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Research Article

THE UTILITY OF TELEMEDICINE IN GENERAL SURGERY DURING COVID-19 PANDEMIC AND BEYOND: OUR EXPERIENCE

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ABSTRACT

Introduction: Coronavirus disease-2019, has severely crippled the public healthcare with diversion of majority of services to manage the pandemic. Various strategies have been adopted by institutions across the world to mitigate the crisis. Telemedicine (TM) has emerged as an important means of tackling this pandemic.
Methods: We did a prospective observational study to evaluate the feasibility and assess the utility of TM services in a subset of Indian population at a tertiary care centre in Uttarakhand (Northern India)
Results: we analysed the demographical parameters of a total of 185 patients who has utilized telemedicine services. We found that there is considerable variability in the gender of patients using the service, type of their presentation, category, outcomes and mode of consultation.
Conclusion: Although TM services have been operating in India for more than two decades, its usage has been largely limited to specific sections of the community and has not grown to meet many of India's unique public health challenges. We conclude that effective and satisfactory surgical outpatient services can be provided by means of telemedicine

INTRODUCTION

The World Health Organization (WHO) defines Telemedicine (TM) as 'the delivery of health care services, where distance is a critical factor by all healthcare professionals using information and communication technologies to exchange valid information for the diagnosis, treatment, and prevention of disease.' The telemedicine services in India are considered to be in the fetal stage, though various governmental and non-governmental agencies were trying to boost its usage for a long time. In India, the urban-rural divide in health care is so stark that 75% of the qualified consulting doctors practice in urban areas instead of only 2% in rural areas, and 23% work in semi-urban areas [(1)]. The urban population has 2.2 hospital beds per 1000 people, whereas it is only 0.1 in rural areas [(2)]. Hence, Telemedicine usage assumes significance in the Indian scenario and could be a game-changer in its grossly underserved rural health care sector.

The ongoing novel coronavirus disease -2019 (COVID-19), declared by the WHO as a global pandemic, has caused unprecedented challenges to the way our world functions, especially in public health care. COVID-19 has severely crippled the public health care services as most of the resources are now diverted to manage the pandemic emergency. The governments adopted various strategies across the globe to tackle this public health disaster, including social distancing norms and lockdown. India is the second most affected country with COVID-19 with a total case count of 5,646,010 as of Sep 23, 2020 [(3)]. India announced a nationwide lockdown in four phases starting from Mar 24, 2020. From Jun 2 onwards, India began the 'unlocking' process and is currently in the 4thphase of unlocking. Because of this strict lockdown, public transport systems were severely affected.

The usage of TM services saw a surge globally after the pandemic as various centers worldwide used this platform to cater to their patients. Various such programs are reported like, a 5G dual Gigabit Network by west China hospital of Sichuan University [(4)] and TM based tracing systems in Singapore [(5)] are only a few among the many. Countries like the USA, Japan, and many European nations are also using these services to deliver optimum care. Like developing tools to facilitate prework before TM services, many innovations are also believed to make TM services delivery easily [(6)].

Telemedicine in India during COVID

Though TM services are operating in India for more than two decades, its usage has been limited to specific sections in the

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community [7]. TM has not grown in India to meet many of India's unique public health challenges partly due to its slow adoption by the public [7]. But to make things different, TM use has surged in India, as necessitated by the ongoing pandemic crisis [8]. The authorities have recognized the increased role of TM to play in the current situation, and also, for the first time in the country, a guideline for TM services has been issued [9].

METHODS

The facility of Telemedicine

Because of the lockdown extension, many of our patients couldn't reach the hospital, and regular OPD services were seriously affected. To combat this, telemedicine services in the hospital started after the 1st phase of lockdown in India - Apr 14, 2020. All central clinical departments offered their teleconsultation services with dedicated phone numbers and a dedicated team of doctors. The call was attended by a tele-promoter, who then handed it over to the appropriate department. Consultations were offered in various forms like a telephone call, text, or video call via Whats App's messaging as per the patient's convenience. Patients could also send their investigation reports or previous consultation documents via WhatsApp if there were a need. No dedicated web portal or app was used for this purpose, as most of our target population were unfamiliar with these platforms, because of the unavailability of the electronic health record system, a detailed history from the beginning along with treatment details and investigations needed to be collected in each case every time. After procuring necessary information and making a diagnosis, patients were classified as those who can be managed from home or those who needed a hospital visit.

In patients under home-based care, written medication prescriptions were sent as WhatsApp images. Also, detailed advice was given regarding nutrition, wound care, postoperative management, and other do's and don'ts as per the case. Efforts were made to manage the maximum possible patients in their community because of the prevailing pandemic and lockdown scenario. In some situations, like wound dressing, suture removal, or minor debridement, where patients needed help from a health service provider, they were asked to consult any local health centers. Clear instructions were given to the patients regarding the procedure be done. Patient progress after interventions were monitored by assessing wound photos or investigations send by patients. There were anxious patients whose surgery got postponed because of the ongoing lockdown. Appropriate counseling was done to alleviate their stress, and temporary measures were suggested until the lockdown was over.

