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An Innovative Telemedicine Initiative From Sri Lanka: The Value of Volunteerism in a Resource-Constrained Scenario During the COVID-19 Pandemic

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Abstract

The unprecedented rise in COVID-19 cases in Sri Lanka since July 2021 led to a situation where the health system was getting overwhelmed. The priority shifted toward triaging patients and identifying those who need immediate medical intervention and managing the rest in home settings. An integrated patient management system where patients could access a medical professional through a short messages service (SMS) and calling system was established. This service provided telephone triage, patient advice, and coordinated with the national ambulance system to evacuate ill patients. This integrated helpline system had a major impact on the management of the recent surge of COVID-19 pandemic in Sri Lanka by patients needing urgent care were directed for hospitalization and the rest managed at home with support, reassurance, and guidance. The numbers of oxygen-dependent patients and deaths declined rapidly and the number of available beds increased. The system played a major role in bringing the crisis under control. Despite many challenges, this innovative integrated system is a unique example of medical volunteerism. The pandemic catalyzed the utilization of information and communication technologies effectively by providing healthcare with a reduction of the burden on healthcare institutions and professionals.

Keywords

frugal innovations, global pandemic, health management, medical education, medical informatics, telehealth

What We Already Know

- COVID-19 pandemic is the most serious public health challenge of recent times.
- Telemedicine systems have been employed worldwide to support healthcare systems overwhelmed by the pandemic.

What This Article Adds

- The pandemic may be considered as a wake-up call to utilize information and communication technologies effectively in providing healthcare.
- Volunteerism can be utilized as an approach to harness support from previously underutilized sectors to face COVID-19 pandemic in resource-constrained settings.

Introduction

Sri Lanka is a South Asian lower-middle income country, and its COVID-19 response is characterized by a strong focus on prevention. Initially, patients who tested positive

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were managed in healthcare institutions. Asymptomatic or mildly symptomatic patients were admitted to Intermediate Care Centers for monitoring and symptomatic management and discharged in 14 days. Those with marked symptoms, uncontrolled comorbidities, and other complications were admitted to hospitals for specialized management.[1,2]

Even though this approach proved efficient during the initial phase of the pandemic in 2020, it was not sustainable due to the rapid rise in cases. During the peak of the surge, the number of daily reported positive patients exceeded 5000 (220 cases per million population and ranked 50th worldwide) and the actual number of estimated new patients per day was around 6000 to 9000.[3] Even an increase in the number of beds allocated for COVID-19 patients to 34,000 was not adequate. Increasing numbers of deaths were unprecedented. The numbers of healthcare workers available for the functioning of the system declined with a significant proportion acquiring the infection and the remaining workforce on the verge of physical and mental exhaustion. The healthcare system of the country was reaching a tipping point.[3,4] The priority shifted toward triaging and identifying those who needed immediate medical intervention early to reduce severe disease and death. This was necessary to prevent overburdening the already fraught hospital staff and to conserve beds for severely affected or vulnerable patients needing specialized care.[2,5]

Intervention

A virtual triaging system for identification and evacuation of those who needed hospitalization and to facilitate home management for mild and asymptomatic patients was proposed. This article presents an integrated patient management system established *via* short message services (SMSs) and telephone helplines, with the involvement of multiple stakeholders. Four key stakeholders, the National Operation Center for Prevention of COVID-19 Outbreak (NOCPCO), Sri Lanka Medical Association (SLMA), the Ministry of Health and the National Ambulance Service were brought together with the involvement of national telecommunication service providers. This activity was carried out under the official circular DGHS/COVID-19/347/2021.

The approach was to integrate and expand existing services. The 247 Doc Call Service under the SLMA was already in operation to provide advice for COVID-19 patients since 2020. The ambulance service, "Suwaseriya," was operating under the toll-free telephone code of 1990. In addition to the above services, a SMS gateway with the toll-free telephone code 1904 was established in NOCPCO.

The integrated system coordinated the above-mentioned separate operations to achieve the following objectives:

(a) Reduce the number of non-urgent admissions to the hospitals.
(b) Provide accurate information to patients.
(c) Identify and evacuate patients who need urgent care to hospitals.

As the number 247 implies, it is a 24 hours 7 days of the week service, made available in all three national languages, Sinhala, Tamil, and English. All medical professionals rendered their services on a volunteer basis.

