

Home Hospital Care through Telehealth during COVID-19 Pandemic in Nepal

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ABSTRACT

COVID-19 pandemic, caused by severe acute respiratory syndrome coronavirus 2 has been occurring in waves due to emergence of different strains. During second wave of COVID pandemic in Nepal, largely caused by Delta variant, due to rapid rise in cases, existing hospitals and health facilities were overwhelmed. As a result, telemedicine was expanded to help reduce strain on the healthcare system and meet unusually high demands. A team of physicians with the support from the local government provided hospital level care for patients at home in rural district of Dang in Nepal. This research analyzes implementation of this model of care and outcomes based on review of patient records and treatment guidelines. Within a month, from May 5 to June 13, 2021, a total of 102 patients received care at home. While most patients had mild to moderate disease, 12.8% of patients had severe disease. Telemedicine usage was highest among the 40-59 years age group, with overall recovery rate of 85.3%. The patient satisfaction survey revealed that majority, 86.5% were happy with the medical care they received. This home hospital care model has shown excellent clinical outcomes and high patient satisfaction even in resource limited setting.

Keywords: COVID-19, global health, home hospital, telemedicine, telehealth

INTRODUCTION

Coronavirus disease (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was first recognized in Wuhan, China, in December 2019. While some regions in Europe and America were devastated during the first wave, a South Asian nation of Nepal was not as affected. During the first wave which peaked around third week of October 2020 in Nepal, there were cumulative 144,872 cases with 1084 deaths.¹ As a result, Nepal was neither expecting nor prepared for subsequent rise in COVID-19 cases until second wave hit very hard during May 2021. As of May 11, 2021, there were 413,111 confirmed cases with 4,466 deaths in Nepal with maximum recorded 9,317 case detection in a single day.¹ Nepal, a landlocked country which shares open border with India, saw covid-19 cases skyrocket by 1360% in one month after mid-April in parallel to rapidly rising number of cases in India.¹ However, with only 713 tests per million people nationally and a test positivity rate as high as 40% at the end of May, the actual number of positive cases is clearly underestimated due to the limited healthcare testing capabilities.²

While Nepal's capital city, Kathmandu was the major epicenter, other rural towns and villages were equally affected. One such places was Dang, a semi-hilly district in Midwestern Nepal, which experienced an exponential rise in COVID-19 cases during the country's second wave of COVID-19. In Dang, in April 2021, the total number of confirmed cases surged 281% in a single week, from 286 to 1090 cases. With rapid rise in number of cases, the number of total positive cases reached 11,155 on May 28, 2021.³ Such a rapid and alarming rise in the number of cases overwhelmed the medical facilities. Medical supplies, drugs, personal protective equipment (PPE) and oxygen became scarce due to export restriction from India.

Due to unavailability of medical supplies and lockdown, local clinics were forced to shut down, and accessibility to healthcare was even more restricted. During the crisis, strict rules and regulation governing telehealth were relaxed that allowed rapid development and adoption of telehealth services in Nepal. While the idea of providing home health care and home hospital care is not new, in Nepal and other developing countries, provision of health care services at home are very limited, and hospital level care at home is unheard of. Therefore, design and implementation of COVID-19 Home Isolation Treatment Service (HITS) to provide care to sick patients at home through telehealth during the pandemic was very unique and novel.

DATA AND METHODS

This study is a retrospective chart review of patients who received healthcare at home through telehealth during COVID HITS project which was launched by a local non-profit Health Foundation Nepal with support from the local government between May 5 and June 13. This research also analyzes implementation of this model of care and outcomes based on review of patient records and treatment guidelines. Sociodemographic status was calculated by using modified Kuppuswami socioeconomic scale, updated for the year 2021.

Data of patients were extracted, reviewed and analyzed on excel software. IRB approval for this research was obtained from ethical committee of Nepal Health Research Council (NHRC ID: 411/2021).

RESULTS

Triage and Clinical Service Delivery

The care team obtained the list of newly diagnosed COVID-19 patients from the local coordinators in Dang, called them

to assess their general clinical condition and triaged based on illness severity and the presence of risk factors associated with severe disease. Screening was done based on clinical symptoms, oxygen saturation and risk factors using the tools adapted from WHO COVID-19 clinical management: living guidance.⁴ The patients with mild and moderate disease without comorbidities, were counseled on home isolation and symptoms-based treatment. They were advised on danger signs and provided with a hotline number to reach the care team if symptoms worsened. Patients who had symptoms suggestive of moderate to severe disease or mild disease with significant risk factors were enrolled in home hospital care for daily follow-up and monitoring. Patients with severe hypoxia, prolonged duration of illness with co-existing risk factors were referred to a hospital.

