

## Pharmacists in Telemedicine: Meeting the Ongoing Demand of Bangladesh Abdul Kader Mohiuddin

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### Abstract

**Background:** Currently, coronavirus COVID-19 has affected 210 countries around the world, killed more than 268,500 and infected more than 3.8 million, according to worldometer, May 08, 2020. Home-care is especially important in these situations because hospitals are not seemingly safe during pandemic outbreaks. Also, the chance to get out of the home during the lockdown period is limited. Telemedicine and telehealth technologies are especially effective during epidemic outbreaks, when health authorities recommend implementing social distance systems. **Materials and Methods:** This study started in February 2020, when the Philippines reported its first death outside China. PubMed, ALTAVISTA, Embase, Scopus, the Science Web and the Cochrane Central Register have been carefully searched. The keywords were used to search out extensively followed journals from various publishers such as Elsevier, Springer, Willey Online Library, and Wolters Kluwer. **Results:** The idea of employing pharmacists in telemedicine is not only good for general patients' healthcare access but also utilization of a huge number of pharmacists who are currently unemployed. In this Covid-19 pandemic situation, where vaccine and medicines are literally non-existent, this cheap but effective technology-based support can ensure maximum protection against virus spread and safety. But, Pharmacy education of Bangladesh does not meet the minimum requirement for adequate clinical, hospital and community pharmacy practice. The system needs special attention too. **Conclusion:** The telemedicine sector in Bangladesh is still in its beginning phase. Employing pharmacists with proper training would bring the best outcome but proper initiatives are not taken. The policy makers are the sole to take any initiatives in the country. Proper lobbying through proper channel is the only solution to establish pharmacists in telemedicine sector.

**Keywords:** telemedicine; pharmacist's intervention; tele-pharmacy challenges; healthcare situation in Bangladesh; underutilization of hospital pharmacy; pharmacy education; patient communication

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### Introduction

Bangladesh's health care services are becoming unusually concentrated in a small fraction of costly critical health-demanding patients. A large part of these complex-patients suffers from multiple chronic diseases and are spending a lot of money.

qualified pharmacist for the patients who are located at a far distance from the pharmacy.

The most common way to use telemedicine is a responsive model, primarily physician-led with virtual visits stimulated by alerts using interactive services, which facilitates real-time interaction between the patient and provide.<sup>1</sup> It delivers resilience to services and enables pharmacists to work remotely, reducing the need for long journeys and increasing job satisfaction.<sup>2</sup> The rise of pharmacists in epidemic situations has become increasingly popular in developed countries such as the United States, Australia, Canada and the United Kingdom. According to information from recent published articles in several ongoing journals, books, newsletters, magazines, etc., the duties, authority and responsibilities of pharmacists