The 1904 SMS service was for COVID patients to contact the National Operations Center for help. The SMS service was available even in a basic mobile phone and operated by a patient without much skill. The general public was informed of the symptom profiles categorized as A, B, and C for urgent action (Shortness of breath was designated as A, other symptoms by B and asymptomatic test positivity by C) through the media. Following self-evaluation, patients are requested to message the category of their perceived symptoms. Information based on SMS is immediately directed to a medical team stationed at the NOCPCO, the patient evaluated over the phone and decisions made on the necessity for urgent evacuation to a hospital. The details of those who needed urgent medical care were notified to the ambulance system and a focal point in the Ministry of Health.

Category B were triaged and those who required medical attention were transferred to an appropriate facility through a health and military coordinated evacuation mechanism. Category C patients were given necessary medical advice to remain at home with the provision of information for self-care. Pulse oximeters for self-monitoring were distributed free of charge to the needy patients. This integrated system is summarized in Figure 1.

Impact of the Integrated Information System on Healthcare Services

The integrated helpline system had a major impact on the management of the recent surge of COVID-19 pandemic in the country. This portal ensures that those who require hospitalization are given priority for evacuation, and those asymptomatic or mildly symptomatic are given necessary advice.

Up to December 31, 2021, Doc call 247 has attended to over 70,000 patients and over 30,000 SMSs via 1904. Out of the 70,000 calls received on Doc call 247, only around 1400 patients needed urgent care and hospitalization. The waiting time was 1.5 to 2 minutes for the medical team to connect with a patient calling or sending a SMS. If the waiting time exceeded two minutes, the members of the Coordinating Committee would inform additional volunteers to join the system. During the peak of the surge, there was a 70% response rate for Doc call 247 service. A list of missed calls, if any, was taken every few hours and then transferred to 1904 system where a separate set of doctors would call the patients and assess them. The number of 247 calls responded to and emergency evacuations carried out via 1990 ambulance system over time is provided in Figure 2a.

