



## A Survey on the Telemedicine in Bangladesh

Tanishka Tiwatane<sup>1</sup>, Gauri Bhavsar<sup>2</sup>, Sonali Bachute<sup>3</sup>,  
Vrushali Zampalkar<sup>4</sup>, Ms. Sushadevi Shamrao Adagale<sup>5</sup>

<sup>1</sup>Student, Computer Engineering Trinity Acadaemy of Engineering, Pune, India

<sup>2,3,4</sup>Computer Engineering Trinity Acadaemy of Engineering, Pune, India

<sup>5</sup>Professor, Computer Engineering Trinity Academy of Engineering Pune, India

### Abstract:-

Bangladesh is a small developing country of South Asia with a huge number of population. About 75% people live in rural areas where the healthcare facilities are very inadequate in contrast to the urban areas of Bangladesh. The healthcare facilities can effectively be given to this huge number of rural people through Telemedicine. The main aim of this paper is to find out the present states of Telemedicine in Bangladesh and their expectations on Telemedicine. The survey shows that 94.80% expert doctors, 74% local doctors, 91.42% patients and 80.32% pharmacy owners of Bangladesh want to introduce telemedicine services for the huge number of rural people of their country. This survey also proposes the telemedicine operating cost for Bangladesh. The results of this survey can be used to develop a standard open Telemedicine model which will be a feasible health care solution for the people of Bangladesh. The healthcare companies of today are looking at ways to lessen costs and increase patient care. As part of this, Telemedicine is developing as the innovative concept of e- healthcare. The new telemedicine stages are making the health- care industry more elastic and flexible. It is with preparing the patient with the required tools to interconnect with the healthcare providers from the comfort of their homes. The results of this survey can be used to develop a standard open Telemedicine model which will be a feasible health care solution for the people of Bangladesh.

**Index Terms—Telemedicine model; Diagnosis; Rural area**

### Introduction:-

Telemedicine, also referred to as telehealth or e-medicine, is the remote delivery of healthcare services, including exams and consultations, over the telecommunications infrastructure. Telemedicine allows healthcare providers to evaluate, diagnose and treat patients without the need for an in-person visit. Patients can communicate with physicians from their homes by using their own personal technology or by visiting a dedicated telehealth online doctor in Bangladesh.

For patients at home, a typical telemedicine exam involves downloading an app such as HealthPlix or calling a telemedicine number, which generally is provided by a primary care physician's office or patient's employer as part of health benefits. After sharing information about medical history and symptoms, the remote patient will be connected to a clinician. Based on the clinician's evaluation, the call will end with the patient receiving further instructions such as to take medication, fill a prescription, go to a hospital or schedule a follow-up



appointment. Telemedicine in the developing world offers solutions to healthcare for people in rural areas, reduce costs, and improve healthcare quality. Bangladesh is a country which offers Telemedicine services through the project basis[1]. In Bangladesh, the first telemedicine link was established in 1999 [2]. Telemedicine consultation has also been shown to reduce total tally costs, and decrease transportation issues and the time [3]-[5]. Quality of medical care in rural areas can be improved by using telemedicine can be served special medical care for the patients [6], [7]. Tele-consultant can affect diagnosis and treatment in telemedicine [8]. The Swinfen Charitable Trust in the UK established a telemedicine link in Bangladesh, between the Centre for the Rehabilitation of the Paralyzed in Dhaka and medical consultants abroad in 1999. This low-cost telemedicine system used a digital camera to take still images, which were then transmitted by email. This successful telemedicine model is a reference model for further telemedicine projects in the developing world [2]. Telemedicine pilot project Diabetic Association of Bangladesh (DAB) was a real time tele-medical consulting telemedicine project. Two way video transmission technology was used in this system. The success rate of this system was not satisfactory because of poor market promotion and other factors [9]. Bangladesh University of Engineering Technology (BUET) and comfort nursing home had started a telemedicine project with the financial collaboration from European Union (EU) through store and forward [1]. We have described some of the telemedicine systems in Bangladesh and showed why they have failed to meet the demand of the people. In order to know the present scenario of Telemedicine in Bangladesh, That's why we have conducted a survey on the shareholders of it.

