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Post COVID-19 Long Term Effects Persisting More Than 6 Months in Various Age Groups of Indian Population

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Abstract: This study was aimed to investigate the long term change in quality of life post COVID-19 in all age groups from different parts of India. Three different survey methods were used to get in touch with COVID-19 survivors that included offline, online and telecommunication. Data was then categorized into three different categories as mild, severe and critical as per the level of severity of symptoms evaluated post-investigation. Individuals and area was treated as a random effect, with all covariates (age, sex, vaccination status, initial COVID-19 symptoms, level of severity of symptoms, time duration for which the symptoms lasted, post-recovery symptoms persisting more than 6 months, status of booster dose and safety precautions whether taken or not) treated as fixed effects. A total of 2600 individuals from various parts of India i.e. Delhi, Ghaziabad, Faridabad, Dehradun, Bangalore, Rajasthan, Tamil Nadu and Kerala were interviewed during the study. 602 positive cases were found with 255 individuals with mild symptoms, 273 severe symptoms, 72 critical cases and 2 special cases.

Results highlights the influence of COVID-19 on longer run, symptoms may resolve over time however, the influence of health on daily activities, work, and social activities may not. Through this communication we also highlights the fact that though COVID-19 has slowed down its infection rates but still precautions needs to be taken and various social programs should be organized to encourage people for booster dose.

Keywords: COVID-19, Symptoms, Health, Survey, Vaccination, Recovery, Precautions, Health

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Introduction

A bunch of analogous cases of pneumonia were recognized by the Chinese officials on 29th December 2019 in the Wuhan city of China. Soon

the causative agent for these increased incidences of pneumonia was found to be novel coronavirus which was later named SARS COV 2 (Zhu *et al.*,

2020). Coronavirus belongs to a group of viruses which can be commonly found in humans as it causes up to 30% of the common cold. The surface and the shape of this virus resembles a crown under an electron microscope thus it was so named as corona in Latin literally translates to "crown" (Mustafa, 2020). 13th January, 2020 in Thailand and 16th January, 2020 in Japan were among the very first cases of COVID-19 to be found outside China (Cheung, 2020; Walter, 2020). A lockdown was imposed by the Chinese administration on the city of Wuhan along with other cities in the vicinity. Afterwards COVID-19 infected infection cases were reported from more countries and cases started flooding in globally. 3 Indian medical students came back to Kerala from Wuhan on 30th January and all of them were shortly tested positive as they had common symptoms of cold and cough (Andrews *et al.*, 2020). A lockdown was imposed in Kerala on 23 March 2020 and later due to increased positive cases the entire nation was put under lockdown on 25th March 2020.

As far as the origin of this virus was concerned many scientists believed that the seafood market of Wuhan in China was the origin of the virus outbreak and suggested that Chinese patients who had COVID-19 may have consumed either infected animals or food items or might have come in contact with the virus in the market itself but later on after detailed inspection it was found out that a large number of the patients had not even gone closer to the market but still were infected. As a consequence human to human transmission phenomenon came into light. It was confirmed that the transmission of the disease takes place through contact with the respiratory droplets or aerosols released into the air while coughing or sneezing. Since then, every country across the globe started registering a virus spread by aerosol penetration inside the upper respiratory tract and lungs through inhalation which caused an enormous and exponential increase in the number of cases worldwide (Parry, 2020; Riou *et al.*, 2020; Lotfi *et al.*, 2020). A mathematical model was developed to study the SARS-CoV-2 infection and

if it could be controlled by isolating the affected individuals and keeping a track of their exposure to other people (Hellewell *et al.*, 2020). With the help of this model it was found out that isolation and recording contacts of the patients was not enough to prevent the pandemic in a really short period of 3 months as it could lead to a massive slow-down in the beginning of symptoms up to isolation. All of this observation helped in the development of preventive measures which included complete lockdown and immediate isolation.

