appropriate policies and strategies.

Chetley et al. (2006) examined the role of ICTs in the health sector of developing countries and found that people absorb new information, ideas and approaches by making sense of them in terms of their own local context and social, economic and cultural processes that help them better deal with the local situation. They also conclude that opportunities do exist for the use of ICTs in the health sector of developing countries, but that there are a number of issues must be carefully considered in each intervention and setting.

One of the most well-known studies is the OECD (2010) report, entitled “Improving Health Sector Efficiency: The Role of Information and Communication Technologies”. The report shows that there are a number of actions that governments can take for effective implementation of ICTs. The case studies illustrate that ICT can make significant improvements in health care delivery, reducing medical errors, improving clinical care through adherence to evidence-based guidelines, and preventing duplication and inefficiency in the delivery of clinical care. The report further added that ICTs are central to efforts to reorganize clinical care to face the new challenges of chronic disease management, allowing greater integration between primary and secondary care, and between health and social care. Electronic health records provide hope for improved reporting and assessment of clinical quality in the future. The report’s findings illustrate the potential benefits that can result from ICT implementation according to four broad, inter-related objectives: (i) increasing quality of care and efficiency, (ii) reducing operating costs of clinical services, (iii) reducing administrative costs, and (iv) enabling entirely new modes of care.

Panir (2011) provides a critical review of the literature on the role of ICTs in the health sector of developing countries. He identified that the broad focus areas of ICT applications in achieving health-related Millennium Development Goals (MDGs) are mostly suggested from the perspective of developed countries, where both demand-side and supply-side of information are of prime importance and best represented by demand-driven ICT use. Panir shows that ICTs play a marginal role in access to health information due to the health vulnerabilities and limited information resources of the poor and concludes that no ICTs will work in a resource-poor setting unless livelihood-based approach is intervened.

More recently, Lewis, Synowiec, Lagomarsino and Schweitzer (2012) pointed out that health systems in low- and middle-income countries continue to face considerable challenges in providing high-quality, affordable and universally accessible care. It is for this reason that policy-makers, donors and program implementers are searching for innovative approaches to eliminate the geographic and financial barriers to health. This has resulted in mounting interest in the potential of e-health (the use of ICT for health) and m-health (the use of mobile technology for health, a subset of e-health) in low- and middle-income countries.

## **II.2. Bangladesh-specific Studies**

One of the earliest publications related to using ICT in the health sector of Bangladesh is a case study by Moshtaq Ahmed (2004), who reports on the experience made with a new computerized information system to register, schedule and track immunization of children, which was introduced by the Department of Public Health in Rajshahi City Corporation, Bangladesh in 2001. Ahmed writes that there has been no independent evaluation of the system, but given that it has been operating for three years without any external support from donors or the central government seems to indicate that it has been working well.

Though not focusing on ICT, Islam and Ullah (2009) found that financial and technical support is very helpful to ensure health service among village people. However, they criticize that the GoB allocates only 5 percent of the budget to the health sector, while it allocates 13 percent for defense. They show that the Government’s allocation and technical support (especially with regards to providing medical equipment) are not sufficient in the rural health complex and that

the people's participation is far from being satisfactory.

Debashish Das (2010) wrote an article, entitled "Development of E-Health Application for Rural Community of Bangladesh". The article focuses on Telemedicine Communicator (TC), which is a prototype system for remote consultations in health for rural communities. It allows for communications between smaller and bigger hospitals in different villages. He shows that TC uses Voice over Internet Protocol (VoIP) combined with a store and forward approach to communications. He comes to the conclusion that TC is an improvement of using telemedicine in the community of destiny. He recommends that VoIP and Wi-Fi technology is relevant to rural areas but that more liberalization of telecommunications in Bangladesh is needed to promote technological development in rural and under-serviced areas.

Mostafa et al. (2010) presented a paper at an International Conference on e-Health Networking, Application and Services, which provides urban and rural perspectives of the proposed deployments to provide E-healthcare in Bangladesh. They propose e-healthcare deployments at the patient side that target urban and rural population in Bangladesh. The paper addresses the existing healthcare facilities and socio-economic condition of these two population categories to identify the potential tele-medicine applications. It also discusses provisions for individual and group deployments for both rural and urban scenarios, which take into consideration the existing nationwide telecommunication infrastructure and services. Mostafa and et al. show that a customized e-healthcare solution can easily be developed for individuals or groups availing the existing array of telemedicine devices and the telecommunication link.

