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Research Article
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Managing COVID in Homecare – Approach to Treatment, Monitoring, and Follow-up by the Family Physician.

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Introduction: The 2nd wave of COVID caused an unprecedented burden on health care workers and resources, calling for structured and effective management of most COVID patients in-home care by general and family physicians via digital and virtual monitoring. **Methodology**: A systematic treatment approach evolved from COVID diagnosis, homecare determination and isolation, oxygen saturation and temperature monitoring documentation, guidance on proning and breathing techniques, diet and lifestyle measures, evaluating comorbidities, and prescribing appropriate medicines. Timely decision making and stratification to assess disease course and need for hospitalization based on meticulous monitoring, clinical signs and appropriate tests were followed. A balanced approach avoiding unnecessary medication and tests, and allaying panic resulting from multiple information sources, was the novel challenge for physicians. Post-COVID follow up was done for three months. **Results:** The recovery rate in homecare with this approach was 97%, with only 11% needing corticosteroids in the second week. The need for hospitalization was in 3%. In the first month, > 90% had post-COVID symptoms, mainly lower energy, fatigue, weakness, reduced smell/taste and reduced work capacity. However, by the 3rd month, this reduced to 33%, with only 6% showing symptoms beyond three months. Management was conservative in the majority. **Conclusion:** A systematic and rational approach to treating, monitoring and managing COVID patients at home can enable better care and recovery and limit unnecessary hospitalization. Diet and lifestyle measures, documentation of oxygen saturation and temperature monitoring, proning and breathing techniques, and psychological support are of great importance that aid recovery and enable sound clinical evaluation.

Keywords: COVID homecare, Oxygen saturation, Proning, Post-COVID, 2nd Wave

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Introduction

The second wave of COVID (Coronavirus Disease) in India in April-May 2021 posed one of the most significant challenges to the healthcare workers, infrastructure and system. At that time, though vaccination had begun, India, with a 1.3 billion population, had vaccinated around 10 million health and frontline workers with both vaccine doses, and about 70 million people aged 45 years and above with the first vaccine dose [1]. Therefore, most of the population was still not immunized at the onset of the second wave, which also brought in variants of concern (VOCs) like Delta and Alpha strains [2]. In contrast to the first wave, the second wave saw a predominance of younger age groups below 60 years, with often multiple family members or entire families getting affected.

The crucial need of the time was informed and balanced decision making by medical practitioners to prevent unnecessary overloading of healthcare resources and giving hospital care to those in real need. This required timely identification of patients with risks and alert signs for hospitalization and oxygen therapy and managing the majority of COVID cases which were mild, effectively in homecare. The general practitioners (GPs) and family physicians (FPs) are the backbones of healthcare in India, and they are the first point of contact for patients. Therefore, they form the firm foundation on which effective COVID management of the community rests. It is essential for GPs and FPs in each region to be trained, updated and have common platforms or chat groups created to discuss cases and share insights and experiences. Digital, and virtual medical care through tele/e-consultation and monitoring, evolved significantly in the pandemic, helping doctors and patients in safer, more convenient and comfortable healthcare [3]. Elaborated here and suggested for GPs and FPs is a systematic and virtual homecare management approach to treatment, monitoring, and 3-month post-COVID follow up for treating COVID patients in-home care. The results are discussed for patients managed by this approach who had symptomatic COVID in April 2021.

Methodology

Setting: The clinical setting for COVID management of cases represented here is homecare with virtual digital treatment and monitoring by the physician. For every patient that called in with symptoms for consultation, COVID case determination and isolation was done after detailed clinical and contact history and performing the standard RT-PCR test for COVID.

Duration and Type of Study: This is a retrospective real-world reporting of COVID patients managed in homecare by the family physician in clinical practice. The observation period was for three months, with initial 14 days of active treatment and daily monitoring. Recording the day when symptoms started (1st day of illness) as accurately as possible was done in all patients for effective monitoring of the disease's course and timely decisions.

Sample size and Description: Real-world data of 63 cases in the age group 18-60 years, who sought consultation from one family physician for COVID in April 2021 during the 2nd wave of COVID in India, and were managed in-home care, has been elaborated here.