Besides being worldwide health crisis which resulted in human suffering, worsening human lives and even death. Along with these socio economic effects COVID-19 also caused serious health problems to the masses. Around 55.8 Cr people worldwide were affected with COVID-19, out of which 4.37 Cr cases were from India alone. COVID-19 as a pandemic has taken around 63.6 lakh lives around the world out of which 5.26 lakh deaths occurred in India (Dong *et al.*, 2020). Early and short term symptoms included fever, breathlessness, loss of sense of smell and taste, running nose, hair loss and fatigue which with further severe cases which included acute chest pain, diarrhea etc. In many cases it was observed that these symptoms remained even after the recovery. A number of research findings have postulated about the short term COVID-19 symptoms on quality of life. This research reports the long term symptoms on various age groups that continued for a period more than 6 months among people who have contacted coronavirus at least once.

As of 12th of July 2022, the total COVID-19 cases in India were 43,652,944 with a total of 525,474 deaths (from JHU CSSE COVID-19 Data). Of the total cases, 42,996,427 patients have recovered successfully which indicates a recovery rate of 98.5% in India (from website CoronaTracker) (Dong *et al.*, 2020). Emerging studies have shown that COVID-19 survivors could suffer some long-term symptoms after recovery from the infection itself (Nalbandian *et al.*, 2021;

WHO, 2022). The purpose of this study was to analyze the long term consequences of COVID-19 on patients who got infected by the SARS-CoV-2 in India. Various places in India like Delhi, Ghaziabad, Faridabad, Dehradun, Bangalore, Rajasthan, Tamil Nadu and Kerala were selected for survey and the selection of area was random.

Materials and Methods

Covariates:

Various parameters were noted during the time of survey that included Age Group, Sex, Location (Area), when did individual got infected with COVID-19, number of times infected, self-diagnosed or lab testing for confirmation, status of vaccination at the time of infection, initial symptoms at time of infection, level of severity of symptoms, time duration for which the symptoms lasted, post-recovery symptoms persisting more than 6 months, status of vaccination, status of booster dose whether taken or not and status of COVID-19 precautions taken.

Five categories were selected regarding when did individual got infected with COVID-19 and that included –

- Early 2020 (First wave)
- Late 2020 (Second wave)
- Early 2021
- Late 2021
- Early 2022

Initial symptoms at time of infection with COVID-19 included sore throat, high/continuous fever, headache/bodyache, running nose and any unknown symptom to be stated at time of interview.

Population Age:

To study the effects of COVID-19 long term effects on various age groups, 6 different categories of age were formed. The categories were as follows -

- Below 10

- 10-22
- 23-35
- 36-47
- 48-59
- 60 and above

Individuals tested positive for COVID-19 were eligible for participation in the study.

Data Collection:

For data collection a questionnaire was designed as Google form. Three different survey methods to get in touch with COVID-19 survivors were used as follow :

1. Face -to-face Offline survey
2. Tele communication
3. Online surveys

These different methods were used to get a farther reach to survey takers as well as to increase the sample region of the findings.

- *For face-to-face offline surveys* - Every person met in daily commute routes like at bus stops, metro, markets, grocery shops, residential areas, etc. were surveyed. The purpose of research was explained to people who were interviewed, but most people were reluctant to take part in the survey due to personal reasons.
- *Through telecommunication* - Known COVID-19 survivors of relatives/personal and social contacts in different cities of India were contacted and forms were filled on their behalf.
- *Online survey* – A Google Form was circulated by means of social media like Facebook, WhatsApp and Emails. The link to the Google Form was further forwarded by our teachers, colleagues, friends to their acquaintances and friends.

The data from all survey methods was compiled into an online form to get a systematic and statistical representation of the data received.