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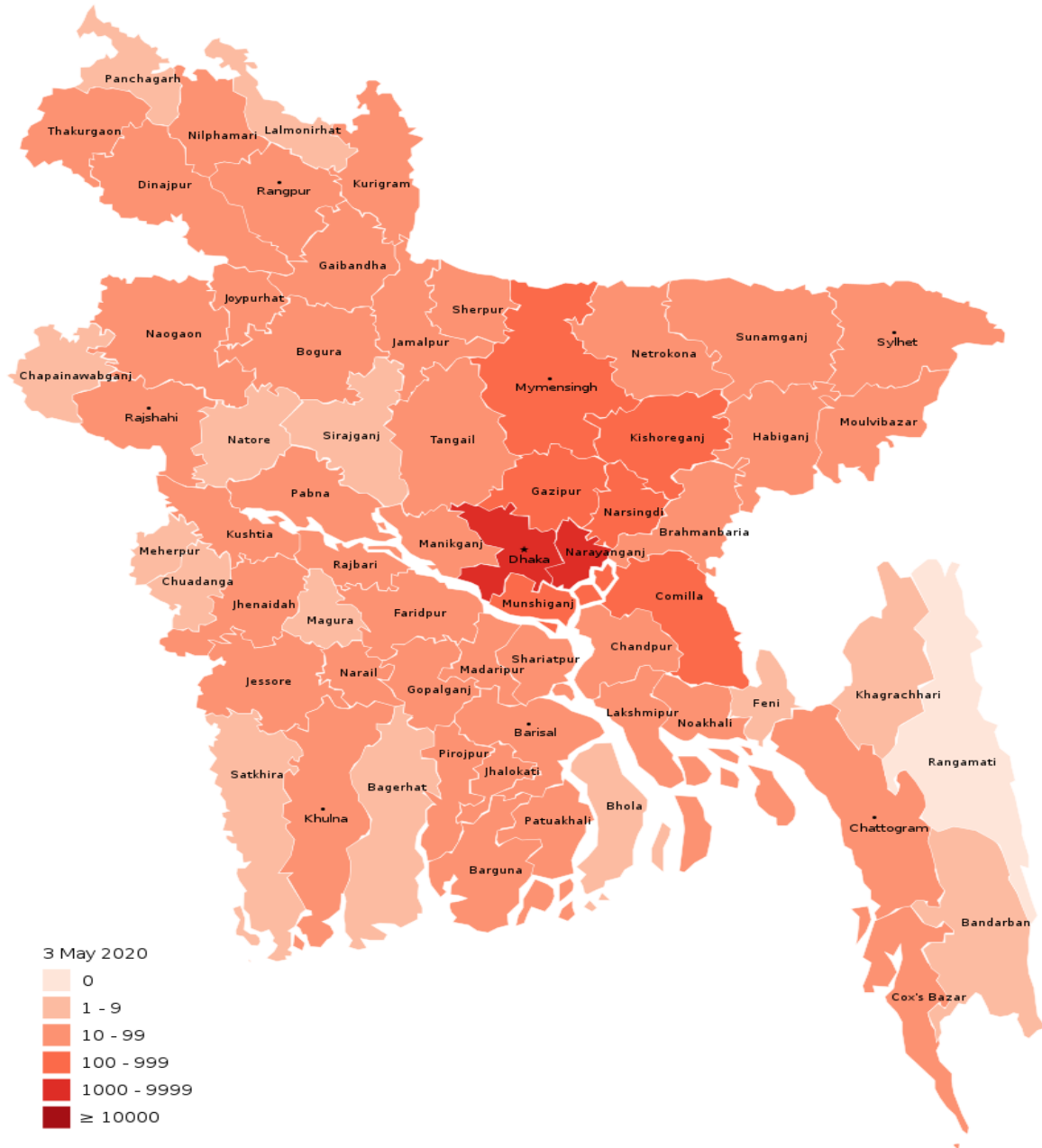
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Tele-pharmacy includes patient counselling, medication review and prescription review by a

are completely different from doctors and nurses, although there are some similarities. Along with doctors, pharmacists can serve as frontline healthcare workers during epidemics. The profession is developed and highly praised in both developed and underdeveloped countries. Millions of professional pharmacists worldwide work in various organizations, and according to data from the International

Pharmaceutical Federation (FIP), nearly 75% of them work in patient care.<sup>3</sup> Even in the United States, the continued lacking of primary health providers and medical specialists has made it possible for pharmacists to care for ambulatory patients with chronic diseases in a variety of treatment services.<sup>4</sup>



