

## Original Research Article

# Feasibility of the home isolation programme for adults and children with COVID-19

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## ABSTRACT

**Background:** The coronavirus disease 2019 (COVID-19) pandemic has caused an upsurge of cases in many countries leading to inadequate quarantine facilities and hospital beds. Studies on the feasibility of home isolation for COVID-19 patients are the need of the hour. This is the first study from India on the feasibility of home isolation to the best of the author's knowledge.

**Methods:** This methodical study was conducted at a designated COVID-19 tertiary care hospital in India, which included all patients enrolled for the home isolation programme from the 4 July to 3 August 2020. Laboratory confirmed COVID-19 patients were assessed during the enrolment for their eligibility for home isolation. The enrolled patients were followed up once daily over a telephonic call with objective parameters like temperature, pulse and oxygen saturation.

**Results:** There were a total of 447 adults and 67 children. Amongst adults, hypertension was the most common co-morbid condition seen in 23 (5.15%) followed by diabetes in 18 (4.03%) patients. Only 24 (5.37%) patients were hospitalised during the duration of home isolation due to reasons like persistent fever, decreased SpO<sub>2</sub>, and non-medical ones like anxiety regarding the disease. Age and the presence of co-morbidities were directly related to the requirement of hospitalisation. No children required hospitalisation. There were no deaths.

**Conclusions:** Home isolation is effective for COVID-19 patients in resource limited settings. We provide strong evidence for adapting it for asymptomatic and mild symptomatic cases with judicious use of resources and without compromising the risk to patients.

**Keywords:** Asymptomatic, Co-morbidities, Hospitalization, Hypoxia, Mild, Tele-consultation

## INTRODUCTION

The coronavirus disease 2019 (COVID-19) was first reported as a cluster of cases in Wuhan, China on 31 December 2019 to the World health organization (WHO).<sup>1</sup> It was declared as a pandemic by the WHO on the 11 March 2020.<sup>2</sup> It has since then affected more than 200 countries, leading to a cumulative total of 34,161,721 confirmed COVID-19 cases including 1,016,986 deaths as on 2<sup>nd</sup> October 2020.<sup>3</sup> It has caused a lot of anxiety in the minds of people. It has also caused a huge economic crisis all over the World.

The first confirmed case in India was identified on 30 January 2020, in Thrissur district of Kerala.<sup>4</sup> As on 2<sup>nd</sup> October 2020, India was the second highest country with the maximum COVID-19 confirmed case burden of 6,394,068.<sup>5</sup>

As per the updated discharge policy by the ministry of health and family welfare, Government of India dated 8 May 2020, asymptomatic and mild symptomatic COVID-19 patients had to stay for at least 10 days in a dedicated COVID care facility.<sup>6</sup> There has been found a lot of psychosocial burden in people kept in quarantine and

isolation due to COVID-19.<sup>7</sup> Patients can become anxious due to the adverse environment around when kept away from their family members.

The ministry of health and family welfare, Government of India released the revised guidelines for home isolation of very mild/pre-symptomatic/asymptomatic COVID-19 cases on the 2<sup>nd</sup> July 2020.<sup>8</sup> This mainly involves tele-communication with the doctors and self-monitoring of health by the patients while remaining in home isolation. It is expected that the patients will be psychologically happy in their own home environment close to their family members. This policy if found feasible will make more beds available for patients with moderate disease. It will substantially reduce the health care expenses for the masses whilst utilising the clinical expertise of the health care workers/physicians for the patients with moderate to severe disease. Furthermore, although COVID-19 in children is mostly mild with flu like illness, it causes unnecessary panic in the minds of the parents. The findings of this study will be helpful to paediatricians and parents of the paediatric patients.

Since the 14 April 2020, our hospital had a tie up as a COVID-19 designated hospital with a local Government authority (Pune municipal corporation). The special outpatient department (OPD) for advising home isolation at this hospital began on 4 July 2020.

India is witnessing an upsurge of cases in the past few weeks with the maximum number of cases from Maharashtra state.<sup>9</sup> Strong evidence about usefulness of the strategy is needed in the country by the local health authorities and policy makers for advocating decisions. It will also reduce the strain on the health care services. It will be especially useful in developing countries with limited resources and a high case burden.

Such feasibility studies are the need of the hour. Current study is probably the first largest study from India on the feasibility of the home isolation programme which is also inclusive of the paediatric COVID-19 positive patients to the best of the author's knowledge.