Inclusion and Exclusion Criteria: Patients aged 18-60 years who sought consultation for COVID symptoms were evaluated with the standard RT-PCR test. The following cases were included as COVID and recommended immediate isolation: Those who were RT-PCR positive; RT-PCR unknown/negative but with symptoms strongly suggesting COVID like loss of smell/taste with fever and cough, or known close contact with COVID positive family/household member in the last one week. For all such patients, if on presentation, the oxygen saturation on pulse oximetry was > 94% with no breathlessness, they were recommended for non-hospitalized care at home (if a separate isolation room with an attached toilet and one openable window for ventilation was available) or in repurposed primary COVID-care centres [4]. Along with details of the presenting symptoms, assessing the existing comorbidities like diabetes, hypertension, cardiovascular disease (CVD) etc., with their current status/control and medications being taken, was done and recorded. In such patients checking blood sugar, HbA1C, complete blood counts, and serum creatinine (by home blood sample collection) and blood pressure (by home digital BP machine) were performed at presentation. For those whose comorbidities were in control, instruction for continuing all medications for the same was given. In uncontrolled cases, referral for specialist's intervention and treatment modification where required was done.

COVID vaccination status of the patient was also recorded. Patients who did not qualify for home care treatment, those who did not complete full treatment and isolation period, and those who modified treatment based on other medical/non-medical opinions were excluded from the retrospective analysis.

Procedure, Data Collection and Analysis

Monitoring: An individual day-wise chart, recording the oxygen saturation by pulse oximetry and temperature by an oral thermometer every 4-6 hours, was shared by each patient with the treating physician at the end of each day for 14 days. In addition, a column in the chart was included for symptomatic improvement where the patient mentioned whether feeling worse or better compared to the previous day.

The 6-minute walk test at 6 pm (for convenient remembrance) or at least once daily was recommended with oxygen saturation recorded just before and after on the chart to pick up 'happy hypoxia' (subclinical oxygen deficiency), an alert for compromised lung function and risk or tendency for falling oxygen levels [5].

Conscious/awake self proning (technique and correct placement of pillows explained pictorially) was advised once in the morning and evening 1.5 hours post meals. Duration of proning was recommended to be 30-40 minutes with ten deep breaths every 10 minutes. Proning was additionally recommended if the oxygen saturation dropped at any point < 95% (suggesting hypoxemia corresponding to pO2 <80 mmHg), and the post-proning oxygen saturation was also to be captured on the chart in such a case [6].

General Health and Hygiene Advice: All patients were advised to drink plenty of water along with healthy liquids like coconut water, buttermilk, lemon juice, fresh fruit juices and turmeric milk for adequate hydration. Information on home-cooked food delivery initiatives and services were made available. Diet rich in vegetables, fruits, curd, protein-rich foods like eggs or pulses, and slices of bread/rice along with timely meals, and avoidance of spicy, irritant and cold/chilled food items, was recommended. Nutritional supplements like vitamin C, D, B-complex and zinc were not compulsorily prescribed but were asked to be continued if taking already.

Antiseptic gargling was advised if throat soreness/pain was present. Steam and saline nasal spray were recommended once or twice daily if nasal congestion was present. Double masking when in contact with the caregiver and overall hygiene and frequent sanitizing was advised.

Physical activity doable without getting tired, like medium-paced walking in the room for 10-15 minutes every few hours with light body stretches, and 5-10 minutes of alternate breathing (pranayama) were advised. The importance of keeping the mind relaxed by reading and watching pleasant content, getting adequate whole night sleep and rest, listening to music and having video chats with friends and family on cheerful topics was emphasized. It was well explained that panic, anxiety, and too many opinions/suggestions from different sources could induce stress and sometimes a feeling of breathlessness, palpitation and worsening of symptoms, leading to inappropriate decisions by both the patient and the treating physician.

Medicines: In the first week, paracetamol was prescribed for fever and body pain every 4-6 hours. In exceptional cases, if the fever was high and not responding well to paracetamol alone, mefenamic acid was added. Medicines for symptomatic relief of cold, cough and congestion like antihistamines and mucolytics were given only if needed. Montelukast was prescribed for ten days in all patients based on preliminary and empirical evidence from some studies on reducing inflammation, fibrosis and oxidative stress, and protective effects against clinical deterioration [7].

Ivermectin (as per protocol by ICMR, India) was prescribed for five days in all patients [8]. Favipiravir was added for 7-10 days in certain patients who had fever >101 deg F or severe malaise/myalgia in the first 48 hours and those with significant comorbidities [9].