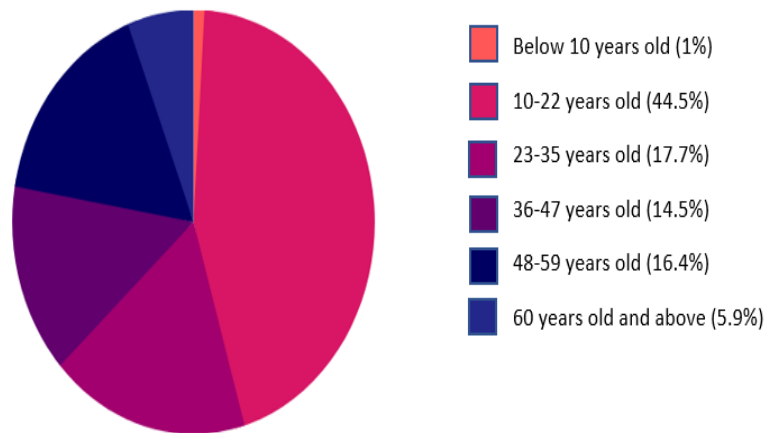


Fig. 1: Pie chart showing various age group participation in present study.

All the data that was collected was only after affirmation from the survey participants. The data was handled with utmost respect to the privacy of all participants and confidentiality of the data was maintained.

Statistical Analysis:

Descriptive statistics were performed to summarize sample characteristics for the population with COVID-19 positive results. Outcomes were treated separately since each is a distinct construct with a validated scale used for measurement.

Results

In total 2600 individuals were interviewed during the survey out of which 602 were COVID-19 positive which sums the positivity rate of people under study to 23.15%. All cases reported in this text highlights long term post COVID-19 symptoms that persisted for more than 6 months till today in individuals. Various age groups (Fig. 1) participated in survey that sums the count of below 10 age group --1%, 10-22 age group--44.5%, 23-35 age group-- 17.7%, 36-47 age group--14.5%, 48-59 age group --16.4% and 60 above age group-- 5.9%. Figure 2 depicts the various age

group participation in present study. Based upon the severity of symptoms further three categorizes were formed i.e. Mild, Severe and Critical. Figure 2 depicts the incidences of symptoms with number of cases investigated.

255 individuals (9.8%) were affected with mild symptoms, 273 (10%) had severe symptoms, 72 (2.72%) critical symptoms and 2 (0.08%) special cases were also reported during the present study. Upon analysis it was found that mild symptoms included cough, fever, fatigue, body ache, weight gain, concentration difficulty, memory loss, loss of smell and taste and leg pain for almost an year. Severe symptoms were ankle pain, weakened immune system, chest pain, low hemoglobin, skin pigmentation, depression, breathlessness, lung infection, hair loss, insomnia, anxiety and allergy to dust. Critical cases include complete baldness, skin burn, uncontrolled diabetes, kidney failure, heart attacks, gall bladder stones, internal bleeding, persistent and frequent typhoid, calcium deficiencies, swelling, joint pains, cardiovascular issues, digestion problems, liver ailments. Table 1 shows the percentage of occurrence and frequency of symptoms. Two special cases were found during study that includes infection of infant baby that had COVID-

