

ORIGINAL ARTICLE

Providing Smartphone Based Health Care Service In Resource Limited Areas of Northern India During COVID 19 Pandemic

Nasir Shamas¹, Imran Hafeez², Muzafar Zargar³, Parvez Nazir⁴, Syed Afaq Jalali⁵, Malik Hamid⁶, Irfan Bhat⁷

^{1,3,4,5} Jlnm Hospital, Health Services Kashmir, ² Department of Cardiology SKIMS Soura

⁶ CD Hospital Srinagar, ⁷ SMHS Hospital Srinagar

ABSTRACT

The coronavirus pandemic known as COVID-19, which started from the Wuhan province of China in December 2019, has rapidly engulfed the world and poses a public health challenge. It has impacted the regional economies immensely by putting a tremendous strain on the health care resources¹. The hypothesis about the obscure modes of spread added to the stigmatization of the disease, which restricts conventional bedside healthcare services. Since close contact and aerosol generation were considered major contributing factors in the spread of the virus, medical professionals increasingly felt the need to change the conventional approach of managing such patients and handling them daily.²

With more and more healthcare workers getting infected and hospital-based care being cited as a predominant source of pandemic spread if not handled properly, the novel, alternative and innovative means and ways of management in Covid 19 were soon to become the order of the day. The adaptation up-gradation and provision of healthcare by utilizing people-friendly, accessible and readily available digital technology has been one of the success stories in preventing the spread of pandemics and providing optimal care to these patients in our region. Digital covid care has been a significant introduction in a short period, contributing significantly to handling the pandemic effectively to date.³

Digital healthcare solutions have provided timely management of the patients in remotest areas and simultaneously ensured the much needed optimal support to the resource-limited health sector of our region by decreasing the footfall in hospital causality, lowering the admissions and hence reducing the bed occupancy in the high dependency and ICU care facilities.⁴

This easily accessible free of cost initiative by a group of doctors named COVID CLINICS works voluntarily with no added financial burden to the patient, healthcare system and the state exchequer.

This group utilizes digital technology in the form of social media, smartphone technology and Audiovisual access to trace on time, triage and manage covid 19 patients by using virtual digital platforms in the forms of social media, telemedicine, and smartphone applications in the resource-limited region of northern India is surely turning out to be a game-changer in covid care; hence proving that the scope of such novel initiatives in dealing with all emerging health care challenges cannot be underestimated.⁵

Keywords: online medicine. Coronavirus disease. Pandemic. Digital health care. Covid clinic. Kashmir, remote areas, smartphones.

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INTRODUCTION

Since the declaration of the coronavirus as a pandemic by the World Health Organization (WHO) in March 2020 and the implementation of drastic measures across the continents in the form of restricted movements, lockdowns and social distancing, the impact on traditional healthcare services has been vast and catastrophic.^{6,7} The risk of infection and pandemic spread by mutual interactions during a conventional medical appointment in a hospital has been a significant factor contributing to the spread of disease to common masses and healthcare professionals all

across the globe.⁸ Digital covid care encompasses the spectrum of comprehensive healthcare service utilizing digital technology in which the treating physician is provided with [a] remote access hence giving him adequate protection against exposure [b] ease of access to the patient and his medical data, [c] simplified checklists and

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Correspondence:

Dr. Nasir Shamas, MD
Sr. Consultant Physician, Endocrine & Adult Medicine
Faculty NBEMS, Medicine JLNMH
J&K Health & Medical Education
Email: nasirshamas@gmail.com

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proformas enabling him to quickly and effectively triage and manage the patient ensuring quality medical care. The patient is also benefitted immensely by [a] expert care at his doorsteps, [b] avoidance of unnecessary referrals to tertiary care even before proper diagnosis [c] no financial implications as the patient is managed free of cost utilizing available technology which he has access to on day to day basis^{9,10}

The healthcare system has been augmented to a great extent by such initiatives as [a] the experts on board have voluntarily extended their support to the patients in home isolation, [b] experts are monitoring the progress of these patients daily by digital access [c] a low incidence of patient arrival in Outpatient department, HD units and critical care facilities has occurred due to "technology-based triage and management services. [d] It has saved expenditure of the patients and the state by decreasing referrals, providing home-based advice and lowering bed occupancy in the resource-limited hospitals of the region.¹¹