Antibiotics (azithromycin/amoxicillin-clavulanate) were not prescribed routinely, but only in those patients who had significant cough with thick/dark mucus or pain on swallowing, suggesting a possible secondary bacterial throat infection [10]. Hydroxychloroquine and doxycycline were not prescribed to any patient. None of the patients was given corticosteroids in any form in the first week of the disease course. The antibody cocktail was not available in India in this period.

Blanket prescriptions or unnecessary and over medication was guarded against, and the same was also discussed with patients, as adverse effects of too many drugs can often eclipse the actual day to day improvement in the COVID disease course and lead to apprehensions and wrong clinical decisions.

Disease Course, Scoring and Decision Making: With daily charts of continuous meticulous patient monitoring, hospitalization was to be considered immediately on any day of the course of the illness if symptoms of breathlessness or chest pain/pressure appeared, oxygen saturation was constantly <94% not improving by proning or dropping anytime below 90% (corresponding to pO2 of 60mm Hg below which there is a steep drop in the oxygen dissociation curve) [6]. Hospitalization was also recommended in altered mental status, significant weakness, or inability to eat or take medicines orally. In the absence of these signs, and the patient doing satisfactorily in homecare in the first week (viral phase), a planned reassessment was done at the beginning of the second week (host inflammation phase) with a review of clinical symptoms, oxygen saturation trends, and laboratory investigations of CBC, CRP, and blood sugar. Other inflammatory markers, including D-dimer and IL-6, were not recommended in homecare non-hospitalized patients. Informed decision making on further course and intervention at the end of the first week was made as follows:

Group A: If symptoms were reducing (fever <101 deg F responding to paracetamol, cough and sore throat improving) and oxygen saturation maintained >94% at all times, then monitoring and observation was continued without any additional intervention.

Group B: These patients had symptoms continuing into the second week, with some fever readings >101 deg F but responsive to paracetamol, or persistent cough, and significantly raised CRP (above five times of upper limit of normal). However, oxygen saturation was maintained at>94% at all times. They were monitored closely and were also offered the option of inhaled corticosteroids (budesonide).

Group C: In such patients, fever and cough symptoms had not significantly improved and were still prominent in the second week with high CRP, and oxygen readings often borderline (92-94%) but improving with proning. These patients were given a short 5-7 days course of low dose oral corticosteroids (methylprednisolone 16-32 mg/day). Hospitalization consideration was given to elderly >70 years, patients with diabetes, hypertension, coronary artery disease, or any significant heart, lung, kidney, liver or immune-suppressive comorbidity.

Group D: If symptoms were worsening or reappearing (fever >101 deg F not very responsive to paracetamol, persistent cough especially with phlegm, the appearance of chest pain/pressure or breathlessness), and oxygen saturation showing declining trends <92% not responding to proning, with significantly high CRP, then immediate HR-CT chest to assess COVID pneumonia severity, and hospital admission was advised for oxygen therapy, intravenous corticosteroids and other drugs.

Recovery and Post-COVID: Patients were considered as recovered if they were fever (≥100 deg F) free and maintained oxygen saturation for three consecutive days after ten days from the start of symptoms [11]. After that, one additional week of self-care isolation and monitoring was advised before stepping out of the home with COVID appropriate behaviour. The patients were explained about the common post-COVID symptoms and rare long-COVID and were advised to follow up by digital updates every week in the first month followed by 2-3 weekly for the next two months [12].

Patients were to immediately report alert signs and symptoms for timely pick up of thrombotic or cardiovascular events or possible Mucormycosis, especially in those with comorbidities like diabetes [13,14]. These red-flag symptoms included numbness or weakness in the face, arm, leg, or one side of the body; mental confusion; trouble in speaking or understanding speech; severe unbearable headache; vision problems (blurring, doubling or loss); losing balance or coordination; chest pain or breathlessness which impairs daily routine or is associated with cough; swelling, cramping pain, or discolouration in limbs; or persistent bone-joint pains.

All patients were asked to continue nutritious food and adequate fluid intake, avoid smoking and limit alcohol. It was emphasized that physical activity should be resumed gradually and graded by restricting working hours initially and increasing the duration by an hour every week with frequent breaks. Strenuous exercises like jogging, running, cycling, or gyming were not recommended immediately.

It was advised to begin with less rigorous activities like simple stretches, guided yoga, outdoor walking at an average pace, and spot exercises for neck-shoulder, arms, legs, and abdomen, then step up gradually every week to reach one's average level of physical exercise over 3-6 months. Patients were asked to continue alternate breathing exercises, proning and oxygen saturation checks once daily. A home incentive respirometer was suggested in required cases.