Sick patients who were unable to obtain a hospital bed were admitted under home hospital care until they could be transferred. All enrolled patients were thoroughly interviewed during intake and counseled by a physician on medical aspect of the disease, its treatment and daily follow-up plan. They were given information on local resources to obtain necessary medical equipment and supplies for home monitoring and treatment. Patients were advised to acquire pulse oximeter and thermometer to measure pulse rate, oxygen saturation and temperature at home. Each patient was assigned to an attending physician who called them daily for follow-up and assessed their clinical conditions until they completed ten days of home isolation or longer if clinically needed. Providers were available 24 hours to answer calls from their patients in case their symptoms got worse or if they had any other queries. Intensity of monitoring was often driven by severity of illness and patients' risk of developing a serious case of COVID-19 with higher risk patients being monitored and followed up more frequently.

Once patients completed home isolation and they were clinically stable, they were discharged from home hospital care per the interim clinical guidance for care of patient with COVID-19, issued by Nepal Medical Council on October 2020.⁵ Some patients who worsened clinically were referred and transferred to hospital for further care. Care team reached out to local hospitals to identify bed occupancy and coordinated transfer of care. Patients' demographic and daily clinical progress notes were written and maintained by physician in a secured shared drive.

In addition to direct clinical care, care team reached out to specialist physicians for care coordination for chronic medical problems. Patients were also advised to obtain necessary lab and radiological investigations based upon clinical necessity and those reports and imaging were transmitted to physicians via secure messaging platform. Care team coordinated with local pharmacies to prescribe medications, obtain information about the current medication list and counsel patients regarding proper medication usage.

The project team developed home treatment and monitoring protocols, nursing guidelines and respiratory care guidelines based on the WHO and other national and international COVID treatment guidelines. Physicians provided daily follow up and discussed care and treatment plan with patients and families. All patients and families received counseling over the phone about nursing care of sick patients, monitoring and administration of medications, breathing exercises, use of inhalers, oxygen

monitoring and home oxygen therapy. The team prepared guidelines and pamphlets on high-risk medications like antibiotics and steroids to educate patients and family on rational use of those medications and their side effects. At the end of each day, the team huddled on an online platform to discuss about new and follow up cases. A team of physicians in Nepal and the US discussed on the clinical progress of patients and treatment plan along with challenges in nursing care, medication, and other aspects of care delivery at home. In addition, they shared newly gained clinical experience and knowledge on managing COVID-19 and related complications.

Table 1: Patient's Demographics, Illness Severity, and Clinical Outcome

Variables	Total Sample n (%)	Male n (%)	Female n (%)
Age group			
0-19	8 (7.84)	1 (0.98)	7 (6.86)
20-39	23 (22.55)	11 (10.78)	12 (11.76)
40-59	53 (51.96)	24 (23.53)	29 (28.43)
60-79	14 (13.73)	4 (3.92)	10 (9.80)
80-99	4 (3.92)	2 (1.96)	2 (1.96)
Socio-economic status			
Upper middle	19 (18.63)	13 (12.75)	6 (5.88)
Lower middle	19 (18.63)	12 (11.76)	7 (6.86)
Upper lower	47 (46.08)	10 (9.80)	37 (36.27)
Lower	5 (4.90)	2 (1.96)	3 (2.94)
Not disclosed	4 (3.92)	2 (1.96)	2 (1.96)
Nonrespondents	8 (7.84)	3 (2.94)	5 (4.90)
Severity of illness at triage			
Mild	59 (57.84)	26 (25.49)	33 (32.35)
Moderate	30 (29.41)	12 (11.76)	18 (17.65)
Severe	13 (12.75)	4 (3.92)	9 (8.82)
Clinical outcome			
Recovered	87 (85.29)	35 (34.31)	52 (50.98)
Hospital admitted	10 (9.80)	5 (4.90)	5 (4.90)
Lost to follow up	5 (4.90)	2 (1.96)	3 (2.94)
Total	102 (100)	42 (41.18)	60 (58.82)

Clinical Outcomes

Between May 5 and June 13, 2021, a total of 411 cases were referred for triage and consultation, of which 102 (24.9%) unique suspected or confirmed COVID-19 cases were admitted. (Table 1) The age of patients ranged from 20 months to 82 years (mean 45.7 ± 16.79). There were 60 (58.8%) female and 42 (41.18%) males. A total of 47 (46.08%) patients belonged to the upper-lower socio-economic class. After initial assessment and triage, 59 (57.84 %) were categorized as mild, 30 (29.41%) as moderate and 13 (12.75%) as severe COVID-19 cases according to WHO definition. Out of 89 (87.25%) who were classified as having mild and moderate

COVID-19 cases at presentation 5 (5.62%) progressed to severe COVID-19. A total of 25 (24.51%) patients had concomitant comorbid conditions like hypertension, type 2 DM, hypothyroidism, COPD and depression. Although most of the patients were tested for COVID-19 either via PCR or antigen-based RDT (89.2%), 11 out of 102 patients did not have positive confirmatory test despite having clinical symptoms suggestive of COVID-19.