The World Health Organization (WHO) (2011) published the eHealth Country Profiles of the countries that participated in the WHO's second global survey on eHealth. The survey covers two categories of questions. The first category is called eHealth foundation actions, which build an enabling environment for the use of ICT for health. These include supportive eHealth policy, legal and ethical frameworks; adequate funding from various sources; infrastructure development; and developing the capacity of the health work force through training. The second category of questions are related to a country's eHealth applications, which were surveyed in 2009 and include telemedicine (the delivery of health care services using ICT where distance is a barrier to care); mHealth (the use of mobile devices in delivering health care services); and eLearning (use of ICT for learning). Bangladesh's eHealth country profile is provided on pages 15-16 of the WHO (2011) report.

Sheraz, Inayatullah and Shah (2013) wrote an article on e-health futures in Bangladesh, coming to the conclusion that there is a great deal of potential for encouraging participatory engagement between various stakeholders in Bangladesh's public health policymaking. They use a six pillars approach to not only enhance this participatory approach but also to examine various discourses and different stakeholder voices to create four alternative futures for e-health delivery in Bangladesh, which aim at optimizing the use of information and communication technologies (ICTs) as well as ensuring widened access and participation.

Sumaiya Nour (2013) comes to the conclusion that ICT health services provide equality health information, advisory service and basic primary health care facility for the women and children at the community level for those who are typically deprived from the basic medical facilities. ICT enabled healthcare service and management facility by utilizing modern technology and telecommunication facilities.

Finally, Tanvir Ahmed et al. (2014) provide a scoping study of e-health and m-health initiatives in Bangladesh. They found that most e-health and m-health initiatives have proliferated within the private sector, using mobile phones. The most common initiatives include tele-consultation, prescription and referral. They identified that most of the initiatives use a health management information system (HMIS) to monitor implementation. They emphasize e-health training in Bangladesh as there is a strong demand for capacity building and experience sharing, especially for implementation and policy making.

### **III. Conceptual Framework and Operational Definition of Variables**

Conceptually, the framework of this study is to examine the impact of the following relatively new health services (which are considered the independent variables) on the role of ICT in health services (which is the dependent variable):

- **Tele-health services focus on remote consultation, saving time, and ensuring emergency services.**  
Tele-health Service is the delivery of health-related services and information via telecommunications technologies. Tele-health could be as simple as two health professionals discussing a case over the telephone or as sophisticated as doing robotic surgery between facilities at different ends of the globe.<sup>2</sup> ICT health service depends on the application of ICT. Tele-health service is an instrument in the application of ICT.
- **Video conference health services focus on observing patients' situation, instant treatment, and the strengthening of monitoring.**  
Video conferencing is used in health services for a variety of reasons, including understanding a patient situation, consultation and proper diagnosis. For example, specialists in the field of neurology are using video conferencing to schedule virtual office visits with patients in rural areas where hospitals and clinics may not have an on-staff neurologist. Neurologists can be connected in minutes for a remote patient consultation in order to provide a timely and sometimes living-saving assessment and diagnosis (Vidyo, 2012).
- **Mobile health services focus on reducing transport cost, ensuring prompt service, and improving efficiency.**  
Local people can receive free health suggestions by calling mobile numbers without coming to hospitals physically. Busy persons can also take medical help at the beginning of any disease. Medical advice is now instantly available no matter whether it is late night, an acute health problem or far away from a hospital. For conditions where patients do not need to come to hospital, they can do so by taking advice through mobile phone.
- **Internet health services focus on facilitating collaboration, supporting effective health research, and improving dissemination of lessons.**  
The Internet is a global system of interconnected computer networks that use the standard Internet protocol suite to link several billion devices worldwide. Internet health service has been used as a dependent variable in this study that influences the role of ICT in health service.
- **Computer health services, which focus on improving the quality of service, discussing effective consultation, and facilitating cooperation.**  
Computer Health Service refers to using any computer-based routine reporting system for population-based health services, medical research, online reference data bases, differential diagnostic tools, medical practice, and hospital management systems.