Patients were also encouraged to seek counselling or support groups for post-COVID stress and anxiety. COVID vaccination, if incomplete or not done, was recommended three months post-recovery following national guidelines [15]. Patients who received oral corticosteroids were asked to repeat CBC and blood sugar at one month. Other post-recovery investigations were not routinely advised for those recovered in homecare except when comorbidities or strongly suggestive symptoms were present.

Ethics and Consent: All data was collected, structured and analyzed by ethical principles and guidelines, following patient confidentiality norms and consent.

Results

For most family physicians, the period of the second COVID wave comprised of guiding and answering queries of a large number of people (patients, relatives, friends, and their referred known ones) every month. One hundred fourteen (114) patients sought direct consultation for confirmed symptomatic COVID in April 2021 and were initiated into homecare management. Among these, retrospectively analyzed here are 63 patients (41 male) in the age group 18-60 years who completed the entire treatment and monitoring period as prescribed, without deviations, self-medication initiation/modification, or multiple medical/non-medical opinions. Fifty-one (51) patients also completed a 3-month post-COVID follow-up.

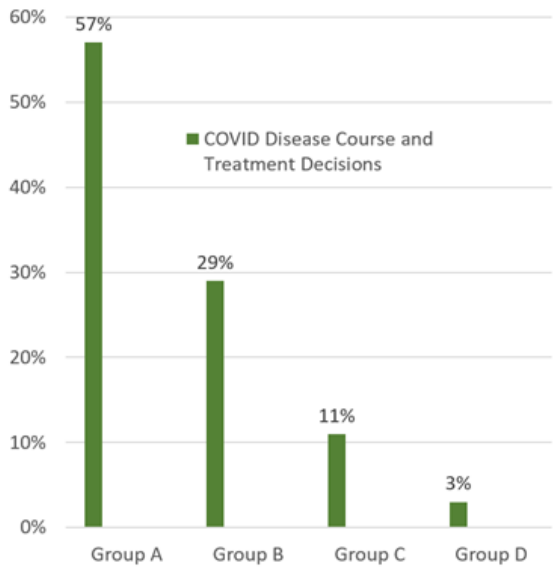
Out of the 63 patients treated in homecare, 29/63 patients were <45 years of age, while comorbidities were present in 14 patients (12 of them in the 45-60 age group). None of the patients had received the COVID vaccine. With respect to comorbidities, 7 patients had diabetes, 2 had asthma, 6 had hypertension, and 4 had diabetes and hypertension with a history of CVD (angina/myocardial infarction, angioplasty/bypass graft).

Favipiravir and an antibiotic were prescribed in 21 and 9 patients, respectively. In the 2nd week, 36/63 (57% - Group A) recovered with improving symptoms and no additional intervention, while 18 (29% - Group B) patients had significant symptoms (fever, cough and weakness) but maintained oxygen saturation and recovered with symptomatic management and close monitoring. Corticosteroids were needed in 7 patients (11% - Group C) due to hypoxemia, significant symptoms and high inflammatory response in the 2nd week, with recovery after that. Only 2 patients (3% - Group D) required hospitalization for breathlessness or falling oxygen level. The first patient with a history of stroke developed breathlessness on day 4. The second patient had oxygen saturation below 92% consistently on days 7 and 8, not responding to proning. Both patients showed significant COVID pneumonia on the HR-CT chest and recovered with hospitalization for <1 week. Details of patient factors/outcomes and group-wise recovery are given in table 1 and figure 1, respectively.

Table 1: Patient factors and outcomes in homecare COVID management (Total patients = 63)

Factor/Outcome	number	percentage
Male	41	65%
< 45 years	29	46%
Comorbidities	14	22%
Hospitalized	2	3%
Antibiotic given	9	14%
Favipiravir given	21	33%
Corticosteroid (oral) given	7	11%

Figure 1: COVID Disease Course and Treatment Decisions



Group A: Symptomatic improvement, maintained oxygen saturation and no additional intervention in the 2nd week.

Group B: Continuing symptoms, maintained oxygen saturation and close monitoring in the 2nd week.

Group C: Symptoms not improving, evidence of mild hypoxemia and needing oral corticosteroids in 2nd week.

