

Research article

Home-based care programme (HBCP) for patients with COVID -19: Boon or burden during pandemic management?Nanjesh Kumar¹, Geethu Mathew², Raghavendra Huchchannavar¹¹Department of Community Medicine, K.S. Hegde Medical Academy, Deralakatte, Mangalore, 575 018, Karnataka, India²Scientist D, Indian Council of Medical Research - Regional Occupational Health Centre, Bengaluru, 562110, Karnataka, India

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Corresponding author: **Raghavendra Huchchannavar**. Email: drraghu49@gmail.com.**ABSTRACT**

Introduction and Aim: India experienced the peak of the second wave of COVID-19 during April to June 2021. Massive surge of cases resulting in shortage of beds and oxygen, home care was recommended as a strategy for management of asymptomatic/mild COVID -19 cases. The present study was undertaken to perform home visits and monitor COVID 19 patients who are a part of home-based care programme (HBCP) in Puttur taluk of Dakshina Kannada district, identification and immediate referral of patients with red flag signs/ symptoms and to identify barriers/challenges faced by health care staff in implementing the programme.

Methodology: The present study was a cross-sectional study with universal sampling. It was carried out as part of a district programme for management of home isolation COVID-19 patients. The team visited the houses of COVID-19 patients and evaluated them.

Results: A total of 112 COVID-19 patients were in home isolation during the study period in Puttur Taluk. Hypertension (29.5%) was the most common co-morbidity and nearly two-fifths (41.1%) of the study participants had one or more comorbidities. Almost two-third (63%) of the patients with comorbidities were symptomatic compared to only 29.4% of patients without any comorbidities. Of the six patients who had saturation of less than 95% five were more than 60 years of age, only one had received vaccination against COVID-19 and all had comorbidities. The HBCP had to face several challenges as the team members could not be in full PPE because of long distances between the houses and hard to reach areas.

Conclusion: Overall, it is a helpful initiative for patients as the health services were provided at the doorstep during the time of restriction of movement. This can be an important tool in managing not only COVID pandemic but also future outbreaks that may follow.

Keywords: COVID-19; home based care; pandemic; comorbidities; health programme.

INTRODUCTION

The novel Coronavirus (2019-nCoV, officially known as SARS-CoV-2 or COVID-19) was first reported in December 2019, as a cluster of acute respiratory illness in Wuhan, Hubei Province, China (1), from where it spread rapidly to over 198 countries. It was declared as a global pandemic by WHO on 12th March 2020 (2, 3). The disease causes respiratory illness (like the flu) with main clinical symptoms such as a dry cough, fever, and in more severe cases, difficulty in breathing (4). COVID-19 is highly contagious with a certain mortality rate, and it was classified as a class B infectious disease and managed as a class A infectious disease in China in January 2020 (5).

India experienced the peak of the first wave of COVID-19 during August to October 2020 and the peak of the second wave during April to June 2021 (6). The number of cases and deaths were significantly higher during the second wave of COVID-19 pandemic (7, 8). Massive surge of COVID -19 cases in the country resulted in shortage of beds, oxygen supply in hospitals and isolation centres (9, 10). In this scenario, home care was recommended as a strategy

for management of Asymptomatic/mild COVID -19 cases (11). As a part of this recommendation, all states in India including Karnataka started implementation of a new strategy in the community.

As per the directives of Government of India only those COVID-19 positive patients who were clinically assigned as mild/asymptomatic cases with requisite facilities at residence and availability of round the clock care giver were eligible for home isolation. All home isolated patients were advised to seek immediate medical attention if serious signs and symptoms develop (breathing difficulty, dip in oxygen saturation, persistent pain/pressure in chest and mental confusion/inability to arouse) (12). Though there is additional requirement of pulse-oximeter, thermometer, triple layer/N-95 mask, sodium hypochlorite solution etc separately for each patient staying in home isolation the study done by Bhardwaj et al observed that home isolation when compared with facility-based isolation is relatively cost effective and the patients have better quality of life during their period of isolation (13).

In Dakshina Kannada district the home-based care programme (HBCP) for patients with COVID -19 was

implemented in collaboration with the private medical colleges of the district. As per direction of the District Collector of Dakshina Kannada, our institute was given the responsibility of visiting all home isolation patients of the entire Puttur taluk. The main aim of this study was to evaluate COVID-19 patients in home isolation and to obtain feedback from health care staff regarding issues faced during implementation of the programme.