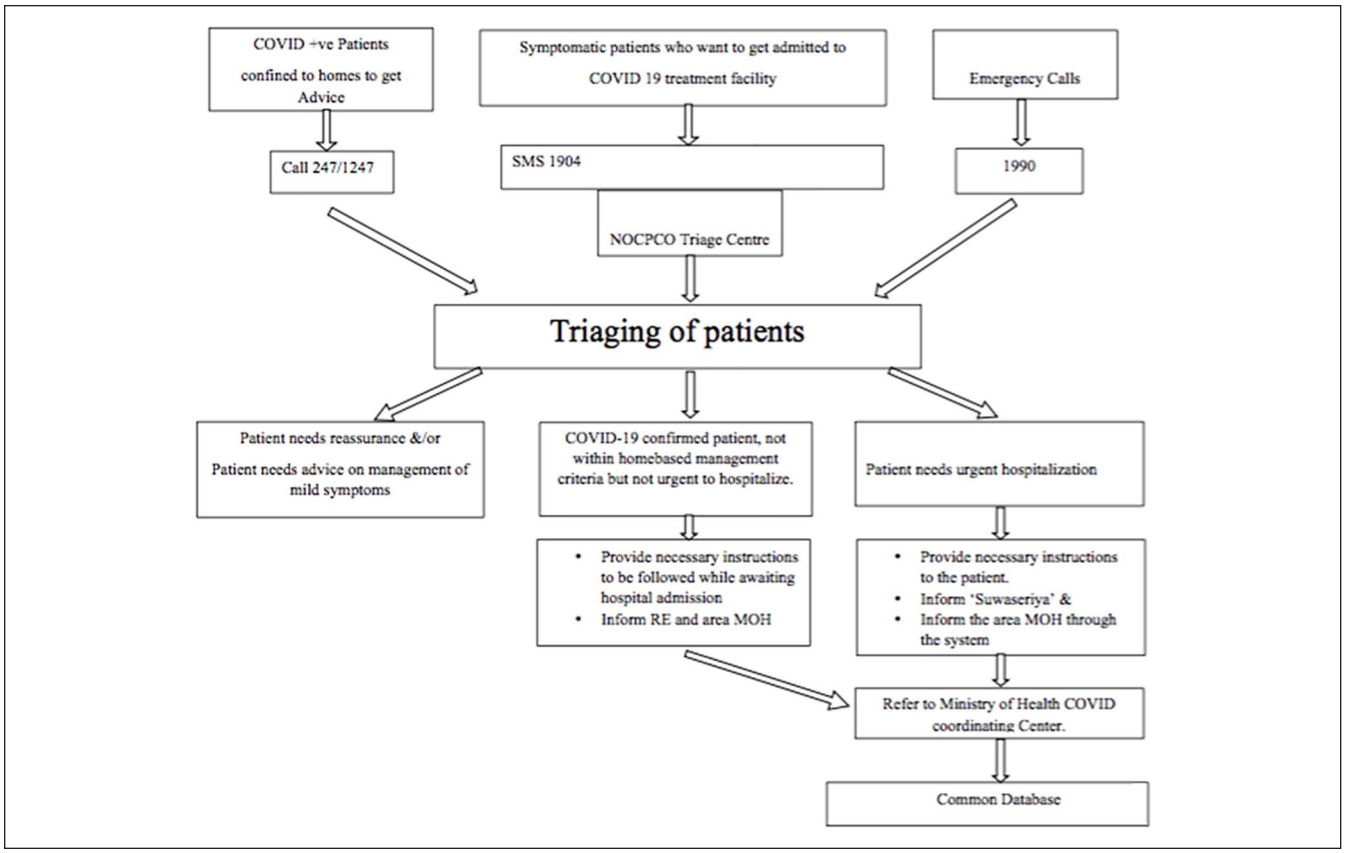

Figure 1. General pathway of the integrated patient helpline system.
Abbreviations: SMS, short messages service; NOCPCO, National Operation Center for Prevention of COVID-19 Outbreak; RE, regional epidemiologist; MOH, medical officer of health.

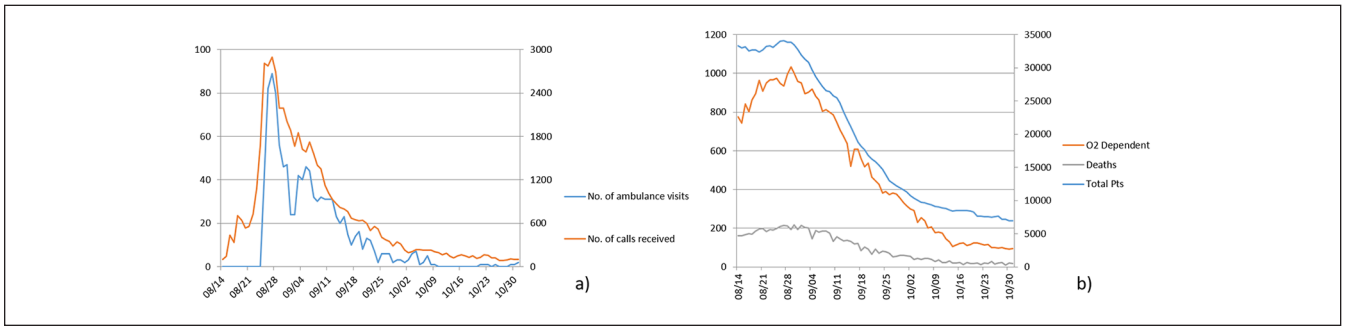

Figure 2. (a) The number of 247 calls responded and emergency evacuations (14.08.2021 to 31.10.2021). (b) Reduction of Hospital admissions/O2 dependency and Deaths (14.08.2021 to 31.10.2021).

Through these services it was possible to operate an effective virtual triaging system and limit admissions only to those who needed urgent care. Within 2 weeks of commencement of the integrated service, an increase in the number of available beds in both the government and private sector were observed. Figure 2b illustrates the reduction in hospital admissions, oxygen dependency, comorbidities, and death count, following the introduction of the integrated helpline system. It also reduced the unnecessary exposure of healthcare workers to infected individuals, further lessening the burden of the medical staff.

