



ORIGINAL RESEARCH PAPER

Education

TRACKING THE MORBIDITY, MORTALITY AND QUALITY OF LIFE OF COVID-19 DISCHARGED PATIENTS FROM A TERTIARY CARE HOSPITAL IN NATIONAL CAPITAL REGION, INDIA

KEY WORDS: Post Covid Syndrome, Long Covid, Morbidity, Covid Convalescence, Mortality, Discharge

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ABSTRACT

Background and Objectives: Post-covid syndrome is a conglomerate of medical signs and symptoms that develop and persist beyond 12 weeks of an infection consistent with covid-19.
Materials and methods: A follow-up cohort study was conducted at a tertiary hospital in Delhi area, evaluating patients discharged after hospitalization for Covid in the first wave (March –September 2020). A single structured telephonic interview, and, a follow up at four months (by record review in the electronic-Hospital Information System (e-HIS)) was used to evaluate morbidity and mortality.
Results: Of the 4415 patients discharged after the first wave, 2181 responded to the telephonic interview. Overall mortality within 4 months was reported at 11%. 40.2% patients reported health issues of which cognitive issues (29.7%) and physical complaints (20.9%) were frequent. The commonest physical complaints were general (20.9%), respiratory (13.9%) followed by dermatologic (6.5%) and cardiac (5.9%). 35% were unable to re-join work and 18.1% felt the work efficiency was effected. 62.1% of the responders re- visited for consultations and 7.8% required re-hospitalisation.
Conclusion: There is high medium term mortality and morbidity after discharge from an index hospitalization due to Covid-19. There is need for continuous monitoring (especially cardiac and respiratory), and psychological counselling after discharge of patients of Covid-19 disease.

Background:

The Covid pandemic continues to pose a major threat, not only with the various waves of acute illnesses, but also with post Covid syndrome or long Covid. Post-covid syndrome, is not a singular condition, it is defined by the National Institute for Health and Care Excellence (NICE) as “signs and symptoms that develop during or after an infection consistent with covid-19 which continue for more than 12 weeks and are not explained by an alternative diagnosis¹.” There are reports of persistent physical, medical and cognitive sequelae in people who have been discharged after COVID-19 hospitalization from all over the world²⁻⁴.

There is no specific treatment of the post covid syndrome. The management is focused on reassurance, self-care, and symptomatic control. With the cohort of Covid-19 survivors increasing, continued monitoring after discharge for long-lasting effects will be needed⁵.

The first wave of Covid-19 impacted the National Capital

region of India in March – September 2020. No studies have been published from India with the purpose of determining follow-up health of Covid-19 discharged patients. A follow-up study was undertaken at our tertiary care hospital (it was defined as Covid care hospital by the Government mandate, for the duration of the first wave) focusing on discharged patients with a Covid-19 index admission.

Methodology:

An Ethics Committee approved protocol was used to establish a cohort of patients who had been discharged from Medanta after treatment for an index Covid-19 hospitalization, in March –September 2020.

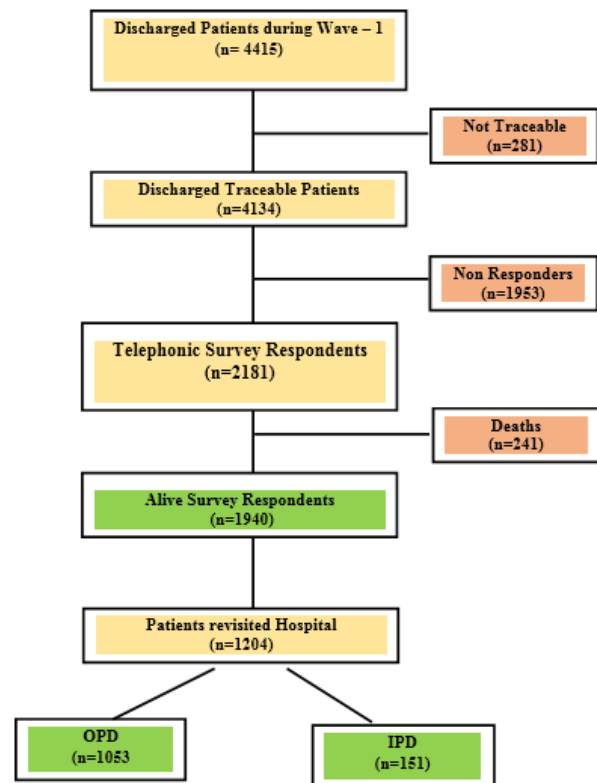
The identity of these patients was noted from the electronic-Hospital Information System (eHIS) data base of all hospitalized patients during the first wave. Each patient has a Unique Hospital Identifier (UHID) linking all episodes of exposure to healthcare services being offered by the hospital. Upon identification of the patients, a telephonic interview was