## Literature Survey:-

- Ahsannun Nessa, Moshaddique Al Ameen.[1] In this section it is found that 94.80% expert doctors, 70% local doctors, 91.42% patients and 80.30% pharmacy owners of Bangladesh want to introduce telemedicine services for the huge number of rural people of their country. The healthcare facilities can effectively be given to this huge number of rural people through Telemedicine. The main aim of this is to find out the present states of Telemedicine in Bangladesh and their expectations on Telemedicine.
- M. K. Dobke, A. Renkielska, J. De Neve, J. Chao and D. Bhavsar.[4] In this section 60% of respondents felt comfortable with telemedicine consultation based on recommendations alone. The total number of patients referred for telemedicine consult was 230, and face-to- face consultation with a WCSS was offered and arranged for 30% of patients. The perception of shared decision making, streamlining patient care, and an opportunity for followup were all highly ranked benefits. The majority of PCPs (93%) agreed that telemedicine wound care consult is a useful tool in their practice and would continue to use the telemedicine consult service.
- Ann B.Bynum and Cathy A.Irwin.[8] In this section there were 61 consultants who conducted the telecon- sultations. The teleconsultants established a diagnosis in 121 consultations and reported a change in diagnoses in 29. The consultants established a treatment plan in 219 consultations and reported a change in the treatment plan in 100 consultations. Teleconsultants who were self- employed were significantly more likely to change the treatment plan. This survey suggests that teleconsultants'

characteristics can affect diagnoses and treatment in telemedicine.

- Uzzal Kumar Prodhan and Muhammad Zahidur Rahman.[15] From this section it was found that most of the people of South Asia are living in rural areas and only 15 to 20% people live in urban areas where health facilities are sufficient and moderated. Most of the rural peoples will have to travel to urban areas for their basic treatment. In order to find the cost analysis of telemedicine, study shows that telemedicine models like Grameen phone telephone medical advice fees are 15 Taka (around USD 0.20) for a three-minute call to a qualified physician. Telemedicine established between DAB and Faridpur needs 600 taka per consultation. The cost should be low so that poor people can avail the cost easily.
- Lal B Rawal and Taufique Joarder.[16] This section says, the government of Bangladesh has made significant efforts in adopting health and related policies as reflected through the policies for medical and nursing educational development, regulation, financial incentives, and professional and personal development. However, Bangladesh lacks policies and provisions specifically targeted to the attraction and retention of HRH in rural health facilities. Therefore, Bangladesh must improve rural retention of HRH through the development of more focused policies and provisions for effective recruitment, deployment, and retention with increased support from the government’s commitment, political non-interference, and backing from professional organizations. Further, a strong mechanism for effective monitoring and evaluation of these policies and provisions needs to be established.

**Proposed System:-**

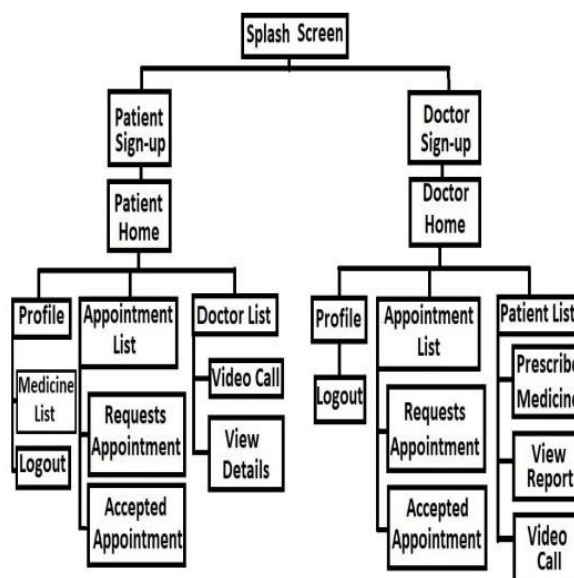


Fig. 1. Block Diagram of the System

An online medicine delivery system is an online based web application that operates over the Internet and sends orders to customers through credit cards, shipping companies, or pay on delivery system. People can buy and sell their products sitting at home. It is getting popular day by day all over the world even in domestic market space. The aim is to make the ordering process and delivery systems of medicines much easier and customer-

friendly. It's very important to make a user friendly environment. This is the system diagram in which each modules are shown as they have developed in the Online medicine Application.