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<sup>2</sup><http://en.wikipedia.org/wiki/Telehealth>.



#### IV. Primary Data Analysis

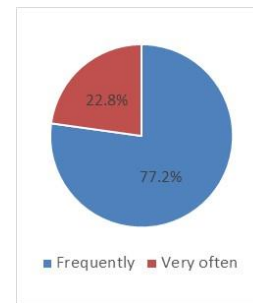
The survey method has been used to collect primary data from both service providers and service recipients of Sadar Hospital through structured and unstructured questionnaires. Each individual was chosen randomly and entirely by chance, such that each individual has the same probability of being chosen at any stage during the sampling process. A total of 65 respondents have been selected, of which 35 people were patients and 30 people were doctors, nurses, field workers, and administrators of the hospital. The first six questions, which focus on the use, awareness and satisfaction related to ICT services, were asked to the 35 patients. Another four questions, related to the impact and efficiency of ICT health services, were asked to the 30 service providers, while the final two questions were asked to both, the 35 service recipients and the 30 service providers.

##### IV.1. Questions Asked to Patients

The first question asked to patients was if they use ICT health services in Sadar Hospital, and if so, if they use it frequently or very often. As Table 1 and Figure 1 show, all 35 patients indicated that they used some kind of ICT health services. The large majority (27 patients or 77.2 percent of the respondents) said that they used ICT health services frequently, while 8 patients (22.8 percent) said that they use ICT health services very often.

**Table 1 / Figure 1: Frequency of the patients using ICT health services**

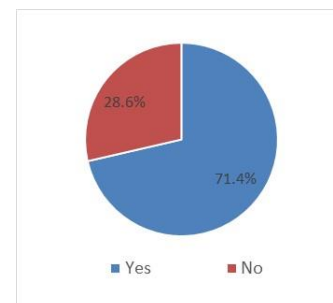
Frequency of using ICT health services?	Frequency	Percentage (%)
Frequently	27	77.2
Very often	8	22.8
<b>Total</b>	<b>35</b>	<b>100</b>



The next question the patients were asked was if they are conscious about ICT health services provided in Sadar Hospital. As Table 2 and Figure 2 show, 25 patients (71.4 percent) said that they are conscious about ICT health services in Sadar Hospital. On the other hand 10 patients (28.6 percent) said that they have little knowledge about ICT health services in Sadar Hospital.

**Table2 / Figure 2: Patients' Consciousness about ICT health services in Sadar Hospital**

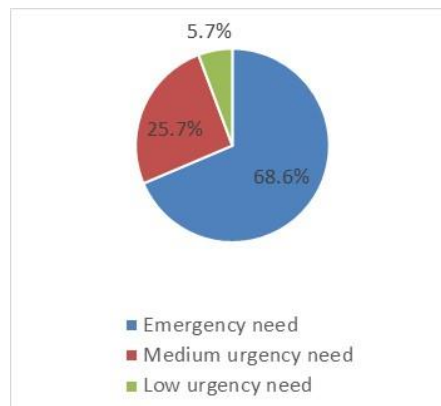
Consciousness about ICT health services	Frequency	Percentage (%)
Yes	25	71.4
No	10	28.6
<b>Total</b>	<b>35</b>	<b>100</b>



The next question we asked the patients was if they took ICT health services in Sadar Hospital for emergency need, medium urgency need or low urgency need. As Table 3 and Figure 3 show, 24 patients (68.6 percent) used ICT health service for emergency need, 9 patients (25.7 percent) for medium urgency need, and 2 patients (5.7 percent) used ICT health service for low urgency need.

**Table 3 / Figure 3: Urgency of need for taking ICT health services in Sadar Hospital**

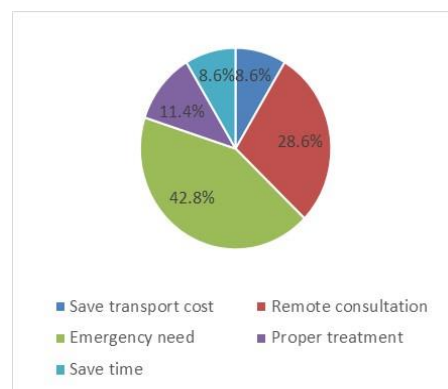
Need for taking ICT health services	Frequency	Percentage (%)
Emergency need	24	68.6
Medium urgency need	9	25.7
Low urgency need	2	5.7
<b>Total</b>	<b>35</b>	<b>100</b>