attempted using a structured questionnaire. The questionnaire is a modified SF 36 for Health-Related Quality of Life (HRQOL) focusing on Post COVID-19 recovery⁶ covering three domains: demographic data (age, gender and working status); health conditions (physical, clinical and cognitive) and Quality of Life. Site specific questions were generated in consultation with the medical and research experts. Translation of the questionnaire from the English version into Hindi and back translation to English was done in accordance with standard research protocols. Pilot testing of questionnaires was conducted on a set of 30 dummy participants.

A team of ten Clinical Research Coordinators (CRC), was trained in the conduct of this questionnaire on a phone call. Patients were explained the purpose of study. After obtaining consent, the telephonic interview was conducted with patients (or care givers). If any phone was not answered, two further attempts were made to call the number/alternative number (from the hospital records). After three failed attempts by one CRC, one final attempt was made by an alternative CRC, after which it was noted as non-responder. We additionally noted follow up outpatient (OPD) consultation or re-hospitalisation (In-patient admission) for this cohort via the e-HIS. The data collected was transferred into an Excel spreadsheet for analysis, including demographic profiling of patients. Detailed analysis was undertaken on health conditions and quality of life after discharge. The analysis has been undertaken using SPSS software, Version 24.0.

Flow chart 1 presents the details of study participants along with sample size.

Flow chart 1:



RESULTS:

Comparison of Cohorts:

The study included the following cohorts:

- a) Respondents of the telephonic survey after the discharge of a hospitalization due to Covid - 19 (index event) (n=2181)
- b) Patients who revisited for Outpatient consultation(OPD)

(in person or on teleconsult) after the index event (n=1053)

- c) Patients readmitted (Inpatient Department ,IPD) after index event (n=151)

Table 1: Comparison of Baseline characteristics of discharged Covid - 19 Study subjects (index event)

	Overall Discharged Patients (n=4415)	Telephonic Survey responders (live) (n=1940)	Revisit at OPD (n=1053)	Re-hospitalized (IPD) (n=151)
Age (Years) n (%)				
< 18	37 (0.8%)	15 (0.8%)	6 (0.6%)	2 (1.3%)
18 - 30	354 (8.0%)	124 (6.4%)	83 (7.9%)	6 (4.0%)
31 - 40	492 (11.1%)	231 (11.9%)	123 (11.7%)	13 (8.6%)
41 - 50	748 (16.9%)	346 (17.8%)	189 (17.9%)	24 (15.9%)
51 - 60	1068 (24.2%)	503 (25.9%)	293 (27.8%)	34 (22.5%)
61 - 70	1031 (23.4%)	430 (22.2%)	219 (20.8%)	36 (23.8%)
> 70	685 (15.5%)	291 (15%)	140 (13.3%)	36 (23.8%)
Gender n (%)				
Male	3154 (71.4%)	1401 (72.2%)	776 (73.7%)	103 (68.2%)
Female	1261 (28.6%)	539 (27.8%)	277 (26.3%)	48 (31.8%)
Severity n (%)				
Severe	1477 (32.7%)	463 (23.9%)	235 (22.3%)	93 (61.6%)
Non Severe	2938 (67.3%)	1477 (76.1%)	818 (77.7%)	58 (38.4%)

Median age of the studied population in our study was 56 years (IQR: 45-65 years); with 71.4% male population. Table 1 compares the different cohorts vis a vis baseline characteristics. The first three cohorts are similar in baseline characteristics and representative of all Covid-19 discharged patients. However, in the cohort of re-hospitalized patients, there is higher representation of elderly (> 70 years) males.