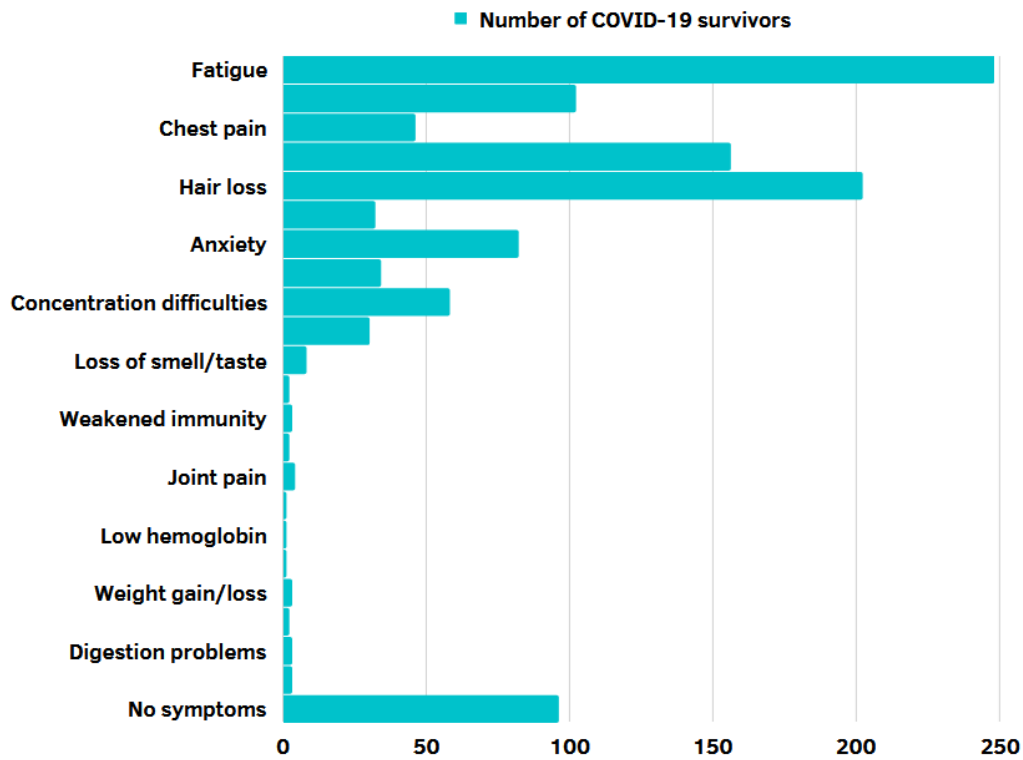


Fig. 2: Incidences of symptoms with number of cases investigated.

Table 1: Sample characteristics for participants who tested positive for COVID-19 with post symptoms exceeding 6-month assessment (n=2600) with persisting symptoms, frequency and percentage of occurrence.

Symptoms	Frequency	Percentage of occurrence
<i>Fatigue</i>	248	39.55%
<i>Breathlessness</i>	102	16.26%
<i>Chest pain</i>	46	7.33%
<i>Body ache</i>	156	24.88%
<i>Hair loss</i>	202	32.21%
<i>Depression</i>	32	5.10%
<i>Anxiety</i>	82	13.07%
<i>Memory loss</i>	34	5.42%
<i>Concentration difficulties</i>	58	9.25%
<i>Insomnia</i>	30	4.78%
<i>Loss of smell/taste</i>	8	1.27%
<i>Diabetes</i>	2	0.31%
<i>Weakened immunity</i>	3	0.47%
<i>Dust allergy</i>	2	0.31%
<i>Joint pain</i>	4	0.63%
<i>Pigmentation on skin</i>	1	0.15%
<i>Low hemoglobin</i>	1	0.15%
<i>Heart problems</i>	1	0.15%
<i>Weight gain/loss</i>	3	0.47%
<i>Liver ailments</i>	2	0.31%
<i>Digestion problems</i>	3	0.47%
<i>Respiratory infections</i>	3	0.47%
<i>No symptoms</i>	96	15.31%