The main objectives of the present study were to perform home visits and monitor COVID 19 patients who are a part of home-based care programme (HBCP) in Puttur taluk of Dakshin Kannada district; to identify the patients with red flag signs/symptoms and refer them immediately for further management and care; to identify barriers/challenges faced by health care staff in implementing the programme.

MATERIALS AND METHODS

The present study was carried out as part of a district programme for management of home isolation COVID-19 patients with main focus on Category I patients. Our institute was given the responsibility of managing Category I home isolated COVID-19 patients of Puttur taluk by the district administrative/health authorities.

Puttur Taluk is part of Dakshina Kannada district, located in Karnataka, a southern state in India. As per the Census of India, 2011 Puttur has a total population of 287,851 with majority of the population residing in rural areas (78.9%) (14). The health care for the taluk is provided by 14 government health centres.

As per the guidelines issued by Government of India, once a person is diagnosed with COVID-19 the decision as to whether to isolate and care for an infected person at home depends on the following three factors:

- (a) Clinical evaluation of the COVID-19 patient,
- (b) Evaluation of the home setting and
- (c) The ability to monitor the clinical evolution of a person with COVID-19 at home.

Operational definition of category I COVID-19 patients - Asymptomatic / mild symptomatic who are above the age of 45 years with/without comorbidities.

The following were considered as red flag signs and symptoms for immediate referral and medical intervention (12)

- (a) Difficulty in breathing
- (b) Dip in Oxygen saturation (SpO_2 below 95% in room air)
- (c) Persistent pain/pressure in the chest
- (d) Mental confusion or inability to arouse

Team comprising of 09 faculty from medical (Department of Community Medicine) and dental colleges (Department of Public Health Dentistry), 04 post-graduates (Department of Community Medicine), 02 medico-social workers and 40 medical/dental interns was formed for the task. The team members in collaboration with the PHC team allotted for the day, visited the houses of COVID-19 patients and evaluated the patients from 15 May 2021 to 31 May 2021.

Study design

Cross-sectional study with universal sampling.

Inclusion criteria

All COVID-19 home isolation patients with above 45 years of age, with or without co-morbidity and those below 45 years of age with known co-morbidity.

Exclusion criteria

All COVID-19 patients below 45 years with no known comorbidity.

The following services were provided by the visiting team:

- History taking
- Screening for red flag signs/symptoms
- General physical and systemic examination
- Checking Blood pressure, GRBS and SPO_2
- Education of patients and family members regarding COVID appropriate behaviour
- Referral if needed

The data was entered in google forms and exported to MS excel master sheet. Statistical analysis was performed using SPSS software version 22. Categorical data are presented as percentage (%). Qualitative variables are analysed using Pearson's chi-square test and Fisher exact tests.

Ethical clearance

Ethical clearance has been obtained from the institutional ethics committee.

RESULTS

A total of 112 COVID-19 patients were in home isolation during the study period in Puttur Taluk. Our team visited all 112 households and examined the home isolated patients. Majority (58.9%) of the study subjects were elderly (≥ 60 years) and nearly two-third (68.8%) possessed APL ration cards (table 1). More than three-fourth (75.9%) of the COVID-19 patients did not receive even a single dose of COVID-19 vaccine.

Table 1: Sociodemographic characteristics of study subjects

	Frequency	Percentage
Age group		
< 60 years	46	41.1
≥ 60 years	66	58.9
Gender		
Male	62	55.4
Female	50	44.6
Ration card		
APL (Above poverty line)	77	68.8
BPL (Below poverty line)	35	31.2
Vaccination status		
Fully vaccinated	6	9.5
Partially vaccinated	21	33.3
Not vaccinated	85	75.9
Total	112	100

Hypertension (29.5%) was the most common comorbidity followed by diabetes mellitus (20.5%) and nearly two-fifths (41.1%) of the study participants had one or more comorbidities (table 2). Fever was the most common symptom (33.0%) followed by

cough and fatigue (31.3%). Six patients (5.4%) had oxygen saturation below 95% and three (2.7%) patients had breathlessness. Overall, 13.4% of study participants were referred to higher centres for further management.

