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**Tele dermatology using WhatsApp messenger during COVID 19 pan-demic; our experience of a cost-effective solution to reach out patients in limited resource settings.**

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**Abstract**

Tele dermatology is a reliable tool for remote consultations. It's significance was greatly enhanced during the COVID-19 pandemic. The tele dermatology model proposed by our study used WhatsApp as communication modality to reach-out non-COVID patients especially in a low-income setting. We used store and forward method of telemedicine and observed effective communication on behalf of the patients irrespective of educational status. This model was time efficient for the practitioners and provided a cost-effective solution to the Dermatology patients in re-mote settings, unable to access healthcare facilities during lockdown. Our study supports the use of free mobile applications such as WhatsApp messenger that the patients are already using for social networking and communication to reach out Dermatology patients cost effectively, particularly in low resource settings and in challenging circumstances such as COVID 19 pandemic.

**Keywords:** Covid-19; Pakistan; Tele dermatology; E-health.

**1. Introduction**

Tele dermatology has proven to be very beneficial in diagnosing, triaging and managing a multitude of inflammatory and even neoplastic disorders of the skin [1]. This modality has become even more important during COVID 19 pandemic as the guidelines issued by Centre for Disease Control clearly state the importance of social distancing for prevention [2]. Being a developing country, Pakistan's healthcare system constantly faces a challenge combating numerous diseases other than COVID-19 within limited resources. With the spread of pandemic, there was an increasing need for an alternative form of

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communication between the patients and physicians. Teledermatology was a viable solution. However, due to the language and communication gap, there was a huge chance of misdiagnosis using Teledermatology as a model. Furthermore, it was speculated that the chances of miscommunication between the patient and the doctor would increase owing to lack of education or literacy of the common, low-income households; which comprises most of the outdoor patients in our hospital. Keeping in view the circumstances, the Dermatology department at Madinah Teaching Hospital, Faisalabad decided to perform their duties in the state of lockdown, through a self-designed, free of cost, voluntary teledermatology model. The means of communication used was WhatsApp messenger that is a free social media messaging application available on iOS and android. In this study, we have observed the trends of acceptance and ease of use for the patients for three months during the pandemic in Pakistan.

## **2. Subjects and Methods**

This study was conducted at Madinah Teaching Hospital Faisalabad, by the Department of Dermatology, from March to June 2020, during COVID-19 pandemic. A teledermatology service employing store and forward model utilizing WhatsApp messenger was offered to facilitate the patients suffering from various skin diseases. It was a voluntary service offered free of charges for three months. We assessed and reviewed the information collected during this process. A WhatsApp number was used as a form of communication between the patients and the doctors. Patients were informed about this service by effectively communicating it through multiple announcements on the local FM radio service, especially during the strict lock down period. During the subsequent smart lock down period, every patient who visited the outdoor department and needed a follow up was given this specific WhatsApp number to facilitate the patient stay home. This number was being used on one mobile device that was with a dermatology trainee for one week, being rotated among the trainees who willingly volunteered their time for this free service. This number was in sync and linked to the WhatsApp web application of a consultant dermatologist. This made the consultations more efficient. The doctors who volunteered for this service were nine in number, including one consultant dermatologist and eight post-graduate residents who had completed their bachelors in medicine and surgery and were doing post-graduate residency in dermatology. Patients were guided to use text messages, voice messages and photographs. Audio and video calls were not entertained. Once the contact was established with the patient, a set number of pre-scripted questions in the native language of Urdu were asked regarding basic patient data. At the end of each consultation, the patients were asked a question regarding their satisfaction with this service. Their responses were compiled and computed with the help of SPSS version 23, using descriptive statistics.

### 3. Results

During the span of three months, we did 160 consultations, assigning a unique ID number to each patient. Among 160 consultations, 109 were new patients, whereas 51 had already registered with Dermatology department and were on follow up or had developed a new complaint. Furthermore, we noted that the patient became the communicator for other patients in his vicinity after receiving consultation himself.

Demographically, 103 patients belonged to the city of Faisalabad where the parent hospital is located. Fifty-seven consultations catered for patients living in cities quite distant from Faisalabad including Karachi, Quetta and Attock. We also received a consultation from Manchester, UK, showing how well this free Tele dermatology service was received.

The time taken for a consultation to be made was less than 30 minutes from 8 am to 2 pm, less than 60 minutes from 2 pm to 10 pm and from 10 pm till 8 am the consultations were done the following day. This decreased waiting time, increasing patient satisfaction with the service. We assessed and analyzed the mode of communication used by the patients whether it was text, audio message or photograph of the lesion, the results are shown in table 1.