We then asked the patients of what they think were their key benefits from ICT health services in Sadar Hospital. As Table 4 and Figure 4 show, 3 patients (8.6 percent) said that they saved transport costs, 10 patients (28.6 percent) said that they received remote consultations, 15 patients (42.8 percent) replied that they got ICT health services related to emergency services, 4 patients (11.4 percent) answered that they got proper treatment, while 3 patients (8.6 percent) said that ICT health services saved them time.

**Table 4 / Figure 4: Benefits by Patients from ICT health services in Sadar Hospital**

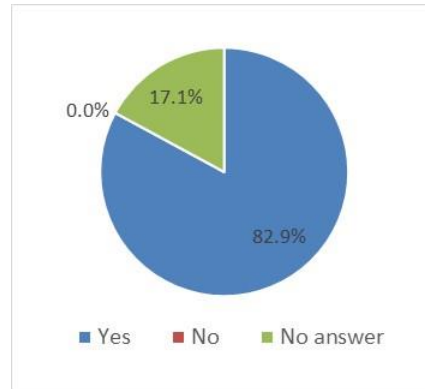
Benefits from e-health service	Frequency	Percentage (%)
Save transport costs	3	8.6
Remote consultation	10	28.6
Emergency service	15	42.8
Proper treatment	4	11.4
Save time	3	8.6
<b>Total</b>	<b>35</b>	<b>100</b>



The next question we asked the 35 patients was if they think that the doctors, nurses and health staffs in general are experts in using ICT health services in Sadar Hospital. As Table/Figure 5 shows, the overwhelming majority (29 patients or 82.9 percent) said that the hospital's doctors, nurses and health staffs are experts in using ICT health services. The remaining six patients (17.1 percent) preferred not to answer the question. Nobody said that the hospital's health staff are not experts in using ICT health services.

**Table 5 / Figure 5: Expertness of doctors, nurses and health staffs on using ICT**

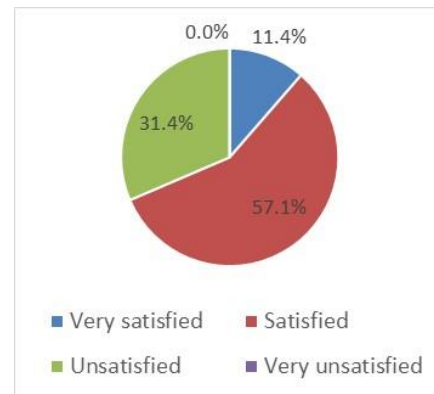
Staff are experts in using ICT	Frequency	Percentage (%)
Yes	29	82.9
No	0	0
No answer	6	17.1
<b>Total</b>	<b>35</b>	<b>100</b>



The last question we asked the patients was how satisfied they were with the ICT health services provided in Sadar Hospital. As Table/Figure 6 shows, 4 patients (11.4 percent) are very satisfied, 20 patients (57.1 percent) are satisfied, and 11 patients (31.4 percent) respondents are unsatisfied with the ICT health service in Sadar hospital. There were however no patients who answered that that they were very unsatisfied.

**Table 6 / Figure 6: Patients satisfaction on getting ICT health service in Sadar Hospital**

Patients satisfactory level	Frequency	Percentage (%)
Very satisfied	4	11.4
Satisfied	20	57.1
Unsatisfied	11	31.4
Very unsatisfied	0	0
<b>Total</b>	<b>35</b>	<b>100</b>

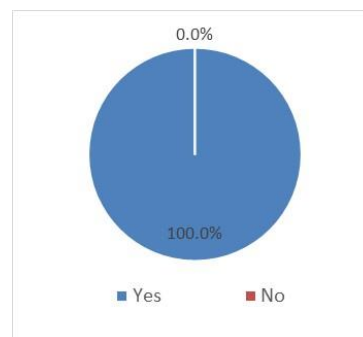


## IV.2. Questions Asked to Health Service Providers

The first question asked to the 30 health service providers was if the application of ICT increases the efficiency and/or effectiveness in providing health services in Sadar Hospital. As Table 7 / Figure 7 shows, all respondents (100%) said that the application of ICT increases the efficiency and effectiveness in providing health services in Sadar Hospital.