**Figure 1. District wise COVID-19 Infected Cases in Bangladesh (As of 23rd April, 2020, Source: corona.gov.bd)**

### Present Socio-Economic and Healthcare Situation

Bangladesh is the seventh most populous country in the world and population of the country is expected to be nearly double by 2050, where communicable diseases are a major cause of death and disability.<sup>6,7</sup> A recent Dengue outbreak in 2019, more than 100,000 people was affected in more than 50 districts in Bangladesh in the first 6 months of 2019.<sup>8,9</sup> According to the 2018 Country Environmental Analysis (CEA) report of the World Bank, particulate pollution causes the deaths of 46,000 people in Bangladesh per year.<sup>10</sup> Although a riverine country, 65% of the population in Bangladesh do not have access to clean water.<sup>11</sup> Both surface water and groundwater sources are contaminated with different contaminants like toxic trace metals, coliforms as well as other organic and inorganic pollutants.<sup>5</sup> Studies in capital Dhaka and Khulna also found that about 80% of fecal sludge from on-site pit latrines is not safely managed.<sup>12</sup> Nearly half of all slum dwellers of the country live in Dhaka division and 35% of Dhaka's population are thought to live in slums.<sup>13,14</sup> A recent research demonstrates widespread poor hygiene and food-handling practices in restaurants and among food vendors.<sup>15</sup> Less than 10% hospitals of this country follow the Medical Waste Management Policies.<sup>16</sup> In 2017, 26 incidents of disease outbreak were investigated by National Rapid Response Team (NRRT) of IEDCR.<sup>17</sup> Economic development and academic flourishing do not represent development in health sector. Out of the pocket treatment cost raised nearly 70% in the last decade.<sup>18</sup> Although, officially 80% of population has access to affordable essential drugs, there is plenty of evidence of a scarcity of essential drugs in government healthcare facilities.<sup>19</sup> Surprisingly, the country's pharmaceutical sector is flourishing, exports grew by more than 7% in last 8 months although total export earnings of the country drop to nearly 5%.<sup>20</sup> In Bangladesh it has also been found that more than 80% of the population seeks care from untrained or inadequately trained village doctors and drug shop retailers.<sup>21</sup> According to WHO, the current doctor-patient ratio in Bangladesh is only 5.26 to 10,000, that places the country at second position from the bottom, among the South Asian countries.<sup>22</sup> According to World Bank data, Bangladesh has 8 hospital beds for every 10,000 people; by way of comparison, the US has 29 while China has 42.<sup>23</sup> Tobacco is responsible for 1 in 5 deaths in Bangladesh, according to the WHO, kills more than 161,000 people on average every year. Around 85% population of age group 25-65 never checks for diabetes.<sup>24,25</sup>

### Pharmacy Education in Bangladesh

Pharmacy Education in many developing countries, including Bangladesh, is still limited to didactic learning that produce theoretically 'skilled' professionals with degrees. Bangladesh's pharmacy curriculum does not meet the minimum requirement for adequate clinical, hospital and community pharmacy education because it is still linked to an old pharmacy model, e.g. based on chemistry and basic sciences. That is present curriculum produces Pharmacist only to work in the pharmaceutical industry and jobs in this field of work is going to be saturated. No university so far have modified their curriculum including topics as epidemiology, pharmaco-economics, clinical medicines, community skills. Manpower development for community pharmacies in Bangladesh is not systematically regulated and constitute an important public health issue. Three levels of pharmacy education currently offered in Bangladesh leading to either a university degree, a diploma or a certificate. Graduates with an industrial degree work while those with a diploma work in hospitals.<sup>26</sup> Pharmacy is taught in about 100 public and private universities in Bangladesh and about 8000 pharmacy students graduate every year.<sup>27</sup> Hospital, community and clinical pharmacy in Bangladesh have not been well developed due to lack of government policy.<sup>28</sup> In real conditions of Bangladesh pharmacy practice areas for graduate pharmacist is limited in industry i.e., industrial pharmacy practices, in the marketing or regulatory sections. The educational system of pharmacy is one of the major reasons for bounded pharmacy practices because the courses included in bachelor degree principally emphasize on industrial practices.<sup>29</sup> Over 90% of B. Pharm curriculum stresses on product-oriented expertise whereas only around 5% of the total course credits are assigned toward clinical pharmacy. his curricular framework indicates a minimum emphasis on patient care education.<sup>30</sup> However, the graduates who pass out do not get employment easily due to their poor training, lack of in-depth knowledge of fundamental concepts and practical skills.<sup>17</sup> Consequently, skilled graduates leave for overseas where they find more prosperous jobs. Researchers argued that Pharmacy Education can be able to contribute for both public and private benefits if a realistic pattern is ensured on its operation.<sup>31</sup> This system could be more favorable to the public if good hospital and community practices are formally introduced, as well as involving pharmacists and other qualified health care providers.