The patients who needed hospital care, like necrotizing infections requiring wide debridement, amputations, or newly diagnosed malignancies, were asked to report to the hospital for further evaluation or admission.

RESULTS

The number of consultations varied, and the numbers showed an increase over time as more and more patients became aware of these facilities, and the lockdown was extended in India further. We retrospectively analyzed the characteristics of telemedicine consultations provided in the general surgery department during the COVID-19 times for two months, and the results are following (Table 1).

Table 1 Characteristics of patients used telemedicine facility in general surgery

Characteristics (n= 185)	No. of teleconsultation (percentage of total)
Sex	
Male	125 (67.5%)
Female	60 (32.5 %)
Presentation	
Asymptomatic	55 (29.7%)
Mild symptoms	114 (61.6%)
Moderate/ severe symptoms	16 (8.6%)
Category of complaints	
Gastrointestinal	54 (29.2%)
Wounds and soft tissue related	31 (16.7%)
Post-operative follow-up	14 (9.3%)
Vascular	21 (11.3%)
Hernia & testicular	06 (3.2%)
Breast	30 (16.2%)
General enquiries/ miscellaneous	29 (15.7%)
Outcomes of teleconsultation	
Home-based care only	117 (63.2%)
Need help from a local care provider	14 (7.6%)
	53 (28.6%)
Asked to report to institute OPD	01 (0.5%)
Report to emergency	
Nature of the consultation	
Phone call only	140 (75.7%)
WhatsApp message	43 (23.2%)
Video call	02 (1.1%)
Reported patient satisfaction score	
1 – very unsatisfied	1 (1%)
2 – unsatisfied	3 (3%)
3 - Neutral	12 (12.2%)
4 - Satisfied	45 (46%)
5 – Very satisfied	37 (37.8%)

We found considerable variability in patients' gender using the service, type of presentation, category, outcomes, and consultation mode. Male patients utilized the telemedicine service almost twice more than females. Among females, half of them were having complaints related to breast diseases. Most patients sought consultation related to gastrointestinal problems, and abdominal pain was the most common complaint in this category. Wounds, abscesses, and soft tissue pathologies constituted 16.75%. Peripheral arterial diseases followed by varicose veins topped the most common cause in vascular diseases. Patients were also contacted regarding the resumption of services in pandemic, anxiety because of an extended waiting list of elective surgeries in the pandemic, etc., and they constituted 15.6%. The patients who utilized TM services were retrospectively contacted and asked to rate the services from 1 to 5, where 1 is not satisfied with 5 being excellent. Out of the 98 patients who participated in the feedback, most were satisfied with the services provided.

A comparison of the number of patients consulted with surgical complaints was made between the pre-COVID-19 lockdown phase (January and February 2020) and during the lockdown period (May and June 2020) (Fig. 1). There was a significant reduction in consultations during the lockdown phase.

A comparison was also made between the number of patients who utilized surgical consultation via physical screening outpatient department (OPD) in the hospital and those who used telemedicine services (Fig. 2). Even though Telemedicine services were available, the data shows that patients are yet to adopt these services as the physical OPD usage outweighed telemedicine services during this period. Also, males utilized telemedicine services almost twice often in comparison to females.

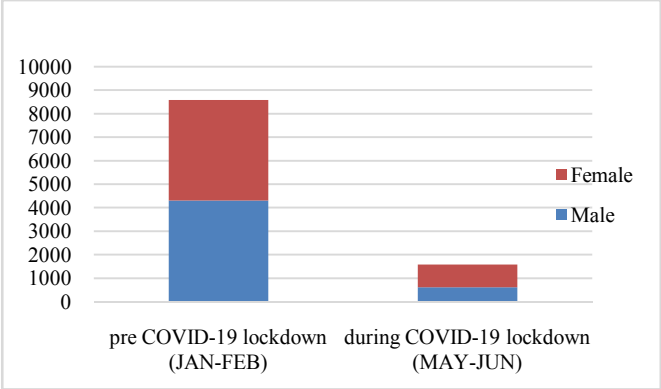

Fig 1 Surgery consultation by patients: before and during COVID-19 lockdown.

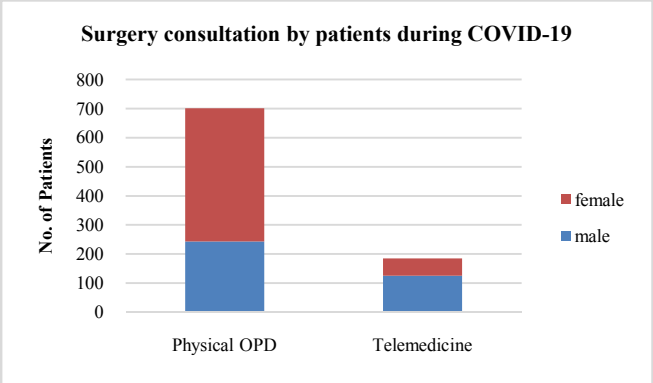

Fig 2 Surgery consultation by patients during COVID-19 lockdown period.