**Table 7 / Figure 7: Does ICT increase the efficiency/effectiveness in providing services**

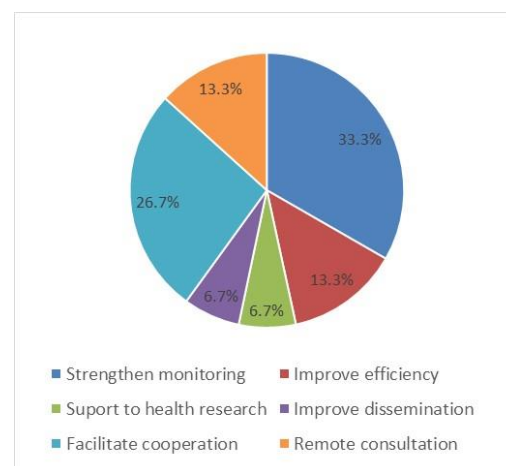
Increase efficiency and effectiveness?	Frequency	Percentage (%)
Yes	30	100
No	0	0
<b>Total</b>	<b>30</b>	<b>100</b>



The second question asked to the 30 health service providers in Sadar Hospital was what their primary use of the ICT facilities are in the hospital. As Table 8 / Figure 8 shows, 10 respondents (33.3 percent) use the facilities to strengthen monitoring, 4 respondents (13.3 percent) use ICT facilities mostly to improve efficiency, 2 respondents (6.7 percent) use the facilities mainly to support health research, another 2 respondents (6.7 percent) use the facilities to improve dissemination, 8 respondents (26.7 percent) use the ICT facilities to facilitate cooperation, and 4 respondents (13.3 percent) use the ICT facilities for remote consultation.

**Table 8 / Figure 8: Facilities of ICT health services in Sadar Hospital**

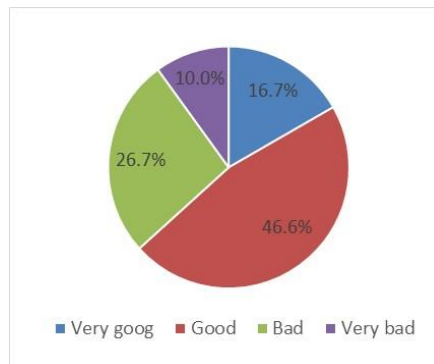
Facilities of ICT health services	Frequency	Percentage (%)
Strengthen monitoring	10	33.3
Improve efficiency	4	13.3
Support health research	2	6.7
Improve dissemination	2	6.7
Facilitate cooperation	8	26.7
Remote consultation	4	13.3
<b>Total</b>	<b>30</b>	<b>100</b>



We then asked the health care service providers on their opinion about the ICT facilities provided by the GoB, if they consider the ICT facilities to be very good, good, bad or very bad. As Table 9 / Figure 9 shows, 5 respondents (16.7 percent) said that the ICT facilities provided by the Government are very good, nearly half of the respondents (14 persons or 46.6 percent) said that the ICT facilities are good, 8 respondents (26.7 percent) said that facilities are bad, and 3 respondents (10 percent) said that government facilities in ICT health service are very bad.

**Table 9 / Figure 9: Facilities given by the GoB in providing ICT health service**

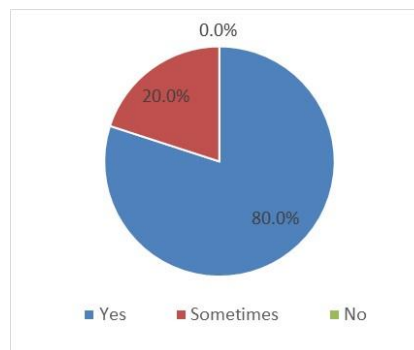
Opinion of the respondents	Frequency	Percentage (%)
Very good	5	16.7
Good	14	46.6
Bad	8	26.7
Very bad	3	10
<b>Total</b>	<b>30</b>	<b>100</b>



The last question the health service providers were asked was if better ICT health services depend on cooperation among doctors, nurses and staffs of hospital and the availability of ICT equipment. As Table 10/ Figure 10 shows, 24 service providers (80 percent) said that better ICT health services depend on cooperation among doctors, nurses and staffs in the hospital and the availability of ICT equipment, while 6 service providers (20 percent) said that ICT health services depend only sometimes on cooperation. None of the service providers answered with no to the question if ICT health services depend on cooperation among doctors, nurses and staffs in the hospital and the availability of ICT equipment.