### **Present State of Pandemic Situation Handling by Bangladeshi Hospitals**

More than half of the 12,425 coronavirus cases detected in Bangladesh have been reported in the capital Dhaka.<sup>32,33</sup> According to the government's disease control agency IEDCR, the virus hit a total of 11 out of 64 districts in the country until 05.04.2020 after first known cases were reported about a month ago.<sup>34</sup> Amidst this global crisis, Bangladesh has been identified as one of the 25 most vulnerable countries to be affected by the fast-spreading virus. By 25.04. 2020, it was confirmed in 63 out of 64 districts.<sup>35</sup> Many patients with fever, cold and breathing problems – which are also COVID-19 symptoms – have gone untreated as the hospitals in Dhaka are sending them to the IEDCR for coronavirus test.<sup>36</sup> Many doctors do not provide services that fear the contagion and according to the patients, laboratory technicians shun workplaces stop medical tests. In some cases, serious patients who are not affected by COVID-19, moved from one hospital to the other but could not receive treatment and finally died, the media reported. In another case, the doctor fled leaving the patient behind.<sup>37-40</sup> Doctors and other healthcare workers say they do not have adequate personal protective equipment and the health system cannot cope with the outbreak.<sup>41</sup> Police have locked down a total 52 areas of Dhaka after Covid-19 positive patients were found in the localities.<sup>42</sup> Experts say elderly people infected with coronavirus need ICU support the most. The number of older persons in the country is over 0.8 million.<sup>43</sup> The country's entire public health system has less than 450 ICU beds, only 110 of which are outside the capital Dhaka.<sup>23</sup> Country-wise comparison shows that the country lacks far behind the other countries who are most at risk. The health minister on 29.03.2020 reported that there are only 500 ventilators in government hospitals and 700 in private hospitals.<sup>35</sup> Only a few hospitals dedicated for Covid-19 patients have a central oxygen storage system to supply continuous mechanical ventilation to ICU patients at a required pressure, including Dhaka Medical College Hospital, Bangabandhu Sheikh Mujib Medical University, Sir Salimullah Medical College Hospital, Square Hospitals, Apollo Hospital and Anwer Khan Modern Medical College Hospital, have that facility.<sup>44</sup>

### **Under Utilization of Hospital Pharmacy**

The pharmacy profession is still lagging behind in developing countries as compared with developed countries in a way that the pharmacy professionals have never been considered as a part of health care team neither by the community nor by the health care

providers. Although hospital pharmacists are recognized for its importance as health care provider in many developed countries, in most developing countries it is still underutilized or underestimated.<sup>45-48</sup> Hospital pharmacy practice is just started in some private modern hospitals in Bangladesh which is inaccessible for the majority of peoples due to high patients cost of these hospitals.<sup>49</sup> People are totally unknown to the responsibilities of hospital pharmacist, even they don't seek for recruit for hospital pharmacist in any hospital except a few aristocrat hospitals.<sup>50</sup> A survey in Dhaka reported that 48% of respondents with symptoms of acute respiratory illness (ARI) identified local pharmacies as their first point of care. Licenses are provided to drug sellers by the Directorate General of Drug Administration when they have completed a grade C pharmacy degree (i.e. 3 months course) to legally dispense drugs but a grade A pharmacy degree holder, having a B. Pharm or Pharm. D degree should be more equipped to handle these situations, if trained properly. Knowledge and helpfulness of pharmacist were identified as two major determinants that could not only satisfy and but also promote willingness to pay for the service.<sup>51,52</sup> They can individualize the medications and their dosing according to the needs of the patient, which can minimize the cost of care for the medication. In Bangladesh, however, graduate pharmacists do not engage directly in-patient care. Here, pharmacies in hospitals are primarily run by non-clinically educated, diploma pharmacists.<sup>28</sup> If the hospital pharmacy is established, patient care, proper dispensing of medications, and other patient-oriented issues can be handled properly. By maintaining a hospital pharmacy quality control program, the health sector can be enriched.

### **Prospect of Pharmacists in Patient Management Service and Telehealth Care**

Pharmacists are the third largest healthcare professional group in the world after physicians and nurses.<sup>53</sup> At present, Hospital Pharmacy has created enormous job opportunities, where graduate pharmacists play a vital role in patient rearing, rehabilitation and wellness. A professional pharmacist or a pharmacy apprentice at a clinic, hospital and community care can determine what to do in a given disease situation, if guided properly by another medical personnel.<sup>54-56</sup> The country has a huge opportunity to recruit these pharmacists at Telehealth Care. In each call, a pharmacist can provide both appropriate and quality information from the most recent medical systems. Studies show that the lack of proper medication management leads to higher healthcare