Table 2: Mortality of Covid-19 discharged patients according to severity during hospitalization (index event):Telephonic survey

	Severe (n=219)	Non Severe (n=22)	Total (n=241)
Mortality n/N (%)	219/682 (32.1%)	22/1499 (1.5%)	241/2181 (11.0%)
Gender n/N (%)			
Male	163/517 (31.5%)	19/1065 (1.8%)	182/1583 (11.5%)
Female	56/164 (34.1%)	3/434 (0.7%)	59/598 (9.9%)
Age (Years) n/N (%)			
< 18	0/5 (0%)	0/10 (0%)	0/15 (0%)
18 - 30	3/16 (18.8%)	0/111 (0%)	3/127 (2.4%)
31 - 40	8/59 (13.6%)	0/180 (0%)	8/239 (3.3%)
41 - 50	32/109 (29.4%)	0/269 (0%)	32/388 (8.2%)
51 - 60	54/171(31.6%)	4/390 (1%)	59/562 (10.5%)
61 - 70	63/178 (35.4%)	13/328 (4%)	76/506 (15%)
> 70	58/143(40.6%)	5/211 (2.4%)	63/354 (17.8%)
Length of stay during index event (Days) (Mean +/-SD)	10.9+/-6.9	6.3+/-3.4	10.5+/-6.8

Mortality:

The findings from the telephonic survey revealed that 11% of

these patients died after discharge for the index event. The mortality rate was very high (32.1%) in those who had a severe index hospitalization (ie were in ICU at any time) as compared to those who were non severe, ie ward admissions

(1.5%). Importantly, the mortality rate showed steady increase with age. However there were no marked differences according to gender. Among those who died, the average length of stay during their index hospitalization was higher.

Table 3: Comparison of health problems and Quality of Life of Covid-19 discharged patients according to severity during index event: Telephonic survey

	Severe (n=463)	Non Severe (n=1477)	Total (n=1940)	p-value
Needed Oxygen support at home since discharged n (%)	48 (10.4%)	49 (3.3%)	97 (5%)	0.0001*
Physical Health Problems n (%)				
Respiratory	83 (17.9%)	186 (12.6%)	269 (13.9%)	0.004*
Cardiac	32 (6.9%)	82 (5.6%)	114 (5.9%)	0.278
Dermatology	19 (4.1%)	61 (4.1%)	80 (4.1%)	0.980
Ophthalmic	14 (3%)	54 (3.7%)	68 (3.5%)	0.519
Experiencing problem during 10 minutes' walk n (%)				
Tiredness	67 (14.5%)	265 (17.9%)	332 (17.1%)	0.084
Breathlessness	91 (19.7%)	206 (13.9%)	297 (15.3%)	0.003*
Weakness	122 (26.3%)	355 (24%)	477 (24.6%)	0.313
Muscular pain	11 (2.4%)	43 (2.9%)	54 (2.8%)	0.541
No limitations experienced	283 (61.1%)	975 (66%)	1258 (64.8%)	0.055
Cognitive Health Problems				
Frequent headaches	38 (8.2%)	99 (6.7%)	137 (7.1%)	0.270
Facing problems in sleep	40 (8.6%)	96 (6.5%)	136 (7%)	0.116
Upset because of something that happened unexpectedly	25 (5.4%)	65 (4.4%)	90 (4.6%)	0.373
Felt nervous and stressed	37 (8%)	89 (6%)	126 (6.5%)	0.134
Not confident to handle personal problems	35 (7.6%)	91 (6.2%)	126 (6.5%)	0.287
Could not cope with things you had to do	54 (11.7%)	156 (10.6%)	210 (10.8%)	0.506
Not able to control irritations in your life	42 (9.1%)	137 (9.3%)	179 (9.2%)	0.895
Angered because of things that were outside of your control	39 (8.4%)	126 (8.5%)	165 (8.5%)	0.942
Quality of Life n (%)				
Joined back work/office	262 (56.6%)	999 (67.6%)	1261 (65%)	0.0001*
Effect on Work efficiency	106 (22.9%)	245 (16.6%)	351 (18.1%)	0.002*
Experienced change in behavior or harassed at work place	28 (6%)	54 (3.7%)	82 (4.2%)	0.026*

* p – value < 0.05, statistically significant

Among severe patients during hospitalization 10.4% needed Oxygen support at home since discharge. The corresponding need for oxygen support was 3.3% for non-severe discharged patients.

