

Role of Mobile Telemedicine Kiosk for Tele-ICU Consultations During COVID-19 Period

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Abstract

One of the most important steps in minimizing the spread of COVID-19 infection is social distancing. Telemedicine can be of great help in implementing social distancing in health care. The Telemedicine consultation can be done with the help of Telemedicine Kiosk. The commercially available Telemedicine Kiosks are costly. Here in this article we are sharing our experience of using a telemedicine kiosk made from the materials already available in our department and how it was used for Tele-ICU consultations during COVID-19 lockdown period.

Keywords: COVID-19; Telemedicine Kiosk; Tele-consultations.

Introduction

The COVID-19 has spread along the continents to become a pandemic very fast. COVID-19 has brought a lot of stress on the health care workers, as they are among the high-risk category of getting infected with the COVID-19 and they also carry the risk of spreading the disease further to other

vulnerable patients admitted in the hospital. This leads to the increase in mortality of patients. Intensive care unit (ICU) has the most number of such vulnerable patients. The most effective preventive method apart from hand washing and facial mask is to maintain social distance.

Telemedicine means 'healing at a distance'¹ it bridges the gap between the doctors and vulnerable patients with the help of information technology. Telemedicine kiosks can be used for consultation between doctors and patients admitted in ICU especially in situations like COVID-19. But commercially available telemedicine kiosks are costly, such kiosks are mostly unavailable in hospitals of developing countries. Free Telemedicine applications are available, but still such applications are not popular among developing countries on a significant scale due to many reasons.^{2,3}

This article shares the experience of using an indigenously made mobile telemedicine kiosk for Tele-ICU consultations during COVID-19.

Materials and Methods

This study was conducted in the department of plastic surgery in a tertiary care institution during the COVID-19 lockdown period. Informed

consent was taken from all patients and ethical clearance obtained from the departmental ethical committee.

A Telemedicine kiosk was made using the material available in the ward; an unused trolley in the department of plastic surgery was cleaned and was given fresh coat paint. It was fixed with an unused IV stand. An old condemned flexible endoscope light source cable was used to mount the Web camera. The trolley was fitted with various health care-related digital equipment, like an infra-red digital thermometer, digital BP apparatus, digital stethoscope, digital glucometer, digital weighing machine, digital pulse oximeter, etc. A laptop and digital video camera were also used. And the Kiosk was connected to Institutional Wi-Fi. The duty nurse took the Kiosk inside the ICU and the consultant online examined the virtually real time (Fig.1) The resident checked the vitals of patients using the equipment fitted on the telemedicine kiosk and findings were conveyed to the consultant in real time (Fig.2) and the senior doctor evaluated the findings, discussed the case and necessary order modifications were given. The feedback was taken from the nurse present in the ICU and the participating doctors about the audio, video and the user-friendliness of the technology.

Results

Feedback (Table 1) showed that, all the consultations and documents which were shown online were clear and voice was audible. Resident doctor inside the ICU and nurse could take the consultations clearly and implement accordingly.

During the study period, none of the patients got infected with COVID19, similarly none of the health care workers while using this technology got COVID19 disease.



Fig. 1: Telemedicine Kiosk In use In ICU.



Fig. 2: Tele ICU rounds transmitted real time to the Consultant.

Parameters	Excellent	Good	Bad
Audio Quality			
Video Quality			
Network Stability			
Easiness Of Use			
Overall Score			

Discussion

Social distancing is one the important in the prevention of the spread of COVID-19. If adequate preventive steps not taken, health care workers can spread the disease to the patient or vice versa. It will certainly add on to the positive cases leading to increased mortality.

Telemedicine is the use of information technology tools for communication between patients and health care workers or among health care workers. Based on this principle of Telemedicine, attempt was made to create atelemedicine kiosk in the department for the tele consultations during COVID-19 period. Tele consultations include; Teleward rounds, Tele-ICU rounds, Tele-burns ward rounds, Tele-emergency consultations, Tele-patient-attendant interactions as well as Tele-monitoring of patients or flaps. There are many other ways other than using a Kiosk, like using a mobile phone, PT camera, drone, etc. But advantages of using a kiosk is that the kiosk camera is more static, voice is more clear and most important is while using a kiosk there is only minimal contact of the equipment with patient or health care personal and another advantage is that it all necessary equipment for monitoring the patient like a thermometer, BP apparatus, Glucometer, weighing machine, pulse oximeter, etc. The disadvantages are it is big, wide, so can be bit difficult to be negotiated into tight spaces like in between beds.

The literature shows that this kind of practice is

already available and being used in developed countries. From remote monitoring of ICU patients. But in developing countries because of the high cost is a limiting factor. This study highlights the role of cost-effective mobile telemedicine kiosk used for tele-ICU rounds and was found to be effective.

The Tele-ICU rounds can be done using the following types of telemedicine application in practice such as:^{4,7}

1. Store and forward (SAF) or Pre-recorded (Asynchronous) TM
2. Real-time or Video Conference (VC) (Synchronous) TM
3. Hybrid TM
4. Mobile or Cellular TM
5. Integration Model

Conclusion

Telemedicine can play a vital role in providing teleconsultations like Tele-ICU consultations during COVID-19 and a Telemedicine kiosk may help in the prevention of the spread of the disease by helping to maintain a social distance.

Limitation of the study:

This study was done only at a single center, large randomized control study involving multiple centers is required to substantiate the result of the study.

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Conflict of interest: None

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References

1. Jones SM, Milroy C, Pickford MA. Telemedicine in acute plastic surgical trauma and burns. *Ann Surg Engl.* 2004; 86: 239-42.
2. Varkey P, Tan NC, Girotto R, Tang WR, Liu YT, Chen HC. A Picture Speaks a Thousand Words: The Use of Digital Photography and the Internet as a Cost-Effective Tool in Monitoring Free Flaps. *Annals of Plastic Surgery.* 2008; 60 (1): 54-8.
3. Codyre P. Will an App Fill the Gap? Innovative Technology to Provide Point-of-Care Information. *Front Public Health.* 2014; 2: 9.
4. Cho SJ, Kwon IH, Jeong J. Application of telemedicine system to prehospital medical control. *Health care Informatics Research.* 2015; 21: (3): 196-200.
5. Davis CR, Rosenfield LK. Looking at plastic surgery through Google Glass: part 1. Systematic review of Google Glass evidence and the first plastic surgical procedures. *Plastic and Reconstructive Surgery.* 2015; 135 (3): 918-28.
6. Atiyeh B, Dibo SA, Janom HH. Telemedicine and burns: an overview. *Annals of Burns and Fire Disasters.* 2014; 27 (2): 87-93.
7. Chittoria RK. Telemedicine for wound management. *Indian J Plast Surg.* 2012; 45:412-7