We have divided the works in several parts:-

The parts are:

- Individual Sign-up
- Doctor Management
- Patient Management
- Report
- E-Prescribing
- Video Conferencing

### 1. Individual Sign-up :

Individual sign-up has been de- signed for patient and doctor. Patient's authentication has been done by phone number authentication of Firebase. Firebase Authentication system manages the current users Session ID. For doctor's authentication their respectively BMDC registra- tion number, NID number and phone number has been used along with the Firebase authentication system.

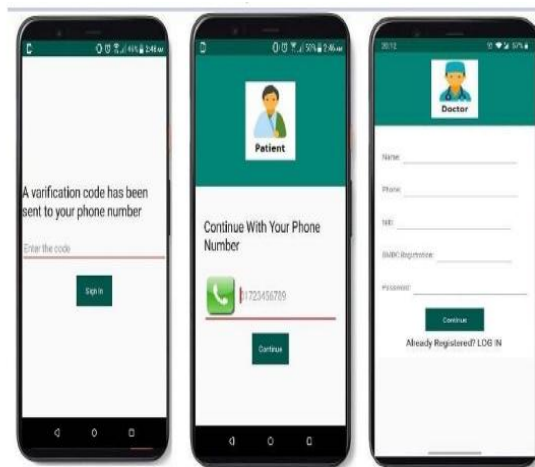


Figure 2: Individual Sign-up of doctor and patient

### 2. Patient Management :

In patient layout fragment has been used. Patient home has five functionality:

Profile

Find

Doctor

Appointment

Report

Medicine

During Sign-up process, patient has to provide some personal information and a profile photo which are

saved in database. The picture is saved in the Firebase Storage and the link is saved in the database along with other personal information. All these information is retrieved from the database and shown in this layout. Patient can find available doctors who are enlisted in the application through Find Doctor function. Patient can search particular doctor by his name or specialty in the search bar. Doctor's detail can be found in the details section. Video conferencing with doctor and appointment scheduling will be discussed later in the paper.

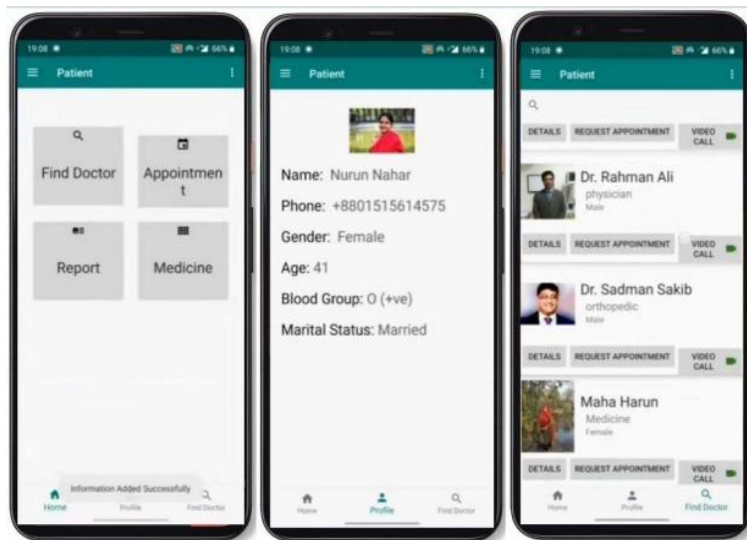


Figure 3: Patient Management

### 3. Doctor Management :

Doctor home has been made using fragment. In doctor's home 2 functionality can be found. They are:

- Profile
- Patient List
- Appointment List

To make doctor's management easy for understanding a figure is added below. Figure 4: Doctor Management During Sign-up process, doctors need to provide some personal information and a profile photo which are saved in database. The picture is saved in the Firebase Storage and the link is saved in the database along with other personal information. All these information is retrieved from the database and shown in this layout. Doctors can find patients who are enlisted in the application through Patient List option. Doctor can search particular patient by his name in the search bar. Doctors can see the patients report if patient has uploaded any. Patient's appointment and prescribe medicine option is also there. It will be discussed later in the paper.