Physical Health: As high as about 20.9% reported at least one health problems after discharge. The specific physical health problems reported were respiratory - 14%, cardiac and dermatological – 6.0% and eye related problem - 3.5%. During 10 minutes of walking, weakness was reported by 24.6% followed by tiredness – 17.1% and breathlessness by 15.3%, and, 5.0% patients required oxygen support at home. Persisting muscular pain was reported by 2.8%. The respiratory problem was reported by relatively higher proportion by severe discharged patients as compared to non-severe discharged patients (17.9% vs. 12.6%, p = 0.0001).

Cognitive Health: Cognitive health issues were reported by 29.7% respondents. Significant proportion reported were “not able to cope with the things they were required to do”(10.8%); “not able to control irritation” (9.2%) ; sleep problems (9.2%), had anger issues (8.5%), felt nervous and stressed (8.2%), had headaches (7.1%), were “not confident to handle personal problems”(6.5%) and felt generally upset and anxious (6.0%).

Quality of Life: More than one third (35%) could not re-join work/office, and, 18.1% felt that their work efficiency was effected due to health issues since discharge. About 4.0% felt a change in behaviour of colleagues at work place. The

deterioration in QOL for all three indicators reported more by severe discharged patients as compared to non-severe discharged patients.

The details on number of patients visiting different departments for outpatient consultation are depicted in Graph 1. Major departments visited by these patients were Internal Medicine – 947 (78.1%), Respiratory & Sleep Medicine – 480 (39.6%), Endocrinology – 313 (25.8%) and Cardiology – 183 (14.9%). Other departments visited by these patients were Gastroenterology/GI Surgery/Liver Transplant – 106 (8.8%), Neurology – 89 (7.3%) and Nephrology 79 (6.5%). Importantly, 75.8% of the OPD visits were in person and 24.2% by telemedicine (video or phone).

Graph 1: Details of patients attending different OPD

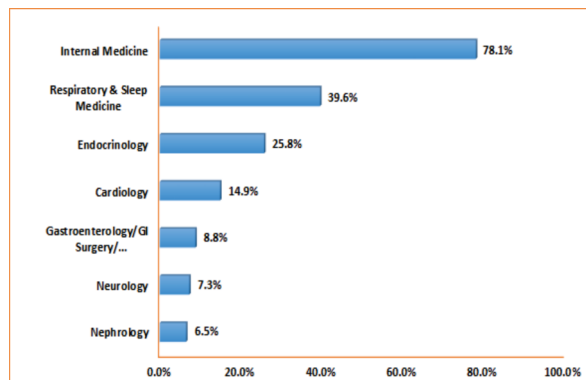


Table 4: Number of Readmissions after index event (n = 151)

Number of Readmissions	Severe (n=93)	Non Severe (n=58)	Total (n=151)
Once only	59 (63.4)	49 (84.5)	108 (71.5%)
Two times	20 (21.5)	3 (5.2)	23 (15.2%)
Three times	10 (10.8)	2 (3.4)	12 (7.9%)
More than three times	4 (4.3)	4 (6.9)	8 (5.3%)

Nearly 37%, of the discharged patients with severe index events needed more than one readmission. However, among the non-severe discharged patients only 15.5% needed more than one readmission.

Table 5: Length of stay of readmitted patients (n = 151)

Number of Readmissions	Severe (n=93)	Non Severe (n=58)	Total (n=151)
LOS during hospitalization	8.6±4.8	6.4±3.2	7.8±4.4
LOS during revisit after discharge	11.1±13.1	6.7±5.3	9.4±11.0

The length of stay for severe readmitted patients was more (11.1 days) as compared to non-severe discharged patients (6.7 days). For the severe patients, the initial LOS during hospitalization was also higher (8.6 days) as compared to the non-severe patients (6.4 days).

