

Prevalence of Post-Covid Syndrome among Affected Individuals- A Cross Sectional Study

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Abstract:

Background: Post-COVID conditions are a wide range of new, returning, or ongoing health problems people may experience four or more weeks after initial infection with COVID-19 which has shown to affect the quality of life of affected individuals.

Methodology: A cross-sectional study was conducted between 1st September 2021, and 28th February 2022 among 500 patients who visited Family Health Centre, Mazhuvannur, Kerala for various treatments who were already diagnosed with acute covid infection preceding 6 weeks.

Results: Out of the 500 participants included in the study, 296 reported at least one post-COVID symptom. The mean age was 47.46 ± 17.20 (18-90) in which 42.57% were male and 57.43% were female. Among the 89.15 % vaccinated individuals, 55.89% availed vaccination prior to infection and 44.11 % post infection. Most prevalent post-COVID symptoms reported were fatigue (31%), dizziness on standing (29.6%), symptoms that get worse after physical activity (25%), cough (21.4%), headache (13.4%). Out of 296 individuals, 174 patients (69.7 %) underwent treatment for post-COVID symptoms and 121 (59.1%) reported improvement on receiving treatment.

Conclusion: Post COVID syndrome affects the quality of life of individuals. In the present study, it is concluded that age, habits (smoking, tobacco chewing, alcoholism) and co-morbid diseases are critical risk factor for the development of post-COVID syndrome and it also influences the post-COVID treatment outcome.

Keywords: Post COVID syndrome, COVID 19.

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Introduction

The disease COVID-19 is brought by a novel coronavirus viz SARS-CoV-2. Followed by a report of cluster of cases of "viral pneumonia" in Wuhan, China, WHO first proclaimed this new corona virus infection as a pandemic on December 31st, 2019.¹ Fever, cough, dyspnea, fatigue, muscular or body aches, headaches, loss of taste or smell, sore throat, congestion or runny nose, nausea or vomiting, and diarrhea are the most common symptoms.²

People with various degrees of acute SARS-CoV-2 infection including those who had moderate or asymptomatic, can develop post-Covid syndrome which includes a wide variety of symptoms and clinical abnormalities. This illness is frequently referred to as long COVID by patient advocacy groups. Post-COVID conditions, as defined by the CDC, are a variety of new, returning, or ongoing health problems that people can experience four or more weeks after being infected with the virus that causes COVID-19. The signs and symptoms of post- COVID syndrome is learnt to be linked with the following clinical findings³.

- ◆ Fatigue
- ◆ Difficulty thinking or concentrating (sometimes referred to as "brain fog")
- ◆ Difficulty breathing (with and without abnormal imaging and pulmonary function testing)
- ◆ Cough
- ◆ Painful joints or muscles
- ◆ Chest pain
- ◆ Depression or anxiety
- ◆ Headache
- ◆ Fever
- ◆ Palpitations
- ◆ Loss of smell or taste
- ◆ Dizziness on standing

The study is to determine the prevalence of post- COVID syndrome among the affected individuals and how it affects their quality of life.

Materials and Methods

Study design and participants

This cross- sectional study was conducted between 1st

September 2021 and 28th February 2022 among the patients diagnosed with COVID 19 disease, who visited Family Health Centre in Kerala. Participants above the age of 18 who agreed to use their personal health data for research purpose. The institutional human ethical committee of Annoor Dental College and Hospital, Muvattupuzha, Kerala, granted ethical clearance for conducting this research (021-B/13).

An unique questionnaire was formulated in English and in vernacular (Malayalam) to ascertain the patient's current health plight and any persisting symptoms that they may be experiencing after COVID-19 infection. 500 people who infected with COVID-19 at least six weeks prior to the survey were included in the study since it is imperative to determine the prevalence of post-COVID syndrome. Trained personnel filled out the questionnaire. After receiving consent, the participants of the survey were quized and the data collected from them was analysed dialectically by a study member besides the person who executed the research.

Content of survey

Age, sex, vaccination history, time of covid infection, socio-economic scenario, quality of life, life style history such as tobacco abuse and alcoholism, presence of persistent symptoms of COVID, co-morbid diseases such as diabetes, hypertension, cerebrovascular diseases etc. and the effectiveness of post-covid treatment was covered by the questionnaire.