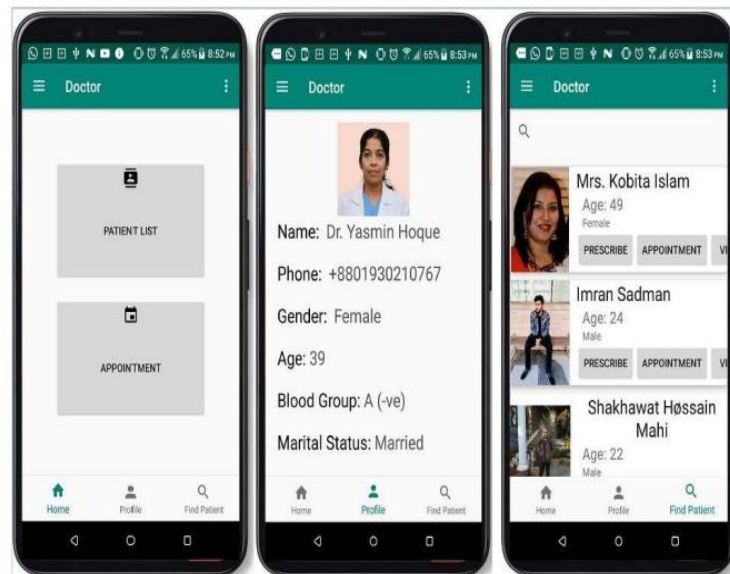


Figure 4: Doctor Management

#### 4. Report:

Patient can upload easily by selecting images from their respective phone's gallery or storage. But beforehand they have to take image of the report using the camera of the phone. The uploading of report is done using Firebase Storage system. An image of the report layout is provided underneath. The report file which is uploaded by patient in the storage is kept as link in the report section in Database. Multiple reports can also be uploaded by one user. Patient can see their own unloaded report after uploading. Patient can view the full image by clicking on it. Doctors can see patients report by clicking on the report section in patient's profile. However doctor cannot upload any report using the application.



Figure 5: Report Management.

### 5. E-Prescription:

Doctors can prescribe medicine to the patient. By clicking on prescribe option in a particular patient's profile a new layout pops up. There a doctor can add medicine name, dose, duration and description. Again a doctor can also see previously prescribed medicine by any doctor. An image of prescription is provided below.

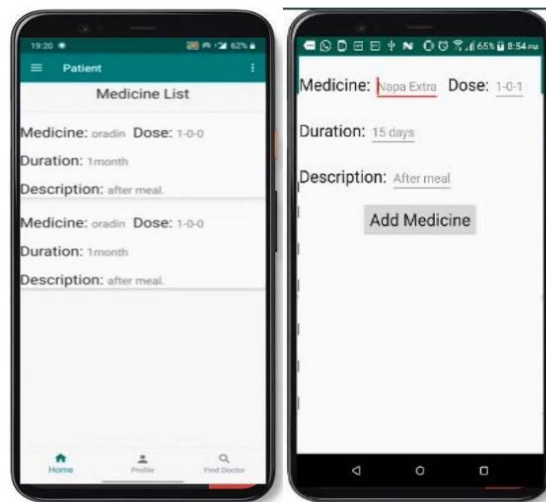


Figure 6: E-Prescription

### 6. Appointment Scheduling :

When doctor is not available patient can set appointment to a particular doctor. To set appointment Patient first need to select a doctor. Then he/she must go to a doctor's profile and click on request appointment. After requesting an appointment, both patient and doctor can see the request in his/her profile. Patient can cancel his/her appointment request anytime. After canceling the request this appointment will also be deleted from the database. An image has been provided for better understanding on appointment scheduling.