## METHODS

Approval from the institutional ethics committee was taken before initiating the study. Presented study was a prospective study in which all patients attending this OPD from 4 July 2020 to 3 August 2020 were included. The infrastructure built for our OPD block was unique. Each doctor wearing the complete personal protective equipment (PPE) as per the hospital policy had a separate cubicle with a glass pane in front. Also, there was a window slit of 6×6 inches created in the glass pane to facilitate exchange of papers and for examining the patients. This slit was at the chest level of the doctor sitting inside the cubicle and the patient sitting outside. This was done to reduce the direct exposure with the respiratory droplets of the patient with the doctor.

Vulnerable doctors i.e. those more than 60 years old or having co-morbidities were not given OPD duty and were posted in a remote room for tele-consultation with the patients. The enrolment documents filed by the health care workers in the OPD were accessible to the doctors during tele-consultation via local internet access. Each doctor had to communicate with a maximum of 100 patients per day in about eight hours. This number of patients per doctor was kept constant as per the daily discharges and new enrolments taking place. All doctors had to undergo a training session prior to their postings in the tele-consultation centre.

Awareness was created through electronic media about the home isolation programme. The patients were given a prior appointment over telephone to avoid overcrowding. But walk-in patients were also included in the study. Laboratory confirmed COVID-19 patients getting enrolled for the home isolation programme were included in this study. The patients were enrolled as per the Government of India guidelines for home isolation at the time of submission of this article. Thus, all patients were required to have a 24×7 care taker. Also, after an interview with the patient, a careful assessment of the patient's home infrastructure was done prior to enrolment. The patients were asked regarding the availability of a separate room with an attached toilet and bathroom. The patients fulfilling the above criteria were enrolled. The inclusion criteria were patients who were asymptomatic and mild symptomatic and whose oxygen saturation (SpO<sub>2</sub>) was >95%. The exclusion criteria were patients with uncontrolled co-morbidities, malignancy or an immunocompromised state. In diabetics, patients with a random blood sugar >200 mg/dl were excluded. Children less than one year and children with a previous history of congenital heart disease were also excluded. The details of the patients enrolling for the home isolation programme were informed to the PMC as per the Central Government rules. Information about age, sex and duration of symptoms, gap in consultation etc. was collected. Un-precise responses were not included for analysis. All patients were prescribed only symptomatic treatment. They were assessed by a post graduate doctor for their eligibility. The initial assessment consisted of the symptomatology, co-morbidities and the clinical parameters. Also, a three minutes' walk test was done as a screening tool in high risk patients as per the doctor's judgement. Printed, validated and pre-tested forms were given to the health care workers for the initial and 10 day follow up assessments.

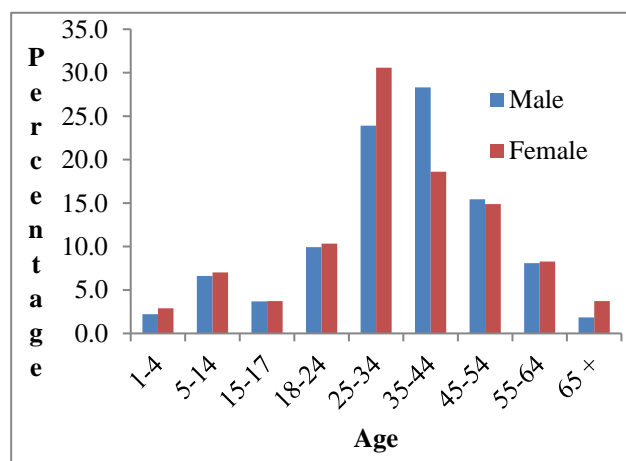
The patients were monitored telephonically once daily for 10 days from the date of their enrolment and were requested to remain in home isolation for 7 more days thereafter. Follow up assessment forms included clinical parameters, symptomatology and warning signs. Parents of children provided the parameters daily over phone. Patients not responding to telephone calls after three attempts were left a message asking them to provide their parameters. On the 17<sup>th</sup> day of home isolation, the

patients could collect their discharge cards from the home isolation OPD. It was mandatory for the patients to have a minimum of a digital thermometer and a portable pulse oximeter to avail the home isolation services. The patients were offered the same from our hospital's medical store at subsidised rates. Upon enrolment, the usage of a standardised thermometer and pulse oximeter were explained to the patients. Instructions to be followed by patients and their care takers about the infection prevention practices were explained verbally as well as through printed and audio-visual media in the language best understood by the patients. Additionally, warning signs and the need to seek medical attention were explained. In case of any warning signs or emergency at any time, the patients were given an emergency contact number and asked to come immediately at the hospital's flu like illness OPD which runs 24×7.