The covid virtual clinic has been a much-needed introduction in pandemic times as [a] it has lowered the patient to patient contact in the Outpatient department, [b] decreased the exposure of healthcare professionals, [c] decreased the risk of hospital fomites becoming sources of infection.^{12,13} In totality. This healthcare delivery mechanism is a working example of the comprehensive digital covid care essential to maintaining basic continuums of medical care for the ailing.¹⁴

Strategy and Methodology

With the detection of the first case of covid 19 in the valley on 18 March and the sequence of events after that, the already meagre healthcare resources were under tremendous strain. The healthcare workers, too, were least aware of the way and means needed to handle the emerging crisis. As the cases kept growing, the hospitals became a hub of activity, and within no time, all the designated covid care facilities had admitted patients to their full capacities. This was when an idea to augment, support and triage the cases virtually via digital mediums and available technology was floated. A strategy to form a virtual social media group named "Covid Clinic" was formulated. This idea was put into action to De-stigmatise the disease, make aware the masses, facilitate covid management and ease out the existing overburdened medical facilities in the best possible

manner. The methodology adopted after the government eased out the legislations for using virtual platforms in the present pandemic for providing patient care were as under^{15,16}:

1. Smartphones being technologically available, handy and easy to use everywhere, were considered an efficient resource for this purpose.
2. Two social media groups were created with the consent of around 330 doctors on board.
3. Nodal in charge, medical professionals directly involved in covid care and screening in remote areas were identified and recruited voluntarily.
4. The technological expertise and know-how of medical professionals required to handle this digital initiative was provided beforehand and updated via a different digital resource of "Save heart Kashmir "which is already functional in the region managing acute cardiac emergencies for the last five years.
5. A two-minute covid assessment proforma and checklist was formulated and distributed to the nodal in charge doctors who became part of the group. Accordingly, they were instructed to assess patients and triage them into mild, moderate, and severe covid cases.
6. This assessment focused on objective points during the virtual interaction with the nodal professional.
7. The doctor in charge was advised to update every bit of information regarding the patient in text, image, data, X-ray, CT Scan, and even indulge in audio and video conferencing as needed.
8. A team of experts handling covid patients in secondary and tertiary care, including physicians, radiologists, medical officers, cardiologists, immunologists, chest specialists and endocrinologists, was taken on board to give their valuable opinion and advice 24x7 free of cost, beyond their official duties.
9. Sharing of algorithms, models of treatment, and interactions during real-time handling of a patient in this open forum made it a considerable knowledge hub wherein a single patient and his management would be watched and followed by the whole team of 330 doctors, instilling confidence and enhancing their covid management skills rapidly.
10. Crisp, up to date and state of the art management advice

was provided to the patient in the least possible time via this platform, and a vast local data bank was created, which would facilitate future projections in healthcare.

11. Continuous feedback was taken from all concerned districts about the situation every two weeks to formulate or reconsider a strategy and update the authorities about the same.
12. This exponential skill enhancement via this group created a ripple effect [a] providing expertise to the

doctor handling covid cases. [b] Update knowledge and gain confidence to manage such cases. [c] Create awareness in the contacts and families involved or exposed. Hence the doctor in remote areas was guided to handle the patient in home isolation, perform effective triage, create awareness in concerned families, manage complications, and refer the patients after information and discussion, streamlining the whole effort in pandemic times.