Group D: Worsening symptoms, hypoxemia and requiring hospitalization.

Refer text under methodology for detailed group descriptions

Out of 51 patients who followed up for post-COVID health for three months, 47 patients had some post-COVID symptoms in the first month, 39 continued to have some symptoms in the 2nd month, 17 had some symptoms in the 3rd month, and three patients continued to have some symptoms suggesting long COVID (figure 2). The common post-COVID symptoms seen (table 2) were general lethargy, fatigue, low energy and weakness; headache, body ache or joint pains; feverish feeling or mild fever; gastrointestinal (GI) symptoms like indigestion, low appetite, and nausea; reduced taste/smell; feeling breathless especially after physical exertion like exercise, climbing stairs, etc.; palpitations; sleeplessness (insomnia); brain fog (feeling mentally less sharp, forgetful); hair loss; and anxiety-depression. Most patients were managed conservatively with diet, lifestyle modification, breathing techniques and home incentive respirometer, rest and graded physical activity, and emotional reassurance. Probiotics, protein and vitamin-mineral supplements (vitamin B-zinc-selenium-chromium, vitamin C, vitamin D weekly, and iron-biotin in case of hair loss), and SOS analgesics like paracetamol were given in some patients. Medicines for sleep were prescribed for a limited period in low doses in 5 patients, while 4 patients were suggested counselling/therapy for anxiety-depression. While 3 patients were recommended a 2-D echocardiogram which was normal, 1 patient was investigated with both HR-CT chest and echocardiogram and referred for specialist care due to the presence of diabetes, blood pressure and history of coronary artery bypass graft (CABG). Blood sugar did not show any abnormality in the follow up of the seven patients who received oral corticosteroids. No patient reported alarm signs/symptoms or developed any thrombotic complications or Mucormycosis.

Figure 2: Post-COVID symptom duration in home-treated COVID patients

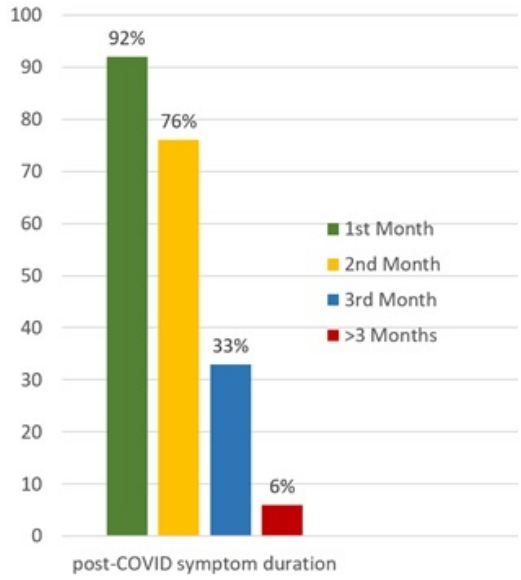


Table 2: Prevalence of different post-COVID symptoms in home-treated COVID patients (N=51)

Post-COVID symptom	number	percentage
General lethargy, fatigue, low energy and weakness	37	73%
Headache, body ache or joint pains	8	16%
Feverish feeling or mild fever	4	8%
Indigestion, low appetite, and nausea	10	20%
Subnormal taste/smell	13	25%
Breathlessness after physical exertion	7	14%
Palpitation	5	10%
Insomnia	14	27%
Brain Fog	6	12%
Hair fall	4	8%
Anxiety-Depression	7	14%
Gum swelling (gingivitis)	1	2%

Discussion

While clinical trials are done with controlled settings and patient factors, the real-world scenario presents varied challenges to the treating family physician. The first among these seen during the pandemic was the multiple sources of health information, guidance and suggestions from the Internet, social media, news channels and relatives-friends, which made patients aware of different medicines and modalities available. The absence of uniform training modules and guidelines for GPs and CPs across the country only added to the variability in prescription and treatments.

All this contributed to patient apprehensions on why a particular medicine was not being prescribed when it was perhaps there on other prescriptions. Getting excess laboratory tests done and the associated panic and anxiety led patients to self-medicate or pressurize physicians into starting antibiotics, favipiravir, even corticosteroids, and in some cases directly acting oral anticoagulants (like apixaban), in the absence of clinical need, and despite imparting reassurance, counselling and detailed explanations [16-18]. Therefore almost 45% (51/114) of patients treated in homecare could not be taken for analysis here due to such deviations.