The effectiveness of the programme was considered as the number of patients seeking medical care immediately upon developing warning signs like breathlessness, chest pain, SpO<sub>2</sub> <95%. In children, in addition to the above, excessive irritability, crying or lethargy were considered to be warning signs. The programme also explained the patients the Infection Prevention measures to be followed to help prevent transmission to other family members in the house. The data was entered in excel sheet and analysed using the SPSS version 25. Appropriate tests like Chi-square tests were used for analysis.

## RESULTS

There were total 447 adult participants who were more than 18 years old. The maximum age was 82 years. The mean age was 38.82±12.30 years. There were total of 67 children. The mean age was 9.73±5.34 years. The details of the age and sex distribution are given in (Figure 1).



**Figure 1: Age and sex distribution of enrolled patients for home isolation, India, 2020.**

Almost all patients availed our subsidised pulse oximeters. Amongst the total telephonic objective parameters over 9 days of all adults, we had 88.62%

patient's parameters. In the paediatric patients, it was 91.87%. The missing data was due to reasons like patients not responding to phone calls and some patients getting admitted. There were also a few patients who did not buy the pulse oximeters.

A total of 37 (8.28%) adult patients had co-morbid conditions. Amongst them 23 (5.15%) were hypertensive followed by 18 (4.03%) diabetics and two patients had ischaemic heart disease. There were also eight (1.78%) patients who had multiple co-morbidities. None of the children had any co-morbid condition. At the time of enrolment, three adult females were pregnant. There were total 64 (14.32%) adult symptomatic patients on the day of enrolment for home isolation while only 5 (7.46%) children were symptomatic. The minimum duration between the onset of symptoms and the COVID-19 laboratory confirmed report was 1 day, while the maximum was 15 days for adults. Mean was 3.59±2.50 days. There were four patients whose durations between symptom onset and confirmed diagnosis were not captured. For children, minimum was 0 days and maximum were 5 days with a mean of 2.40±2.41 days.

**Table 1: Age distribution of admitted patients.**

Age group (years)	Home isolated (%)	Admitted (%)
15-24	51 (12.06)	1 (4.17)
25-34	137 (32.39)	2 (8.33)
35-44	117 (27.66)	5 (20.83)
45-54	71 (16.78)	7 (29.17)
55-64	35 (8.27)	7 (29.17)
≥65	12 (2.84)	2 (8.33)
<b>Total</b>	<b>423</b>	<b>24</b>
<b><math>\chi^2=20.55</math>; <math>p=0.001</math></b>		

The minimum number of days from the receipt of COVID-19 positive laboratory confirmed report to the day of enrolment for the home isolation programme was 0 days while the maximum was 6 days for adults. Mean was 1.02±0.974 days. In children, the minimum was 0 days while maximum was 4 days with a mean of 1.13±0.85 days. In the adult patients the most common symptom at presentation was cough in 22 (34.38%) patients, fever in 21 (32.81%) followed by sore throat in 10 (15.63%) patients. While in children, the most common symptoms were cough and fever in 3 (4.48%) each followed by irritability in one child. During the period of home isolation 22 (4.92%) adult patients were asked to come to the hospital for a physical examination while four patients were asked to come to the hospital in case of persistence of symptoms. The most common symptoms during the duration of home isolation were dry cough followed by fever in adults. The most common advice given for cough was a liquid formulation of dextromethorphan, triprolidine and phenylephrine combination while oral acetaminophen was prescribed for fever. In the children, during home isolation, loose

motions and headache followed by fever were the common symptoms. In the adult patients, 24 (5.37%) got admitted to the hospital during this programme. The most common reason for admission was reduced SpO<sub>2</sub> which was seen in seven patients. Amongst the admitted patients, there was a significant correlation between the age and the hospital admission. Higher the age more was the need for hospitalisation as shown in (Table 1).

Additionally, amongst the patients requiring admission to the hospital, there was a strong correlation seen between the patients who had co-morbid conditions and requiring admission to the hospital as shown in (Table 2).