Table 2: Comorbidities, symptoms and oxygen saturation among study subjects

	Frequency	Percentage
Comorbidity		
Hypertension	33	29.5
Diabetes	23	20.5
Cardiac diseases	3	2.7
Renal diseases	3	2.7
Cancer	2	1.8
Chronic respiratory illness	1	0.9
Others	2	1.8
No comorbidity	66	58.9
One comorbidity	28	25.0
Two or more comorbidities	18	16.1
Diabetes status (n=23)		
Under control	11	47.8
Not under control	12	52.2
Hypertension (n=33)		
Under control	20	60.6
Not under control	13	29.4
Symptoms		
Fever	37	33.0
Cough	35	31.3
Fatigue	34	30.3
Decreased smell	25	22.3
Decreased taste	25	22.3
Body pain	20	17.9
Headache	13	11.6
Diarrhoea	11	9.8
Breathlessness	3	2.7
Oxygen saturation		
≥ 95%	106	94.6
< 95 %	6	5.4
Referred to higher centre for further management	15	13.4

Out of 112 patients who were in home isolation, 63 were category I patients. About half the COVID-19 category I patients in home isolation were symptomatic irrespective of age or gender (table 3).

Almost two-third (63%) of the patients with comorbidities were symptomatic compared to only 29.4% of patients without any comorbidities and the finding was found to be statistically significant (p

value - 0.017). Approximately two-third (63.9%) of patients who did not receive even a single dose of COVID-19 vaccine were symptomatic compared to only two-fifth (40.7%) of patients who were vaccinated, however the finding was not found to be statistically significant (p value - 0.068). Most of the home isolated category I patients (90.5%) had oxygen

saturation of 95% or more. Of the six patients who had saturation of less than 95% five were more than 60 years of age, only one had received vaccination against COVID-19 and all six cases had one or more comorbidities.

Table 3: Distribution of category I patients based on symptoms and oxygen saturation

Factors	Symptoms among study subjects (%)			p value
	Absent	Present	Total	
Age				
< 60 years	12 (46.2%)	14 (53.8%)	26 (100%)	0.987
≥ 60 years	17 (45.9%)	20 (54.1%)	37 (100%)	
Gender				
Female	12 (42.9%)	16 (57.1)	28 (100%)	0.651
Male	17 (48.6%)	18 (51.4%)	35 (100%)	
Comorbidities				
Absent	12 (70.6%)	5 (29.4%)	17 (100%)	0.017*
Present	17 (37.0%)	29 (63.0%)	46 (100%)	
Vaccination status				
Not vaccinated	13 (36.1%)	23 (63.9%)	36 (100%)	0.068
Received at least one dose	16 (59.3%)	11 (40.7%)	27 (100%)	
Total	29 (46.0%)	34 (54.0%)	63 (100%)	
	Oxygen saturation (%)			
	<95%	≥95%	Total	p value
Age				
< 60 years	1 (3.8%)	25 (96.2%)	26 (100%)	0.387
≥ 60 years	5 (13.5%)	32 (86.5%)	37 (100%)	
Gender				
Female	2 (7.1%)	26 (92.9%)	28(100%)	0.684
Male	4 (11.4%)	31 (88.6%)	35 (100%)	
Vaccination status				
Not vaccinated	5 (13.9%)	31 (86.1%)	36 (100%)	0.226
Received at least one dose	1 (3.7%)	26 (96.3%)	27 (100%)	
Comorbidities				
Absent	0	17 (100%)	17 (100%)	0.178
Present	6 (13.0%)	40 (87.0%)	46 (100%)	
Total	6 (9.5%)	57 (90.5%)	63 (100%)	

A feedback survey was conducted among team members to explore the barriers/challenges and facilitators for on ground implementation of the

programme. Few of the important challenges and advantages of the programme as obtained from the implementing health team are mentioned in table 4.