costs, longer hospital stays, morbidity and mortality. Further, it was reported that one in every five hospitalizations was related to post-discharge complications and about seventy percent were related to proper use of the drug. In 2017, the World Health Organization committed to minimizing serious, avoidable drug-related harm over the next 5 years. Pharmacists' interventions to prevent drug-related problems at three community hospitals in California saved approximately 0.8 million USD in a year.<sup>57</sup> The estimated annual cost of medication error-based illnesses and deaths worldwide was USD 500 billion due to non-compliance with the clinical intervention and quantities in 2016. Also, the authors estimate that more than 275,000 people die every year for the same reasons.<sup>58</sup> A pharmacist can use simple and non-medical terminology to set the goal for patients to understand the information as well as to fulfill the prescription by proper request. With chronic conditions such as cardiovascular and respiratory diseases, there is ample evidence of the effectiveness of the tele-pharmacist for remote monitoring, communication and consultation.<sup>59</sup> In addition, psychotherapy can also be operated through telehealth as part of behavioral health.<sup>60</sup> Pandemic patient pharmacy needs have resemblances with the traditional patient population but with different focus.<sup>61</sup> For example, when providing consulting services to patients, instead of focusing on medications as usual, their queries relate primarily to the knowledge of medical prevention and basic details on COVID-19, such as mask selection and standard COVID-19 signs and symptoms, symptomatic treatment options, breathing difficulties or cough management in comorbid situations, reinforcing behaviors that limit the spread of the pandemic, including social distancing and remaining in the home whenever possible through phone calls/video conferencing.<sup>62,63</sup> Student pharmacists have earlier served as an effective educational resource for patients about the H1N1 pandemic.<sup>64</sup> Overburdened by patient loads and the explosion of new drugs, physicians turned to pharmacists more and more for drug information, especially within institutional settings. They obtain medical and medication history, check medication errors including prescription, dispensing and administration errors, identify drug interactions, monitor ADR, suggest individualization of dosage regimen, provide patient counseling, etc.<sup>65</sup> Among chronic disease patients, particularly those under quarantine, there is a greater challenge in the supply of drugs and compliance with medications, although the safety and effectiveness of care is still critical for these patients. Stronger data on the effectiveness of this area

of pharmacy care, together with a critical assessment of its limitations, can raise awareness among the actors involved about its potential and could contribute to a wider dissemination of tele-pharmacy services in public interest. Sorwar et al, 2016 revealed that the existing telemedicine service reduced cost and travel time on average by 56% and 94% respectively compared to its counterpart conventional approach with high consumer satisfaction.<sup>66</sup>

### **History of Telehealth Service in Bangladesh**

The year 1998 represents a milestone for eHealth in Bangladesh when the first eHealth project was introduced by Swinfen Charitable, a non-profit institution. It associated collaborative work between the Center for Paralyzed Rehabilitation (CRP) in Bangladesh and Haslar Royal Navy Hospital in the UK. In the same year the Ministry of Health and Family Welfare (MoHFW) launched its first initiative on eHealth.<sup>67</sup> Just a year afterward the private enterprise Telemedicine Reference Center Limited (TRCL) started providing healthcare with mobile phones. The Bangladesh Telemedicine Association (BTA), a professional coalition, was created in 2001. That has provided a platform for ongoing and sparse eHealth initiatives in the country. A similar platform, called the Sustainable Development Network Program (SDNP), was formed in 2003 with the aim of establishing better cooperation and understanding between providers.<sup>68</sup> Later in 2006, TRCL paired with GrameenPhone (GP) and established the Health Line:789 subscriber mobile help desk.<sup>69,70</sup> A number of NGOs subsequently developed an interest in eHealth and mHealth, including BRAC, the Sajida Foundation and DNet.<sup>71</sup> In addition, Bangladesh launched a toll-free national emergency aid line 999 in December 2017 to meet immediate needs in the event of any accident, crime, fire or ambulance.<sup>72</sup> In addition, the IEDCR has launched 17 hotline numbers for the said Covid-19 outbreak.<sup>73</sup>