Patients consulted us for a wide range of diseases from Psoriasis and Acne to Condylomata Lata, a summarised list can be seen in table 2

Table (1) Demographic Data of the Study Groups

Characteristics	Frequency (%)
<b>Gender</b>	
• Male	• 55 (34.4)
• Female	• 105 (65.6)
<b>Level of education</b>	
• Less than 9 years	• 17 (10.6)
• 10 to 14 years	• 72 (45.0)
• More than 14 years	• 71 (44.4)
<b>Mode of communication Text</b>	
• English	• 53 (33.1)
• Urdu	• 16 (10)
• Roman Urdu	• 79 (49.4)
• No text	• 12 (7.5)
<b>Audio message</b>	
• Yes	• 47 (29.4)
• No	• 113 (70.6)
<b>Picture</b>	
• Yes	• 156 (97.5)
• No	• 4 (2.5)
<b>Multiple/more than one mode of communication</b>	156 (97.5)

<b>Patient Satisfaction</b>	
• <b>Satisfied</b>	• 159 (99.4)
• <b>Unsatisfied</b>	• 1 (0.6)

Table (2) List of diseases consulted through our tele dermatology model

<b>Disease</b>	<b>Percentage</b>
Dermatitis	14.37%
Bacterial Diseases	3.75%
Viral Diseases	3.12%
Fungal Diseases	11.25%
Parasitic Diseases	11.25%
Miscellaneous	5%
Inflammatory dermatoses	6.87%
Cosmetic Disorders (acne, melasma and other pigmentation disorders)	24.38%
Autoimmune disorders	17.5%
Vascular disorders	2.5%

#### 4. Discussion

Store and forward model of telemedicine has been in practice for some time, Alexander et. Al [5] used this model during the COVID-19 pandemic and suggested the use of this model to reduce the in patient load especially during such unforeseen circumstances. Our study included the use of WhatsApp as a mode of communication between the patient and the dermatologist. Due to ease of use and familiarity, WhatsApp messenger is proving to be a very vital tool in tele dermatology as shown in a cohort study conducted including the healthcare professionals [6]. This is also reflected in our research, as 10.6% of the patients with 9 years or less of formal education used this tool without any hesitancy as they were already familiar with it.

COVID-19 pandemic has sparked a discussion about having proper consultation charges for telemedicine and formulating a model which is cost-effective as well as efficient [7]. Various business models have been discussed in a review article by Chen et. Al [8]. In addition to that, an Australian study regarding physicians` perception about consultation charges in a store and forward tele dermatology model concluded that initial consultation charge should be from AU\$61 to AU\$120 [9]. In Pakistan, a well-adopted telemedicine model has been in place since 2008 known as Telenor Teledoctor that charges the

caller with 0.08 USD per minute [10]. In contrast to the ones mentioned, we offered free of charge consultations to help the patients, during this difficult time of economic recession. Triage was done by our team, and we asked the severely diseased patients or those with atypical lesions who required clinical and laboratory workup to come to the hospital for an in-person consultation.

Lurie et al. proposed that models of healthcare services that do not compromise patients' health or privacy need to be developed, particularly for use in disasters and emergencies. [11]. It was shown by a survey done on undergraduate medical students that even though the Telehealth technology is likely to be adopted, there are concerns about patient privacy and security [12]. According to Wang et al., lack in any standardized form of system that preserves patient confidentiality proves to be a significant barrier in adopting this model [13]. It was reported by Kaliyaden et al. that 23% of his patients declined to take photographs due to social or religious reasons [14]. A quarter of the patients included in the study by Chee et al also showed this concern [15]. Contrary to the perceived cultural norms, 65.6 % of our patients were females and had no reluctance in sending the pictures of their lesions to us for assessment of their disease. In most cases we didn't even had to ask for the picture as the patient had already sent one.

There is a significant risk of misdiagnosis if the pictures taken of the lesion are unclear or misleading. Various studies done by Keller et al [16], Sola-Ortigosa et al. [17] and Vestergaard et al. [18] have shown that if used effectively, this model can yield similar results as compared to in-patient visits. We noted that on just three occasions, we had to ask the patients to retake a better picture of the lesion. Otherwise, the quality and the positioning of the picture was adequate to formulate a diagnosis and start treatment. This proves that using a mode of communication that the patients are already well versed with, highly facilitates communication. This smooth communication was probably an important reason for our reduced consultation time and the resultant reduced waiting time for the patients. Andrees et al. also reported significantly less patient waiting time in teleconsultations as compared to in-patient visits [19].

The language of communication plays an important role in patient compliance that forms the basis of the book written by Baraldi and Gavioli [20]. Particularly in a country like Pakistan, where multiple languages are spoken, language becomes vital for patient compliance. Urdu is the national language of Pakistan, widely spoken and understood. At the start of the study, we decided to ensure that all of the communication from our side is in the native language of Urdu. WhatsApp allows its users to communicate with the help of video, audio as well as pictures. In our study, WhatsApp picture was sent by almost all of the patients and the most used form of text communication was Roman Urdu. Those who were unable to type or communicate properly through text, sent audio messages and accounted for 29.4% of the patients. This showed that if the main communication is in a native language, it gives the patient

more space to explain and understand the process and creates an ease for use. Patients chose their mode of communication quite wisely without any guidance.

In a study by Marchell et al. it was seen that even if the patients were satisfied with the store and forward model of teledermatology, they still preferred the in-person visits [21]. Nicholson et al. presented a study in which majority of the patients liked the store and forward model yet, 42% of the patients would like to see a dermatologist face to face despite agreeing that this mode of consultation saved their time [22]. In our study, 99.4% of the patients were very satisfied with this service. The ease of use and rapid response by our team was well received.

## **5. Conclusion**

Free mobile applications such as WhatsApp messenger that the patients are already using for social networking and communication can be efficiently used to reach out Dermatology patients cost effectively, particularly in low resource settings and in challenging circumstances such as COVID 19 pandemic.

## **6. Declarations**

### **6.1 Conflict of Interest Statement**

The authors declare no conflict of interest.

### **6.2 Funding Disclosure**

The authors disclose no financial funding for this article.

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