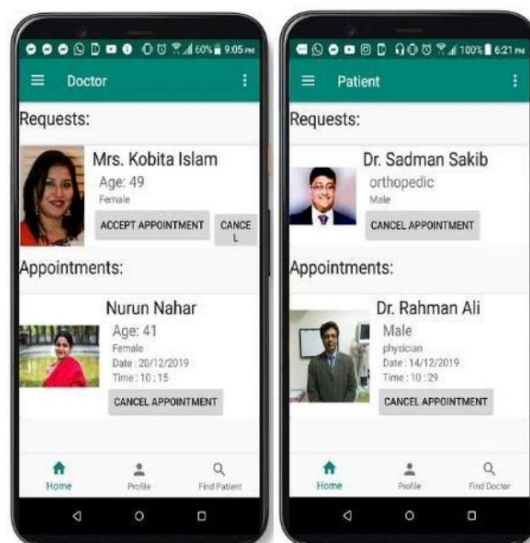


Figure 7: Appointment Scheduling

### 7. Video Conferencing :

Video conferencing is done with the help of an integrated google application, DUO. DUO was used because every android phone has it pre-installed, which made our job easy than using API.



**Figure 8: Video Conferencing between patient and doctor**

### Discussion:-

It was found from our survey that village doctors have shown their interest to give healthcare services through telemedicine with the payment of 51-100 taka. Pharmacy owner's also agreed on the amount 51-100 taka for their telemedicine infrastructure support. Most of the patients have said that they want telemedicine services in the range of 201300 taka. We can conclude that the expected fees for telemedicine should be made in the range of patients. 300 taka is the proposed fees of telemedicine where expert doctors will get 150 taka, 75 taka for village doctors and 75 taka for pharmacy owners per patient. The survey conducted by Sharmin Jahan and others in 2014 of e-health shows that if travelling cost of a patient to visit a medical specialist is higher than the cost of providing econsultation, then e-health might be an cost effective viable solution [12]. It is also found from three papers that Telemedicine provides a potential method for solving health care [13]-[15]. After collecting the data from field, we have converted the data into process able states through different variables. The variables are processed through the statistical package R. We have processed the data based on the four different perspectives called Local Doctor, Expert Doctor, Pharmacy owners and Patients. The results are found based on the different perspectives which summary are tabulated in the result section. In my conference paper, I have incorporated the key findings of my survey for the length of the paper. The more details data analysis may be included into the further Journal paper based on my survey. From the review paper conducted in 2015 by Lal B Rawal and others, we came to know that there are no extra benefits or up-gradation facilities for Doctors and Nurses who work in rural areas. As a result, it is very difficult for them to stay in rural areas for a long time and satisfactorily engage in the treatment of huge number of rural patients [16]. If we cannot retain the health workers in rural areas, Telemedicine can be an alternate solution for these types of situation. From the recent





study conducted by Emmanuel Kwame Darkwa and others in 2015, it was found that the living status in rural areas is very poor with inadequate facilities. There are no standard rules and policies developed for the health workers who will work especially in the rural areas of Bangladesh. As a result, high regulations of Doctors and Nurses are found in rural areas. Most of the Doctors are urban centric.

## Conclusion:-

This System represents the current status of telemedicine services of Bangladesh. We have seen that the patients (91.42%) want to introduce this service in their areas for their treatment. They also want to get the services within their financial capabilities. Local doctors normally referred his patients to expert doctors for the complex cases. They (74%) are agreed to implement the telemedicine service. Local doctors can be able to increase their personal skills for patient management through telemedicine. Authors expect that the results of the survey will assist the researchers for the further development of standard telemedicine model in Bangladesh.

Hence, we defined virtual health as continuous, connected care delivered via digital and telecommunication technologies. It includes video visits and telemedicine, remote monitoring, asynchronous communication, medication adherence, and clinician or provider-facing solutions, such as virtual consults and virtual second opinions. Virtual health has the potential to touch the so-called four Cs that are critical to the success of consumer well-being and care delivery. It can drive:-

Continuity—agnostic of care setting (home, outpatient, or inpatient).

Connectivity—encompassing asynchronous and syn-chronous modalities.

Coordination—linking all stakeholders (consumers to providers; providers to providers; consumers to life sciences companies, and more).

Care continuum—from well-being to acute to postacute care.

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