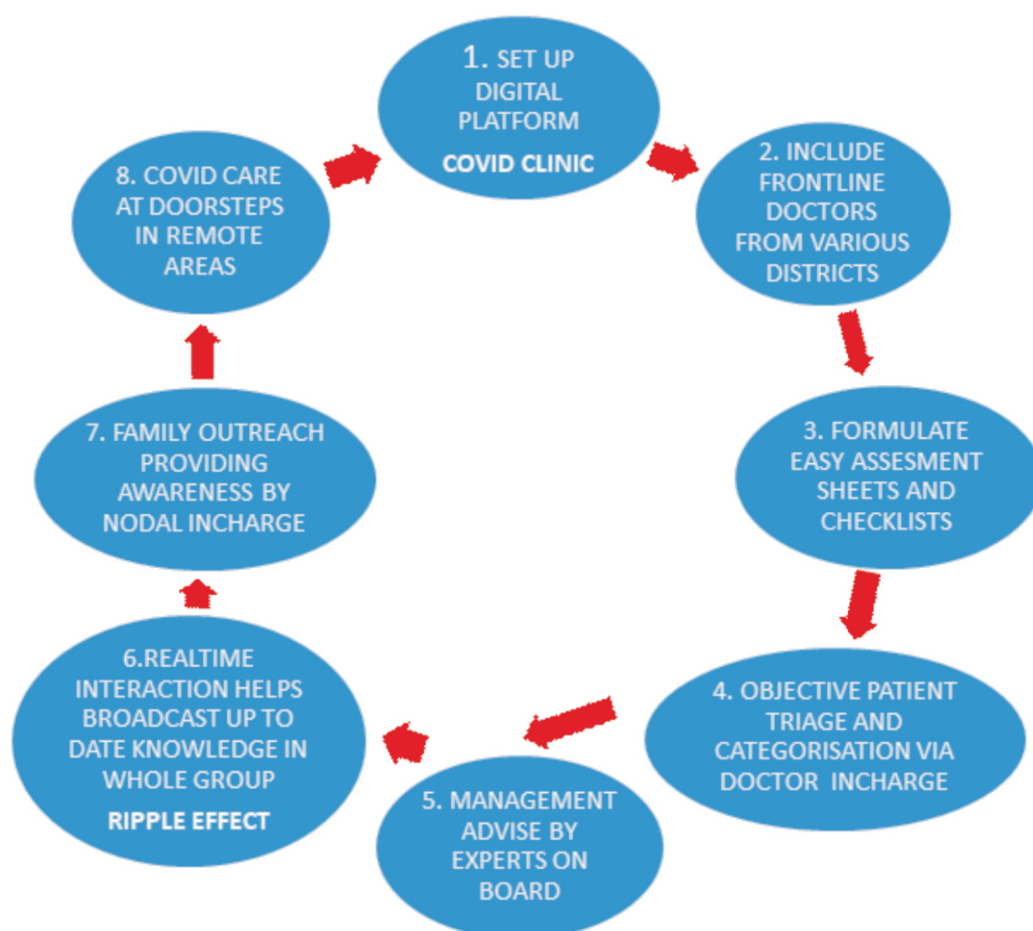
Figure 1: COVID Clinical Assessment Sheet for Triage and Categorization

COVID CLINIC-TWO MINUTE ASESMENT SHEET

CASE ASSESSMENT SHEET FOR COVID PATIENTS

NAME	AGE/GENDER	ADDRESS	CONTACT NO	DATED
COVID TEST RTPCR / RAT DATED	TREATED BY SKIMS SMHS HEALTH PRIVATE	HOME ISOLATION ADVICE BY SKIMS SMHS HEALTH PRIVATE	IN LAST 2 DAYS BETTER SAME WORSENER	DRUGS TAKEN PARACETAMOL ANTIBIOTICS ANTIVIRALS
FEVER AFEBRILE / <101 F / >101 F COUGH SOMETIMES / EVRY HOUR / CONTINUOUS BREATHLESSNESS NIL / ON MOVING / ON SITTING / SEVERE IN BED DIARRHEA LOSS OF SMELL LOSS OF TASTE HEADACHE MUSCLE ACHES			PULSE SPO2 BP RR TEMP	
DIABETES YES/NO HYPERTENSION YES/ NO HEART DISEASE YES / NO COPD / ASTHMA YES / NO CANCERS YES / NO			INSULIN / ORAL DRUGS STENT/ DRUGS INHALER / DRUGS CHEMO/ DRUGS	
CBC LFT KFT BSF	X RAY CHEST DATED REPORT	CT SCAN DATED REPORT	D DIMER LEVEL NORMAL RAISED LDH FERRITIN	CRP LEVEL <10 10-20 >20
ASYMPTOMATIC RR <24 CT NAD / NO CAP SPO2 >94% ROOM AIR	MILD COVID RR <24 CT <25% SPO2 >94% ROOM AIR		MODERATE COVID RR 24-30 CT 25 -50% / CAP + SPO2 90-94%	SEVERE COVID RR >30 CT 50-75% CAP BILAT SPO2 <90
MANAGEMENT ADVISE:				