Challenges and Sustainability

Although many countries have attempted diverse methods to overcome the challenges imposed by the pandemic, there is lack of evidence on establishment of patient helpline systems in a low-resource setting. Implementation of such a system

in a low-resource context involves unique financial, logistical, administrative, and technological challenges.[3,4,6-9]

Orchestrating this complex process was a trial due to unpreparedness of doctors, chaotic situation created by the increasing numbers of cases and deaths, uncertainties of the disease condition itself and fear psychosis created by the media. Patients were distressed not only by their own illness but also by the potential plight of their family members. The entire scenario created a seminal challenge in communication.[8]

Training a diverse group of volunteers to work in a complex system was a major test. Doctors were trained *via* an online training program and motivated to share knowledge amongst them through a dedicated social media platform. This was a display of connectivism; the learning paradigm of a digital era.[9,10]

Sustainable coordination was a major concern. Doc call 247 service consists entirely of volunteers ranging from specialists to medical students. There is a roster system in place to ensure that a particular number of doctors were available at a particular time. Number of expatriate medical professionals also rendered their services as volunteers to sustain the helpline, transforming this operation to a global telemedicine project.[4,6] Operating a SMS gateway for patient prioritization needed a dedicated medical team in the Operations Center.

In such a scenario, this integrated system was a unique example of medical volunteerism that displayed global empathy, compassion, and collaboration for the benefit of people whom they have not met or were not responsible for.[9,10]

Conclusion

This innovative Telemedicine Initiative from Sri Lanka utilized volunteerism in a resource-constrained scenario during COVID-19 pandemic and harnessed support from all stakeholders including sectors previously underutilized in healthcare, such as information and communication systems. This project has been able to integrate its healthcare system and professional volunteerism by technology to face the challenge. This has contributed to reduce the burden on treatment centers as well as healthcare professionals and ensured equity in the distribution of its resources. This innovative approach is perhaps a model to follow in an unprecedented crisis, anywhere in the world.

The pandemic may be considered as a wake-up call to utilize information and communication technologies effectively, going forward to provide the best healthcare possible and reduce the burden on healthcare institutions and professionals.[3,4,6-9]

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Ethical Approval

This article describes an emergency response activity during COVID-19 pandemic. This activity was carried out under the official circular DGHS/COVID-19/347/2021. It was not conducted as a formal research requiring ethical committee approval.

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References

1. Karunathilake I, Mudiyanse R, Witharana C, Peiris M. The rational approach for controlling the spread of COVID-19 in Sri Lanka. *Ceylon Med J*. 2020;65(3):72-74.
2. Karunathilake I, Amarasiri M, Hamdani A. Application of statistical modeling to interpret a health system crisis in Sri Lanka due to COVID-19. *Preprints*. 2021. doi:10.20944/preprints202112.0455.v1.
3. Jensen T, Holgersen MG, Jespersen MS, et al. Strategies to handle increased demand in the COVID-19 crisis: a coronavirus EMS support track and a web-based self-triage system. *Prehosp Emerg Care*. 2020;25(1):28-38.
4. Ministry of Health. COVID-19-national epidemiological report-Sri Lanka. Epidemiology Unit. Published 2021. Accessed December 30, 2021. https://www.epid.gov.lk/web/.
5. Kristal R, Rowell M, Kress M, et al. A phone call away: New York's hotline and public health in the rapidly changing COVID-19 pandemic: a descriptive commentary about New York City health+ hospitals clinician-staffed COVID-19 hotline. *Health Aff*. 2020;39(8):1431-1436.
6. Wang J, Wei H, Zhou L. Hotline services in China during COVID-19 pandemic. *J Affect Disord*. 2020;275:125-126.
7. Song R, Choi YS, Ko JY. Operating a national hotline in Korea during the COVID-19 pandemic. *Osong Public Health Res Perspect*. 2020;11(6):380-382.
8. Hegde SKB, Sharma M, Alam I, Bambrah HS, Deshmukh A, Varma D. Leveraging health helplines to combat COVID-19 pandemic: a descriptive study of helpline utilization for COVID-19 in 8 States of India. *Asia Pac J Public Health*. 2021;33:441-444.
9. Hardavella G, Aamli-Gaagnat A, Frille A, Saad N, Niculescu A, Powell P. Top tips to deal with challenging situations: doctor-patient interactions. *Breathe (Sheff)*. 2017;13(2):129-135.
10. Goldie JGS. Connectivism: a knowledge learning theory for the digital age? *Med Teach*. 2016;38(10):1064-1069.