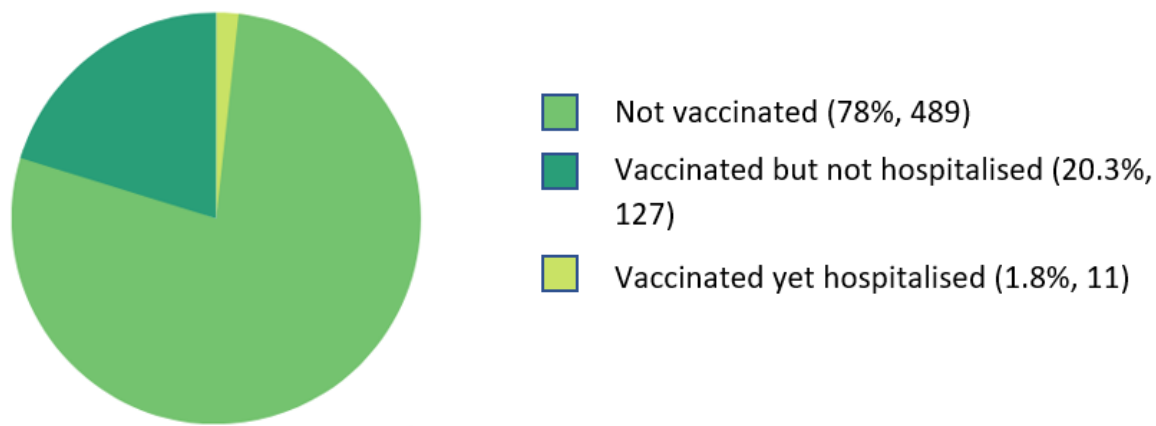


Fig. 3: Status of vaccination during infection with COVID-19.

19 at time of birth but neither of the parents of baby was infected. Baby recovered from COVID-19 after 22 days.

Status of vaccination was also analyzed during the period of infection with COVID-19 and it was observed that 78% of people under study were not vaccinated (n=489), 20.3% were vaccinated but not hospitalized during infection (n= 127) and only 1.8% individuals were vaccinated at time of infection but still were hospitalized due to severe symptoms. Figure 3 highlights the status of vaccination during infection with COVID-19.

WHO and doctors have worldwide recommended that booster dose needs to be taken to strengthen the immune system and precautions needs to be taken till there is a cure. But during this study it was found that out of 2600 people interviewed only 800 had taken the booster dose. Same was observed with the precautions only 20% (n= 520) individuals are still following the COVID norms and safety precautions. The study also aims to highlight this serious concern and demand for large level advertisements and awareness for booster doses and safety precautions.

Discussion

In this study, long term symptoms of COVID-19 on the quality of life on various age groups in India has been studied and analyzed. Results suggested

that COVID-19 has caused a devastating effect not only on the socio economic parameters of the world but also disturbed the physical health-related quality of life. Out of total 2600 individuals 602 were COVID-19 positive whose symptoms ranging from mild to critical. In this study 255 individuals (9.8%) were affected with mild symptoms, 273(10%) had severe symptoms, 72 (2.72%) critical symptoms and 2 (0.08%) special cases. During the study the status of booster dose and precautions taken by people i.e. wearing mask and using sanitizers was also assessed and analyzed.

These results add to the growing number of studies that highlight the long-term symptoms and effects of COVID-19 on survivors (Nalbandian *et al.*, 2021; Lopez-Lian *et al.*, 2021). A recent systematic review and meta-analysis showed that the five most common symptoms are fatigue (58%), headache (44%), attention disorder (27%), hair loss (25%), and dyspnea (24%) with follow-up time ranging from 15 to 110 days post-infection (Poudel *et al.*, 2021). Only a few studies have assessed the long-term effects on quality of life, psychological distress, and perceived stress.

Given this dismal data on the post-discharge outcomes of other groups of coronavirus infections, our study emphasis on ongoing long term clinical symptoms. Longer follow-up will be needed to assess longer-term changes, for

example, to determine if improvements in physical health-related quality of life and perceived stress are maintained over time, or if mental health-related quality of life and psychological distress do improve with longer follow-up. These results suggested that though the life threatening incidences and symptoms of COVID-19 has slowed down but still its transmission rate is same and precautions need to be taken out till there is a permanent cure for it.

Conclusion

Our survey-based, longitudinal study of all age group individuals diagnosed with COVID-19 showed persisting long term effects of more than 6 months to 1 and 1.5 years. Our study adds to the growing body of literature on the long-term effects of COVID-19 and contradicts many studies by showing some improved long-term outcomes. Clinicians should consider assessment of long-term outcomes, particularly for vulnerable populations found to have lower quality of life. Further research with a larger cohort and longer-term follow-up is needed to identify if more symptoms are found in people disturbing physical health-related quality of life or mental health-related quality of life. The current study provided helpful information to clinicians caring for COVID-19 survivors and policy makers to gauge and address the long-term impact of COVID-19 and highlight the importance of taking both booster dose and precautions to be followed until there is a permanent cure for the disease.