Figure 2: COVID Clinic wheel



Advantages

1. The whole mechanism works voluntarily, absolutely free of cost.
2. No added financial burden to the patient or state exchequer.
3. Augments home care, thus decreasing footfall in hospitals.
4. The initiative has contributed to creating low HD and ICU bed occupancy.
5. Undue uninformed referrals have lowered significantly.
6. Provided continuous medical education platform for medical professionals involved.
7. Empowering nodal doctor who in turn handles many families with confidence.

Data Analysis

COVID CLINIC has established an overall outreach to 14 districts of the region. Six districts are adjacent to the border areas or considered remote areas with minimal healthcare facilities. Mass outreach and advice have been provided via audio-visual mediums like zoom meetings, social media chats and live WhatsApp video calling, catering to a total population of around 42000 people. The group handles 50 to 55 covid cases daily and has implemented an active virtual triage system via an assessment sheet and checklist. More than 2868 active covid cases have been managed till 10TH SEPTEMBER 2020, with around 14600 contacts advised about precautions to be taken and do's and don'ts during the pandemic. Three hundred thirty doctors have been provided with up to date information regarding the management of covid 19 cases and supported with the required expertise to

handle complications of covid 19 patients in remote areas of the region.

Abiding by the WHO categorization of the disease,¹⁷ amongst the cases, 629 [21.93%] were asymptomatic and handled at home. One thousand three hundred thirty-four cases [46.5%] had mild symptoms of fever, cough and malaise during the presentation. 703 [24.5%] patients were labelled as moderate with fluctuating oxygen saturation and high-grade fever. They were kept under strict observation during the tenure of illness. Some mild cases with worsening symptoms and associated comorbidities were advised hospitalizations. 202 [7.04%] cases were categorized as severe covid due to presentation and were advised urgent admission in High dependency units of hospitals.

In the meantime, while handling the spectrum of covid 19 cases till 10 September 2020, 2554 x-ray chests were analysed and reported, 867 HRCT chests were discussed in detail, and CT scoring was delineated for proper management. To date, 511 follow-up cases of recovered covid 19 also have been handled and managed optimally at home.

Table A: COVID Clinic Achievements till 10TH September 2020.

S.No	Activity Till 10 TH September 2020	Number
1.	Remote Outreach	14 Districts
2.	Mass Outreach Via Audiovisual Sessions	42000 viewership
3.	Close Contact Awareness	14600
4.	Healthcare Professional Skill Enhancement	330 Doctors
5.	Active Cases Handled	2868 Till Date
6.	Asymptomatic Cases	629 [21.93%]
7.	Mild Cases	1334 [46.5%]
8.	Moderate Cases	703 [24.5%]
9.	Severe Cases	202 [7.04%]
10.	X Rays Chest Analysed	2554
11.	CT Chest Analysed	867
12.	Follow up Cases Handled	511

Assessment of Follow-Ups

1. Covid follow up cases were assessed as per
2. Changes in lifestyle,
3. Sports and social activities;
4. Symptoms like dyspnoea, pain, fatigue, muscle weakness,
5. Neuropsychiatric symptoms such as memory loss, depression and anxiety.

DISCUSSION

Communication technology (CT) providing distant covid services is a comprehensive extended spectrum of

awareness, education, management, skill enhancement of the frontline professionals and two-way interactive assessment and feedback from on-ground staff and masses. This mode of healthcare with incorporated technology broadens the reach and holds great promise in improving the healthcare facilities.^{18, 19, 20}

Covid Clinic: A virtual medical care set-up established voluntarily has successfully performed triage, categorization and management of the cases with a massive outreach to 14 remote districts of the region via social media platforms and audiovisual support. Such treatment has been approved in many places outside the country in a pandemic. The regulatory laws have also been eased out within the country to cater to the massive demand of providing awareness and healthcare support to the ailing without added risks of spreading infection^{21, 22, 23, 24, 25, 26}.