The following post-COVID symptoms such as fatigue, difficulty in thinking and concentration, headache, joint or muscle pain, tachycardia, breathing difficulty / shortness of breath, cough, stomach pain, depression / anxiety sleeplessness, fever, dizziness on standing, symptoms that get worse after physical activity, diarrhoea, fluctuations in smell, taste, and menstrual cycle were analysed. The number of days patients abstained from regular work, daily activity performance status of the patients, job loss, efficacy of post- COVID treatment was evaluated to assess as to how post- COVID syndrome affected the quality of life.

Statistical analysis

Chi-square test was used to find the association between two independent variables. Statistical analysis was done by using SPSS version 26.

Results

Characteristics of survey cohort

During the study period, survey was performed among 500 individuals who survived COVID-19. Out of 500, at least 296 persons reported to have post- COVID symptoms and they were included in the study.

The mean age was 47.46 ± 17.20 (18–90). Of the participants, 42.57% were male and 57.43% were female.

Vaccination status : 89.15 % were vaccinated out of which 55.89% took vaccination before and 44.11 % after COVID infection.

Habits: Out of 500 covid affected individuals ,15.54 % tobacco smokers, 2.36 % tobacco chewers and 13.57% alcoholics were affected by post- COVID syndrome.

Co-morbid diseases: Out of 296 patients affected by post- COVID syndrome, 18.96 % were diabetics, 1.35% malignant, 18.58 % hypertensives, 5.07 % allergic, 5.7% with cardiovascular infirmities and 6.8 % with asthma/ COPD.9*

Prevalence of post- COVID symptoms among various groups

Most prevalent post – COVID symptoms reported were fatigue (31%), dizziness on standing (29.6%), symptoms that get worse after physical activity (25%), cough (21.4%) and headache (13.4%).

Post-COVID treatment outcome

Out of 296 individuals affected with post-COVID syndrome 174 patients (69.7 %) underwent treatment for post- COVID symptoms and 121 (59.1%) patients reported improvement on receiving treatment

Assessment of quality of life of individuals affected with post-COVID syndrome

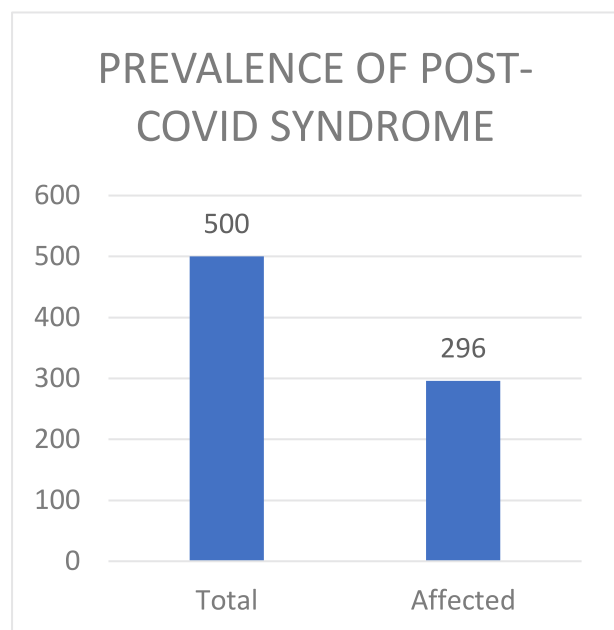
64.19 % patients were employed and 34.21 % were not able to pursue their job after getting infected with post-COVID syndrome and 45.95% affected individuals had to reduce/ avoid daily activities for an average of 9.02 ± 7.65 weeks.

Discussion

Prevalence of post covid syndrome among different groups

In the present study, we assessed the prevalence of the post-COVID syndrome in 500 individuals recovered from acute COVID-19 and convinced that more than half of the patients suffered from persistent symptoms. There is escalating concern over post-COVID syndrome, but more is yet to be revealed. Evaluating the prevalence of post- COVID symptoms in different age groups, individuals with co-morbid diseases, people following different habits such as tobacco smoking, chewing, alcoholism and also assessing the post- COVID treatment outcome among them may help to develop treatment strategies.