Table 4: Barriers/challenges and facilitators for on ground implementation of HBCP

Barriers/challenges	Facilitators
1. Duplication of work (ASHA workers already monitoring patients)	1. Better patient care – Early diagnosis of complications and referral, avoids unnecessary travel to hospital
2. Hesitancy among government staff to work along with faculty from private institute	2. Helpful in conveying health information to community and better acceptance from the public
3. Bad weather conditions and long travel time – from parent institute and also within the villages (as houses were spread-out)	3. Better understanding about problems of patients and health care workers in the community
4. Risk of exposure – team members were not able to wear full PPE in the community	4. Improvement in communication skills and better understanding about COVID home based management
5. Lack of resources, time constraints and coordination in health centres	5. Useful for patients below poverty line to get health services at door steps

Though the orders were issued by the district authorities there was a bit of hesitancy at a few places among government health staff for working with private institutes. There were occasions wherein the team reached the specified health centre/village but the government health staff were not aware of the visit or they did not have the list of home isolation patients ready. Team members risked the exposure to COVID as they could not be in full PPE because of long distances between the houses and hard to reach areas with minimal connectivity by road. Interns and post-graduates who were part of the team got first-hand experience about the Home-Based Care Programme and also helped in better communication of health information regarding COVID-19 to the community. The HBCP was especially helpful for patients below poverty line as the health services were provided at the doorstep during the time of restriction of movement and lack of proper employment.

DISCUSSION

The home-based care programme (HBCP) for patients with COVID -19 was implemented as part of management of asymptomatic and mild cases of COVID-19. In the present study 46 (41.1%) study subjects had at least one comorbidity with 18 (16.1%) having two or more comorbidities. Hypertension was the most common comorbidity (29.5%) followed by diabetes mellitus (20.5%). The findings were similar to the study conducted by Murarkar *et al.*, (15) but the prevalence is comparatively higher in our study. This may be because of the relatively higher age among study subjects. Banke *et al.*, in a retrospective study in Delhi also observed that hypertension has the most common comorbidity with 37% of study participants having been diagnosed with hypertension (16). Fever followed by cough and fatigue were the most common symptoms in our study which is comparable to the study done by Guan *et al.*, (17) on 11,791 patients from different regions of China. Tambe et al also observed that fever and cough were the most common symptoms in laboratory-confirmed COVID-19 cases (18).

Age and gender did not have any significant impact on signs and symptoms in COVID-19 patients similar to the study done by Masud *et al.*, (19). In the present study it was observed that COVID-19 patients with comorbidities were more likely to be symptomatic and having lower oxygen saturation, analogous to the findings in study conducted by Guan *et al.*, (17). Vaccination was found to have a positive impact on the overall health of study subjects as patients who had received at least one dose of vaccine against COVID-19 were found to be less symptomatic (40.7% in vaccinated cases versus 63.9% in unvaccinated cases) and only one among 27 vaccinated patients (3.7%) had oxygen saturation below 95% compared to 13.9% in non-vaccinated group. Study carried out by Pramod *et al.*, (20) also observed that symptoms were

comparatively lower in cases who had received at least one dose of COVID-19 vaccine (20.2%) when compared to unvaccinated cases (59.6%). Contrary to this were the findings in a study conducted by Balachandran *et al.*, wherein the authors observed that vaccinated patients were more symptomatic, however they also observed that ICU admissions and severity of illness was relatively less in vaccinated individuals (21).

The present study is the first in providing an insight about barriers and advantages of on ground implementation of home-based care programmes from healthcare workers point of view. Timely information regarding the visits by HBCP team with prior line listing of home isolation patients will help in better utilization of health care staff. There is need for better planning before on ground implementation regarding the availability of resources and means to supplement / optimize the utilization and avoid duplication of work. The government healthcare staff can be addressed in advance regarding the facilitatory work planned in coordination with private health institutes so that there is better cooperation in achieving a common goal.

CONCLUSION

Overall, though the programme increases the burden of the government because of the additional requirement of manpower, material and time and also there is duplication of work to certain extent but the programme helped in early identification of high-risk cases and prompt referral (13.4%) to higher medical echelons in a timely manner which otherwise would have gone for further complications leading to increased morbidity and mortality. Home based care programmes are a useful initiative especially for patients of low socio-economic status living in hard-to-reach areas. With availability of adequate manpower, PPE and other resources for conveyance, HBCP can be implemented at larger scale in management of COVID pandemic. This can be an important tool in managing future outbreaks and also help in restricting the extent of spread of disease by preventing unnecessary movement of the infected patients.

CONFLICT OF INTEREST

Authors have no conflicts of interest to declare.

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