Civil Rights at the Department of Health and Human Services in the United States is also aggressively promoting this virtual method of handling cases and promoting audio-visual interaction methods via various electronic remote platforms considering the public health emergency.^{27, 28, 29}

Covid Clinic group and our methodology of voluntary cost-free virtual digital healthcare in a pandemic are itself unique and novel as it has achieved the set goals of catering to the public in pandemic without extra financial burden on the people and the state whereas, in the west and other regions, the established remote platforms have infused finances and activated the system by upgrading the mechanism with the help of various virtual medical care companies like Am well, Teladoc and Ryan care in the USA. ZTE and NTCC technology in China has collaborated to provide adequate healthcare remotely. Medicare support service in Australia has also delivered digital home care support to the needy in pandemic times.^{30, 31, 32}

In addition to triage and objective assessment, we have prescribed medicines remotely to such patients and monitor their response daily. The majority of covid 19 patients have responded to treatment, and the side effect profile has been minimal. This form of medical prescription is also supported by the data evolving from the west and has been termed medico-legally safe³³. Even this management mode is endorsed widely, and the White House task force agrees on expanding and adopting digital Medicare services^{34, 35}.

Some researchers have raised valid issues about patient

Table B: Benefits and limitations of the digital platforms in providing health care services.

S. No	Benefits	Limitations
1	Provided the space to address public concerns in large scale healthcare crises	Lack of patient privacy and data security
2	Effective patient handling in lockdown areas during the Pandemic	Absence of clinical examination and assessment in person
3	Triage and management of considerable group was performed lessening the burden of healthcare system	Regional infrastructural issues
4	It served as a medium of patient awareness and a source of continuous medical professional education	Internet Connectivity

privacy and absence of bedside examination as a vital limiting factor in assessing the clinical status and providing benefit to the patient, despite that this mode has been approved to increase penetration of healthcare services into the community in public emergencies as posed in a pandemic.³⁶

Some countries had financial limitations in organizing digital platforms for management, but that was not the case with us as we operated voluntarily without extra financial burden on the patient and the state exchequer.³⁷

ADVANTAGE

The world over, the public and private sectors are investing in digital healthcare in huge numbers, putting billions of dollars into the healthcare system to enable digital services for their people.

Despite this considerable investment, our smartphone-based technology has been working with equal efficiency, saving lives and providing optimal services in pandemics without any additional burden to the exchequer.³⁸

Future Impact of Digital Health Care

Patient attitudes toward digital health have improved since the pre-COVID-19 era in a pandemic. However, some barriers, such as perceptions of technology security, remain to be addressed for optimal virtual health adoption. Such models will likely evolve to optimize hybrid virtual and in-person care delivery.

Virtual healthcare models are evolving and proliferating, moving from purely "virtual urgent care" to a range of services enabling longitudinal virtual care, integration of with other virtual health solutions, and hybrid virtual/in-person care models, with the potential to improve consumer experience/convenience, access, outcomes, and affordability.

CONCLUSION

Since the medico-legal aspects associated with telemedicine were relaxed to triage and manage cases in a pandemic, this form of remote virtual medical care COVID CLINIC: has become the order of the day. Such a digital platform has helped society significantly increase penetration into the community. This management medium has helped decrease the exposure to new infections in a pandemic in our region. The use of remote medicine is not new. Still, the passion for making it run voluntarily and providing a mechanism to use it effectively in resource-limited low-income areas without any additional financial implications has been a novel and outstanding effort by all means. This initiative has connected us into one network in pandemic and enhanced our connection with each other with satisfying results on the ground. This mode of healthcare and the framework provided herein is readily available, free of cost, handy, easily accessible in the remotest regions and needs to be considered in other regions for larger benefits to the ailing masses.^{39,40,41}

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