**Table 10 / Figure 10: Dependence of better ICT health services on cooperation among doctors, nurses and staffs of hospital and availability of ICT equipment**

Opinion of the respondents	Frequency	Percentage (%)
Yes	24	80
Sometimes	6	20
No	0	0
<b>Total</b>	<b>30</b>	<b>100</b>

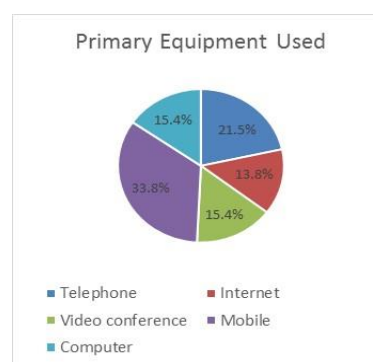


### IV.3. Questions Asked to Patients and Health Service Providers

The first aspect we asked both, patients and service providers, was what kind of ICT equipment was primarily used related to their visit of Sadar Hospital. Table/Figure 11 shows that 14 respondents (21.5 percent) used primarily telephone, 9 respondents (13.8 percent) used mostly internet, 10 respondents (15.3 percent) used primarily video conferencing, 22 respondents (33.8 percent) used primarily mobile ICT health services, and 10 respondents (15.3 percent) used mostly computers.

**Table 11 / Figure 11: Primary equipment used in ICT health services by service recipients and service providers in Sadar Hospital**

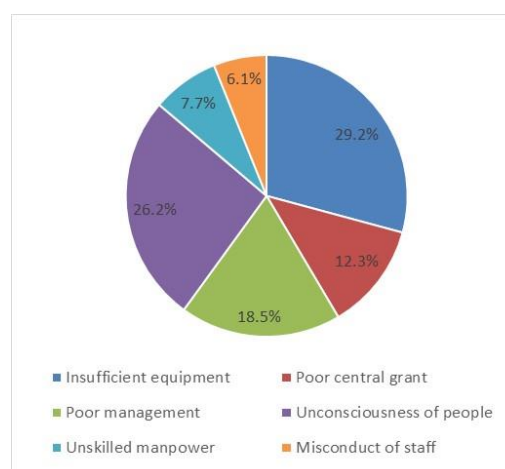
Equipment used	Frequency	Percentage (%)
Telephone	14	21.5
Internet	9	13.8
Video conference	10	15.3
Mobile	22	33.8
Computer	10	15.3
<b>Total</b>	<b>65</b>	<b>100</b>



Finally, we asked the patients and service providers about the main obstacles for providing more/better ICT health services. As Table/Figure 12 shows, 19 respondents (29.2 percent) said that there is an insufficient number of equipment in Sadar Hospital; 8 respondents (12.3 percent) emphasized poor central grants from the government for ICT health services; 12 respondents (18.5 percent) told about poor management in ICT health services at Sadar hospital; 17 respondents (26.2 percent) identified the unawareness of general people in ICT health services; 5 respondents (7.7 percent) found that unskilled manpower in ICT health services are the main obstacle; while 4 respondents (6.1 percent) referred to misconduct of hospital staff.

**Table 12: Obstacles faced by ICT service provider sand receivers in Sadar Hospital**

Opinion of the respondents	Frequency	Percentage (%)
Insufficient equipment	19	29.2
Poor central grant	8	12.3
Poor management	12	18.5
Unconsciousness of people	17	26.2
Unskilled manpower	5	7.7
Misconduct of staff	4	6.1
<b>Total</b>	<b>65</b>	<b>100</b>



## **V. Overall Findings from the Primary and Secondary Data Analysis**

The following findings have been summarized based on the primary data analysis as well as the review of the literature. Hence, they do not only apply to Sadar Hospital but to most hospitals in Bangladesh, keeping in mind that getting health services is a fundamental right of all citizens. Health services are considered an essential precondition for the development of human beings.