A well-defined and systematic approach for assessment, monitoring and treatment can only be effective if coupled with proper care, compliance and confidence from the patient with the support of family and caregivers. With the mentioned clinical approach and patient parameters here, only 2 patients required hospitalization, and corticosteroids were given only when hypoxemia was recorded with persistent symptoms and high CRP. Corticosteroids in the absence of hypoxemia have not shown clinical benefit and are not recommended [19]. However, generally, a large number of patients during the 2nd wave took corticosteroids in the 2nd week, or even earlier in the viremic phase if highly symptomatic, often with prolonged duration of dosing [17]. This led to a more adverse result with immunosuppression, increased blood sugar, and risk of opportunistic infections like Mucormycosis in the community [20]. Rampant and blanket use of antibiotics in all cases can give rise to significant future antimicrobial resistance and unnecessary adverse effects [16]. In the cases given an antibiotic here for suspected bacterial sore throat, as a deduction in hindsight, some could have been managed with antiseptics gargles alone. Ivermectin was given to all based on national guidelines and the advantage of low cost, short course duration, accepted tolerance and adequate availability [8]. Based on the evidence for favipiravir in reducing viral load and days of illness, it was given to the patients who were initially highly symptomatic or had associated comorbidities [9]. This drug has a high cost, high pill burden and longer dosing duration. No correlation was seen between the viral load by RT-PCR cycle time (Ct) and the severity of clinical symptoms.

Meticulous clinical monitoring and maintaining oxygen saturation and daily symptom charts, along with awake proning, are the cornerstones of management.

Following simple lifestyle measures and maintaining general physical and mental health go a long way in helping recovery. The timing of laboratory tests, initiating different medications, and clinical decisions are crucial and require objectivity, availability of complete monitoring charts, and absence of pressure. Continuous communication and discussion with the patient and family/caregivers is the key for which digital platforms have evolved. One of the most important factors for reducing disease severity and hospitalization, apart from vaccination, is controlling comorbidities with regular medication and monitoring. Effective and early recovery in homecare is significantly higher in such cases without the need for hospitalization. The antibiotic cocktail is now available for high-risk patients.

Post-COVID symptoms of tiredness and low energy were seen in most patients, especially in the first month. Body aches and headache, sleeping difficulty, GI symptoms, and subnormal taste/smell were other common post-COVID symptoms. Hair fall was seen in some women patients. However, in most, these were mainly in the first month and lasting not more than three months, with possible long COVID in 3 patients. The overall type, prevalence and duration of post-COVID symptoms here was seen to correspond with those reported in the literature; however direct comparisons may be inappropriate due to the small sample size and subjectivity of reporting by the patient [21-23]. Age or intensity of active COVID symptoms did not play a role in determining the nature, severity or duration of post-COVID symptoms. No set of routine or standard investigations can be advocated for post-COVID symptoms. The call must be taken on a case-to-case basis after assessing risk factors, whether alarm signs present and associated comorbidities. Majority recover with conservative and lifestyle measures. COVID vaccination can be advocated 3-6 months after COVID recovery [15].

Conclusion

COVID cases in the 2nd wave in India were seen commonly in the younger population of 18-60 years, with a majority showing mild disease requiring home care and management. However, this was accompanied by multiple sources and access to information coupled with panic and pressure due to a fast rise in daily caseload and overburdening of healthcare resources. This presented new challenges to the family and general physicians who were the backbone of managing COVID.

The key was a systematic and rational approach to treating, monitoring and managing COVID patients at home for better care and recovery and to limit unnecessary hospitalization. Diet and lifestyle measures, documentation of oxygen saturation and temperature monitoring, proning and breathing techniques, and psychological support are of great importance that not only aid recovery but also enable sound clinical evaluation and decisions with avoidance of undue over-prescription of drugs and tests. Post-COVID symptoms were also seen to subside in most cases by three months with conservative health measures.

What this data adds to existing knowledge

Holistic management of COVID by the physician (instead of prescription medicine practice only), meticulous monitoring and follow-up utilizing digital means effectively, structured and timely stratification of patients and informed decision making can significantly improve COVID management in homecare for both the family physician and patient, as well as minimize clinical deterioration, complications and need for hospitalization. This also helps strengthen the foundation of healthcare and reduce the severe burden on in-patient doctors and infrastructure. Sharing such data, insights and experiences by family physicians can further help refine the approach to treatment and improve patient care.

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