**Table 2: Co-morbidities of admitted patients.**

Co-morbidity	Admitted	Home isolated
<b>Yes</b>	8.00	29.00
<b>No</b>	16.00	394.00
<b>Total</b>	24.00	423.00

$\chi^2=20.97$ ;  $p<0.001$

The patient's sex and symptoms did not affect the need for hospitalization. None of the children were admitted at any point during the period of home isolation.

Amongst the total enrolled patients, 423 (94.63%) patients were discharged from home isolation at the time of analysis. Additionally, the 22 (4.92%) admitted patients were also discharged. Only two patients were still admitted in the hospital at the time of data analysis. The reasons were myocardial infarction requiring cardiac bypass surgery in one and sepsis in the other patient. There was not a single death among all the enrolled patients.

## DISCUSSION

Due to the sudden upsurge of cases during the COVID-19 pandemic, there has been a huge economic crisis all over the world. It has greatly increased the health care expenditures for the masses. Moreover, there has been an acute shortage of quarantine facilities and hospital beds. Through this large single centre study, we aimed to discern the feasibility of home isolation for asymptomatic and mild symptomatic COVID-19 patients. Regular follow up during this study resulted in a minimum (11.38%) lost to follow up of patients. This included 24 patients who were hospitalized.

There was only one study available for us to compare our data with which was conducted at the Sunnybrook health sciences centre, Toronto, Ontario wherein a virtual care program for 50 adult COVID-19 patients was carried out. Our study had a relatively large sample size of 447 adults and 67 children. Male preponderance was present in both studies. The most common symptom on presentation in patients was cough in both the studies. Other common symptoms were fatigue and headache in that study while we had fever and sore throat. Hypertension was more

often seen than diabetes mellitus. These observations were similar to ours. Cardiac disease was present in one patient while two patients had cardiac disease in ours. Four patients (8.00%) in the Sunnybrook study required admission to hospital while in our study only 24 (4.67%) patients were hospitalised. Although this number seems big, not all patients got admitted for medical reasons. There were a few patients who got admitted due to anxiety regarding the disease. The conclusions from the former study were similar to our findings that such programmes can be used for the management of non-critical patients.<sup>10</sup>

In our study, the positive feature was that monitoring for hypoxia which is the most vital parameter was done daily in patients. Thus, it was easy for doctors and patients themselves to assess for hypoxia and seek medical care immediately. Simple telephonic consultation was provided to all patients who have shown to be quite effective. This model can be easily applied across all countries irrespective of the access to the internet or broadband. Additionally, the vulnerable category of doctors got an opportunity to deliver care to COVID-19 patients in a safe way. In resource poor settings, this group of highly skilled health care workers can be utilised if need arises in the future. At our centre, physical assessment of all patients was done on the day of enrolment for home isolation. All these features were absent in the study done by Law PW et al. Additionally, there was minimal loss to follow up of patients for us.

Our study shows that higher the age, higher is the need for hospitalisation. In such cases, it may be beneficial to do strict monitoring of patients twice a day. If there are any non-responders to the telephone calls in this category of patients, they may benefit with a health care worker's visit to their homes for a physical assessment.

The Government of China however did not find home isolation for COVID-19 patients the best course of action in Wuhan. It was also stated that all patients need to be brought to the hospital for their treatment.<sup>11</sup> The Chinese Government were compelled to self-isolate patients at home due to insufficient number of hospital beds. Although their study details were not available, we believe that they did not try the ideal model of home isolation. There was a hypothetical risk of secondary transmission of the infection to other family members at home. This may be due to the ambiguous experience in the early part of the pandemic when there was insufficient knowledge regarding the disease transmission and clinical progression.

There were a few limitations of our study. There was some missing data as patients did not answer our phone calls, or gave us incorrect contact numbers. Few patients did not buy pulse oximeters. Furthermore, we could not capture the figures as to how many patients contacted our emergency telephone number. Also, the details as to how many patients did not enrol due to unavailability of



infrastructure or care taker were missed. Our programme was aimed at reducing the anxiety of patients as they could remain comfortably in their home environment although we could not assess it qualitatively.

## CONCLUSION

From Current study it can be concluded that home isolation for asymptomatic and mild symptomatic COVID-19 patients is feasible both for the health care sector and the patients. Our study provides strong evidence for adapting the strategy for COVID-19 patients with judicious use of resources and without compromising the risk to patients.

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