DISCUSSION

An unforeseen combination of a pandemic of dangerous magnitudes like COVID-19 and the lockdown imposed in India as a precautionary measure, which is regarded as one of the world's strictest by many, has dramatically affected the way our health system functions. Hospitals were forced to prioritize their resources for pandemic preparedness. The traditional treatment options like a face to face OPD consultation or in-patient hospital care became unfeasible in many settings across the country. There exist striking differences in equity and access to healthcare systems across the country, and variations are observed depending on region, state, urban-rural status, public or private healthcare system, socioeconomic status, gender, etc. [10,11]. And as a teaching institute, we cater to one of the most underprivileged areas of the entire sub-continent with unique geographical and socioeconomic challenges. Our target population ranges from the remote hilly habitats of the Himalayas in Uttarakhand to the rural areas in western Uttar Pradesh, with an estimated target population of around 20 million [12].

For the first time, both patients and doctors were exposed to Telemedicine to such a large extent in our setup. This novel experience led us to many insights regarding how we can adopt this technology to benefit our target population in a post-COVID-19 era. We believe that telemedicine technology is feasible in India and can address many of the unique challenges in our regional health system.

Perceived benefits

With our TM experience, we found it a great tool to be used for our patient population. In our scenario, the perceived benefits of TM were (1) prioritization of hospital resources in a pandemic. More staff can be allotted for pandemic related services as TM requires less staff, contrary to a standard set up. It was of a great deal to a resource-constrained system like ours. (2) It provided easy and uninterrupted access to patients during lockdown to expert medical care at their doorsteps (3) Minimised patient-hospital contact. Thereby preventing the cross spread of COVID-19 between patients and hospital staff. (4) Benefits in health-economics in terms of lives saved from timely referrals, morbidities prevented, unnecessary OPD visits precluded- saving time to both doctors and patients alike, unnecessary tests prevented, the travel cost saved, patients don't need to travel long distances from far-flung areas protecting them from loss of income particularly in case of daily wagers (4) provided a first-time experience to both our patient and doctor population paving ways for its further usage even after COVID time. (5) provision of quality health care in rural population, otherwise these patients would have gone for local untrained doctors. (6) furthering the concept of digital literacy, (7) better teamwork and integration of tertiary care and primary hospitals. (8) counseling and anxiety alleviation during pandemic times (9) better cross-departmental referrals, as all department doctors sitting in the same OPD making consultations easy. (10) we observed a significant proportion of our patients had minor ailments only. This knowledge is essential as we expect a post-pandemic rush when restrictions are fully eased and regular hospital services start. It provides useful information to our health systems and policymakers to plan now and prepare for such a scenario where TM is integrated more into our routine services. Many minor decisions can be managed via teleconsultation and hence not overburdening the systems in the post-pandemic era.

Challenges while using TM in our scenario

But the use of TM was not without challenges. The main concerns we faced during a telesurgery outpatient department's operation were (1) lack of physical examination part. We noticed that we couldn't follow many Telemedicine guidelines as the majority of our patients don't have access to even thermometers, leave alone other sophisticated patient vitals and condition monitoring equipment. (2) most of our patients don't have access to smartphones, preventing getting their reports via WhatsApp. As many of the investigation reports were in English, our patients could neither read them nor send them via WhatsApp due to the lack of smartphones. (3) even those who have a phone with WhatsApp facility faced difficulties because of poor network connectivity as many were from rural areas barring sending media files, technical limitations like low picture quality- causing a problem in assessing patient conditions like wounds and patient factors like unfamiliarity with these services causing incorrect photos/ accidental disconnections. (4) privacy concerns. Patient information was shared using messaging services, and we noticed that many of the patients were reluctant to use video call facilities as they were not comfortable doing so. (5) unavailability of pre-existing electronic health records of our patient population. We had to collect necessary information from the beginning and often noticed the absence of relevant information, posing challenges to teleconsultation.

Recommendations for the future

Based on TM's experience during this pandemic, we tried to formulate some recommendations for its future use in our patient population. We noticed a massive potential of TM in India regarding its expansion if provided right directives and extensive usage can bring considerable changes in how the

Indian health system works. (1) routine use of TM services with hospital services even in a post-pandemic setup (2) policies to strengthen the use of TM, and more budgetary allocation in this regard (3) common web platform or app for TM services at government level (4) encourage start-ups in this sector 5) healthcare-technology cooperation (6) training of health care professionals and patients regarding TM use (7) awareness programs for its enhanced usage (8) expansion of smartphone use or network access in rural Indian population (9) setting up a feedback-driven system (10) upgrade rural primary health care centers with TM facilities.

CONCLUSION

The current COVID-19 pandemic and associated lockdown restrictions have paved the way for Telemedicine in both patients and health care providers alike. A more enhanced application of this technology beyond the pandemic times should be considered as it can play a massive role in improving the health care sector in the Indian scenario. Surgical units can also give effective patient care using this, and it assumes significance while considering the health care of difficult populations like ours. Having said this, there needs a priority-based approach from multiple levels to harvest its potential benefits.

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