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References

- Andrews MA, Areekal B, Rajesh KR, Krishnan J, Suryakala R, Krishnan B, Muraly CP and Santhosh PV. (2020) First confirmed case of COVID-19 infection in India: A case report. *Indian J Med Res.* 151(5): 490-492.
- Cheung, Elizabeth (2020) Thailand confirms first case of Wuhan virus outside China. *South China Morning Post* (13 January 2020).
- Dong E, Du H and Gardner L. (2020) An interactive web-based dashboard to track COVID-19 in real time. *Lancet Inf Dis.* 20(5): 533-534.
- Hellewell J, Abbott S, Gimma A, Bosse NI, Jarvis CI, Russell TW, Munday JD, Kucharski AJ and Edmunds WJ. (2020) Centre for the Mathematical Modelling of Infectious Diseases COVID-19 Working Group, Funk S, Eggo RM. Feasibility of controlling COVID-19 outbreaks by isolation of cases and contacts. *Lancet Glob Hlth.* 8(4): e488-e496.
- Lopez-Leon S, Wegman-Ostrosky T, Perelman C, Sepulveda R, Rebolledo PA, Cuapio A and Villapol S. (2021) More than 50 Long-term effects of COVID-19: a systematic review and meta-analysis. *Sci Rep.* 11(1): 16144.
- Lotfi M, Hamblin MR and Rezaei N. (2020) COVID-19: Transmission, prevention, and potential therapeutic opportunities. *Clin Chim Acta* 508: 254-266.
- Mustafa N. (2020) Research and Statistics: Coronavirus Disease (COVID-19). *Int J Hlth Res.* 10: 1-20.
- Nalbandian A, Sehgal K, Gupta A, Madhavan MV, McGroder C, Stevens JS, Cook JR, Nordvig AS, Shalev D, Sehrawat TS, Ahluwalia N, Bickdeli B, Dietz D, Der-Nigoghossian C, Liyanage-Don N, Rosner GF, Bernstein EJ, Mohan S, Beckley AA, Seres DS, Choueiri TK, Uriel N, Ausiello JC, Accili D, Freedberg DE, Baldwin M, Schwartz A, Brodie D, Garcia CK, Elkind MSV, Connors JM, Bilezikian JP, Landry DW and Wan EY. (2021) Post-acute COVID-19 syndrome. *Nat Med.* 27(4): 601-615.
- Parry J. (2020) China coronavirus: cases surge as official admits human to human transmission. *BMJ.* 368: m236.
- Poudel A, Zhu S, Cooper N, Roderick P, Alwan N, Tarrant C, Ziauddeen N and Yao GL. (2021) Impact of COVID-19 on health-related quality of life of patients: A structured review. *PLoS One* 16(10): e0259164.
- Riou J and Althaus CL. (2020) Pattern of early human-to-human transmission of Wuhan 2019 novel coronavirus (2019-nCoV), December 2019 to January 2020. *Euro Surveill.* 25(4): 2000058.
- Walter S. (2020) Japan confirms first case of infection from Wuhan coronavirus; Vietnam quarantines two tourists. *The Straits Times*, 16 January 2020.
- World Health Organization (WHO). Coronavirus disease (COVID-19): Post COVID-19 condition. [https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-\(covid-19\)-post-covid-19-condition](https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-(covid-19)-post-covid-19-condition)
- Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, Zhao X, Huang B, Shi W, Lu R, Niu P, Zhan F, Ma X, Wang D, Xu W, Wu G, Gao GF and Tan W. (2020) A Novel Coronavirus from Patients with Pneumonia in China, 2019. *N Engl J Med.* 382(8): 727-733.