This study identified that positive change has occurred in providing ICT health services in Sadar Hospital. Both the efficiency and effectiveness of management have increased in providing health services. The use of modern equipment (telephone, internet, video conference, mobile and computer) in ICT health service helps patients to get service more promptly. It saves time and costs of the patients, ensures remote services and instant medical advices. With the help of ICT, service providers in hospitals play their role more effectively in a) strengthening monitoring systems(both in and outsides of the hospital) and b) facilitating cooperation among the staffs and patients.

On the other hand, e-health services are hampered in Sadar hospital and other hospitals due to a lack of skilled manpower; i.e., many service providers are not sufficiently skilled to use ICT. Besides, most of the patients do not know how to get e-health service because there is no specific system, no clarifications on how to get e-health service in hospitals. It is also evident that the supply of ICT equipment by the government does not fulfill the requirements of general patients. The quality of present equipment to provide e-health services in Sadar hospital and other public hospital is very poor. Patients are not getting expected e-health services for the lack of sufficient technical equipment.

The study comes to the conclusion that the provision of ICT health services is not always clear to patients, that insufficient budgetary allocations from the central government adversely affect the provision of e-health services, and that there is no effective monitoring system from the central government, which hampers the efficiency of e-health services in most public hospitals.

The study reveals that even though some ICT health services are provided in public hospitals, they are less provided than in private hospitals (which have more and better ICT equipment and facilities). In any case, both, service providers and recipients think that more awareness of ICT services could ensure better e-health services of Sadar Hospital as well as other public hospitals.

## **VI. Recommendations**

The following recommendations are given on the basis of the analysis and findings of the study.

- The GoB should provide specific programs on ICT health services in order to create awareness among the general people.
- Skilled manpower should be recruited and they should give proper training on ICT service.
- The equipment facilities in ICT health services should be increased for providing service effectively and efficiently.
- Central grant and technical support of ICT is also important for ensuring a high quality of health services because existing facilities cannot meet the demand of the people. The

government should provide the necessary grant and technical support to hospitals to ensure proper e-health services.

- Many people do not know how to get ICT health services due to a lack of awareness. The government should introduce necessary program to help the general people to get ICT health services.
- The conduct of behavior and qualities of staffs, nurses and doctors should be helpful to the people in order to improve ICT health services in hospitals. The accountability and transparency in ICT health services of every hospital should be ensured by the Ministry of Health and Family Welfare (MoHFW).
- ICT health services provided by hospitals are not always satisfactory to the patient. An evaluation and monitoring system should be developed by concerned authorities to meet the expectation of the patients.

## **VII. Conclusions**

As pointed out by Chetley et al. (2006, p. 4), a critical mass of professional and community users of ICTs in health has not yet been reached in developing countries. Bangladesh is a developing country that has not yet been prepared to properly cope with the adoption of ICT in the health service sector. Bangladesh's health policy has no specific rules and regulations for applying ICT efficiently and effectively. In Bangladesh, the role of ICT depends on specific circumstances and some applications of ICT are more used than others. A more systematic use of ICT in the health sector could be ensured through a better planning, monitoring, and implementation of the government's health policies.

Even though some ICT health services have been adopted in Bangladesh, we still face many challenges and problems with the application of ICT in health services. The study attempts to find out the actual role of ICT health services in Sadar hospital. ICT health services are beginning to be used innovatively to bring health service to the people in a more effective manner. The proper application of ICT health service can change the present scenario of health services by changing their monitoring, working, coordinating, training, recruiting, communicating and maintaining system of health services. Existing policies need to be reviewed and revised for improving accessibility, affordability and quality of ICT health services for further improvement of health.

Finally, ICT health services create a new and more effective system of service delivery which increases capacity of the service providers to provide rapid, safe, effective and affordable health services. ICT in health service systems will change operating systems of clinical patterns, support and the policy environment constantly and the information systems must respond to these changes. If the government and other concerned authorities fail to make appropriate changes in the policies, legal infrastructures, availability in ICT equipment, skilled manpower and proper monitoring in ICT health sector, general patients cannot get proper treatment. So government should take positive steps to remove the obstacles and to increase the benefits of general patients in ICT health services all over the country, which would help the development prospects of Bangladesh.



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