DISCUSSION:

This is the first of its kind, post -discharge medium term study of the Covid-19 convalescent first wave patients in the National Capital region of Delhi.

Of the 4415 patients discharged after the first wave, 2181 responded to the telephonic interview. Participants included 1477, who were discharged with moderate disease (ward admission) and 463 with severe disease (ICU admission).

Overall mortality within 4 months was reported at 11%. 40.2% patients reported health issues of which cognitive issues (29.7%) and physical complaints (20.9 %) were frequent. The commonest physical complaints were general (20.9%), respiratory (13.9%) followed by dermatologic (6.5%) and cardiac (5.9%). 35% were unable to re-join work and 18.1% felt the work efficiency was effected. 62.1% of the responders re- visited for consultations and 7.8% required re-hospitalisation.

These trends are similar to a study of 100 first wave survivors from a large University hospital in the UK², but the prevalence seems lower in India. The UK study identified fatigue as the most common reported symptom 72% (ICU group) and 60.3% (ward group). The next common symptoms were breathlessness (65.6% in ICU group and 42.6% in ward group) and psychological distress (46.9% in ICU group and 23.5% in ward group). Sixty percent of the ICU group and 15% of the ward group remained off-sick from work at the point of follow-up in this study. The difference in numbers could possibly be explained by the fact that the median age of the population studied in India was 56 (45-65) years, and in the UK study it was 70.5 (20-93) years. The mortality trends also increased in our study with increasing age and was the highest at 40.6% in males older than 70 years. The re-hospitalization rates in our study were also the highest for the elderly and for those who had a severe index event.

The Italian post covid study of 143 patients⁸ also showed higher fatigue (53.1%), dyspnea (43.4%), joint pain, (27.3%) and chest pain (21.7%) rates then in our study.

A systematic review and meta-analysis of the short- and long-term clinical outcomes after SARS and MERS also suggests similar postdischarge symptoms⁹ of respiratory compromise,

reduced exercise tolerance, PTSD, and reduced QoL as key issues in survivors, which can persist up to 12 months after hospital discharge.

General constitutional symptoms / overlap with body ache, joint pains, cognitive dysfunction, and psychological distress. The prevalence of fatigue in all reports is in keeping with epidemics of various viral flu like fevers such as SARS, H1N1, and Ebola¹⁰. Respiratory complaints including breathlessness at exercise was significantly higher in those who had a severe index event (17.9% vs 12.6%) and is an anticipated symptom that can persist long-term after discharge. Exercise tolerance problems (10 minute walk) is also multifactorial and similar to fatigue. Our study has demonstrated that those needing ICU admission (severe disease) are also more likely to experience an impact on quality of life, work efficiency and are unable to re-join work. This prevalence is comparable to those reported in the meta-analysis where 11% to 45% of survivors reported breathlessness even up to 12 months^{9&4}.

This study found levels of psychological /cognitive health problems to be statistically similar in ICU patients compared to ward patients. This a pattern different from that seen in other studies of survivors of previous coronavirus epidemics⁹. In patients admitted to ICU in this study (ie a severe index event), the mortality rate was very high (32.1%) as compared to those who were non severe, ie ward admissions (1.5%). Importantly, the mortality rate showed steady increase with age. This is in keeping with the well-characterized post-intensive care syndrome in Covid-19¹¹.

The limitations of this study include the fact that there are no controls and evaluation of baseline health (co-morbidities) of these survivors. The study was conducted in a tertiary care centre and does not include patients who were home managed or at quarantine facilities. Further follow up of these patients and comparison with the more morbid second wave of covid is needed to evaluate the long term impact on health. Rehabilitation for covid convalescents should be focussed on respiratory, cardiac and psychological rehab for the long term prevention of morbidity and mortality

CONCLUSION:

There was high medium term mortality and morbidity after discharge from an index hospitalization due to Covid-19. There is need for continuous monitoring (especially cardiac and respiratory), and psychological counselling after discharge of patients of Covid-19 disease.

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