### **Challenges of Tele-pharmacy Implementation**

Firstly, it has limited evidence of its effectiveness beyond that of intervention by a traditional pharmacist. This favors the skepticism of both physicians and patients towards these services and limits their acceptance in the community.<sup>74</sup> Second, the tele-pharmacy is a service based on the technology. Thus, the driver is technology but also the limiting factor for its implementation. Establishing a tele-pharmacy service involves not only meeting technological requirements but also a considerable amount of time, effort and money.<sup>75</sup> Third, effective tele-pharmacy



services should be based on standardized healthcare delivery models, and require appropriate regulations that may differ from country to country. For example, such facilities are not permitted or even restricted in some countries, while adequate legislation is available in others such as USA, Italy and other European countries.<sup>76-79</sup> Unfortunately, despite the rampant potential of tele-pharmacy in many countries, the laws and policies governing pharmacy operations do not adequately address the growing sector. Fourthly, the reluctance or inability to use advanced technologies can limit the implementation of tele-pharmacy services from the perspective of both pharmacists and patients, especially in the context of the elderly.<sup>80-85</sup> Fifthly, since tele-pharmacy involves the gathering, transmission and replacement of personal and health information on the web, information security and privacy are major issues. Data sharing of information collected via tele-pharmacy services with other healthcare professionals increases the possibility of security breaches. The security and integrity of patient data is therefore of paramount importance when determining the setup of a tele-pharmacy system of information technology.<sup>86-91</sup> Sixth, the integration of tele-pharmacy services in the national healthcare systems and the connection of tele-pharmacy services (including a combination of electronic data entry, prescription order verification, online benefit adjudication, medication dispensing) among different areas of a country requires harmonizing the healthcare systems and related governing laws and setting up proper rules and regulations.<sup>92-94</sup> Seventh, tele-pharmacy services are not yet reimbursed: individuals are required to pay for these services, and the expenses are not covered by private or public health insurance.<sup>95-99</sup> This restricts the use of these services by patients who may eventually need them.

### Overcoming Challenges

In Bangladesh a number of telemedicine systems were introduced. Telemedicine laws and reimbursement policies since telemedicine practice is increasing on a daily basis in Bangladesh, so structured laws and regulations on doctors, patient issues, licensing of physicians and telemedicine providers are very much needed. Clear rules should be in place on questions of reimbursement. Bangladesh Television (BTV) and other satellite channels can play an important part in popularizing telemedicine. They should broadcast successful cases considering telemedicine's efficacy and cost-efficiency. Telemedicine systems and services compatibility of hardware and software require users to have compatible hardware at both ends of the

communications link, which reduces interoperability and the benefits of access to different sources of telemedicine expertise. If the equipment is difficult to access or are less likely to involve practitioners. Equipment for wireless telemedicine is preferable to wire devices. Telemedicine privacy and confidentiality involves the electronic transmission of patient medical records and information from one location to another via the Internet, or other computerized media. Medical information is often delicate, confidential and private. Telemedicine, thus presents significant challenges for safeguarding the privacy and confidentiality of information about patient health. Specific privacy regulations should govern the practice of telemedicine so that patients can feel safe in knowing that confidentiality of their personal information will have to suffer certain penalties.

### Conclusion

Tele-pharmacy offers opportunity for highly trained clinical pharmacists to fill the needs of healthcare in both underserved and metropolitan environments. However, the article focuses two major issues public health support in pandemic situation. Firstly, importance of telemedicine in crisis moments of epidemic situation and credibility of pharmacists in this sector, both are apparently non-existent in Bangladesh. Structural training program should be arranged for the pharmacists before appointing in telemedicine. The concept will benefit around 70% rural people of Bangladesh, who has very limited access to healthcare facilities. At the end, it can be said that pharmacists can play a role in both medical aids and regulation. Similarly, in tele-healthcare, the professional pharmacist can play an essential role that has not been recognized yet due to lack of proper initiatives. We hope that policy makers of Bangladesh are aware of its potential and contribute to the wider promotion of tele-pharmacy services in the interest of the citizenry. The article should provide healthcare associates and policymakers of Bangladesh a broader picture and unleash many unseen facts regarding implementation of telemedicine.

### Abbreviations

IEDCR-Institute of Epidemiology, Disease Control and Research

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