Among 102 patients enrolled in the telemedicine care, 87 were discharged with complete recovery, 5 were lost to follow up, whereas 10 patients were admitted to the local hospital due to clinical deterioration, no death was reported. Out of 10 patients admitted to the hospital, eight of them recovered completely and were discharged after few days of hospital admission whereas two of the patients could not be contacted. Patients were followed up for an average of 7.49 days with minimum 2 calls per day.

A total of 96 patients participated in a satisfaction survey after discharge. The data were collected via a semi structured telephone interview with the patient or caregiver. Most of the participants reported that they were very satisfied with the service and would recommend the service to other family and friends. Majority of the patients (76.47%) said that the doctor clearly explained about COVID-19 infection and its treatment, and 88.23% reported they were able to understand the doctor's advice most of the time. Majority (86.5%) reported they were happy with the care they received.

DISCUSSION

COVID-19 Home Isolation Telehealth Service was an innovative healthcare delivery model which provided acute level care services at home and helped reduce the strain on the healthcare system. Dang district which had only 115 hospital beds and 15 ICU beds designated for care of COVID-19 patients had insufficient hospital capacity to manage huge surge in cases during the second wave.⁶ This project reached out to 411 clients and treated 102 patients at home, and helped free much needed institutional bed for the sicker patients. Health care delivered virtually through telehealth helps to preserve resources by reducing the need for personal protective equipment required during face-to-face visits and prevent staff and patient exposure.⁷⁻⁸

During the peak of pandemic while PPE was scarce, care delivery through telehealth reduced physicians' exposure to infected patients and helped preserve resources. Majority of the patients who received care were young, between age 40-59 years, reflecting the population group who have better access and acceptance to cellphone and internet technology. In addition, young patients have strong immunity and less comorbid conditions, they have lower chance of developing severe disease compared to elderly patients. Most of the patients who received services at home had mild or moderate illness because patient with severe illness were referred early to hospitals for higher level of care. Among those patients who received home care, there was slight female predominance. Middle and upper lower class used the services the most; its use was low in lower socioeconomic class. This could be due to digital divide in which lower economic class have less access to the technology and services.

While providing health care through virtual platform, it is important to have an appropriate telehealth triage and monitoring guidelines to monitor severity of patients and determine appropriate level of care. This was partly easy in

case of COVID-19 because decompensation in these patients often begins with hypoxia which can be measured by portable and simple oxygen saturation monitor. With close monitoring and follow-up of patients, the team was able to track high risk patients, identify patients who were clinically deteriorating and provide necessary care and referral. This could have prevented progression to severe stage of illness and improved overall clinical outcome; Only 10 out of 102 (9.8%) patients clinically deteriorated and needed transfer to the local hospitals for higher level of care. In addition to better clinical outcome, patient satisfaction was high, 86.5%. Health care services at home provided autonomy to patients and family which might have increased patient compliance and satisfaction.

Even though the scope and practice of telehealth has increased, home health care model certainly has its limitations and shortcomings. Availability of lab testing and radiological tests in the community was limited. Although many patients were able to obtain drugs, medical equipment and home oxygen, some patients were not able to obtain those in time due to national shortage or financial reasons. In addition, some patients who were referred for higher level of care were unable to find a hospital bed easily or feared to go to hospitals and continued care at home. So poor availability of medical support system at community which was even more restricted due to pandemic and lockdown was a huge barrier in providing optimal care to the patients at home. Difficulty in obtaining these services added extra work and responsibility for the patients and caregivers.

Telehealth relies heavily on virtual communication, digital media and patient-reported physical findings to establish rapport with the patient, gain insight on their clinical condition, and make decision on the disease severity. Often it is difficult to establish strong physician-patient relationship due to the lack of in-person visit which might depersonalize care. During virtual visits, reliance on patient reported symptoms is high, and data on physical examination will be limited while making clinical decisions. The telemedicine team often encountered problem in establishing secure communication with the patients to send out the prescriptions, obtain lab results and transmit high quality radiology images and reports. So having robust connectivity between patients, providers and treatment team was felt to be necessary for better care coordination. Cellular phone has relatively good penetration in Nepal,⁹ so there is a huge potential to expand telehealth service through telephone in other rural town and villages. However, telehealth policies are still unclear and under development in Nepal,¹⁰ which could be a major limitation in expanding its usage and adoption.

CONCLUSION

Use of telehealth to provide acute hospital level care at home during pandemic was found to be a feasible alternative in rural district of Dang in Nepal. While most patients who received treatment had mild to moderate disease and the patients were younger, overall recovery rate and patient satisfaction was high. Unavailability of adequate ancillary service, investigation facilities, essential medications and medical equipment at community during the pandemic and lockdown were challenges to provide optimal care at home. In addition to availing other medical services in the community, addressing other aspect of patient care like building robust trust and confidence with patients and

providing adequate support services for home care would be subjects for ongoing studies and discussion.

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