In our study, 59.2% of the participants reported to have sufferings due to persistent symptoms at the time of the quizzing which include fatigue (31%), dizziness on standing (29.6%), symptoms that get worse after physical activity (25%), cough (21.4%) and headache (13.4%). Max Agustin et al., through a longitudinal prospective study has reported that the on-going presence of shortness of breath, anosmia, ageusia or fatigue as prolonged symptoms even in non-hospitalized patients were observed at a duration of four to seven-



Graph 1 Prevalence of post- COVID syndrome among affected individuals

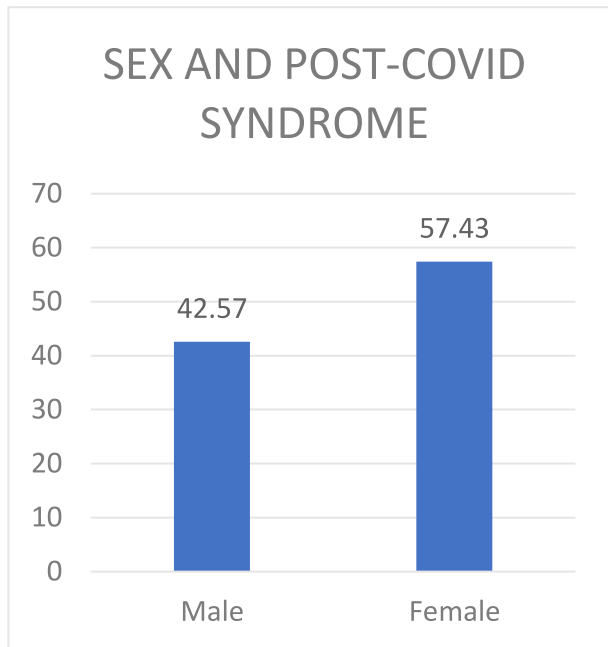
months of post-infection and concluded it as post-COVID syndrome (PCS)⁴. Previous studies also have established that persistent symptom in a wide range varying from 13.3% to 96.0%, but majority of them reported higher rates^{5,6,7}. In the present study, 72.63% of individuals reported post-covid syndrome within the age

group above 60 years old shows high statistical significance with $p = <.01$ suggest that age can be considered as a risk factor for the development of long covid syndrome. Another study by Han Zhang et al., also reported that patients aged between 40 and 80 years had a higher incidence of fever, cough, muscle soreness, and fatigue⁸ (Graph 1).

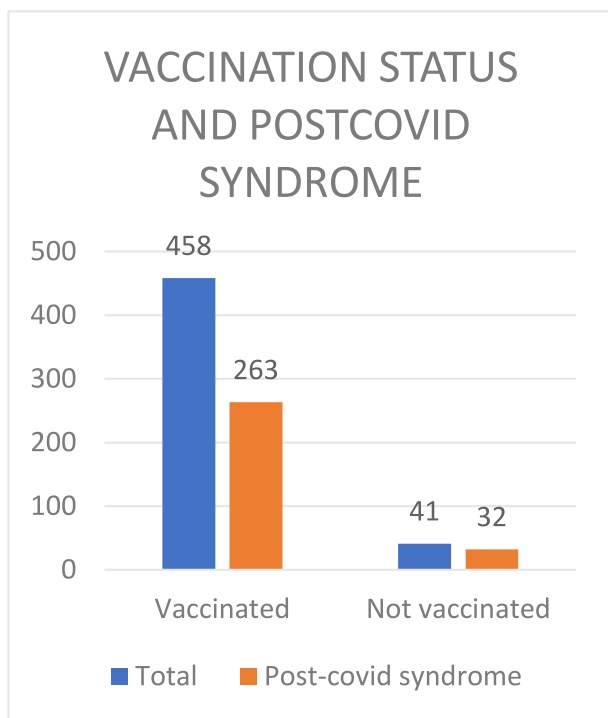
In the present study 57.43% females and 42.57% males reported to have post- COVID syndrome is in consistency with the results reported by other studies and found that female sex can also be a riskfactor⁹ (Graph 2).

In our study, it could be observed that 78.04% non-vaccinated individuals reported at least one post- covid symptom ($p = <.05$) when compared to 57.4% vaccinated individuals which is in consistency with the previous study results confirms that COVID-19 vaccination will have a protective effect against long COVID10(Graph3).

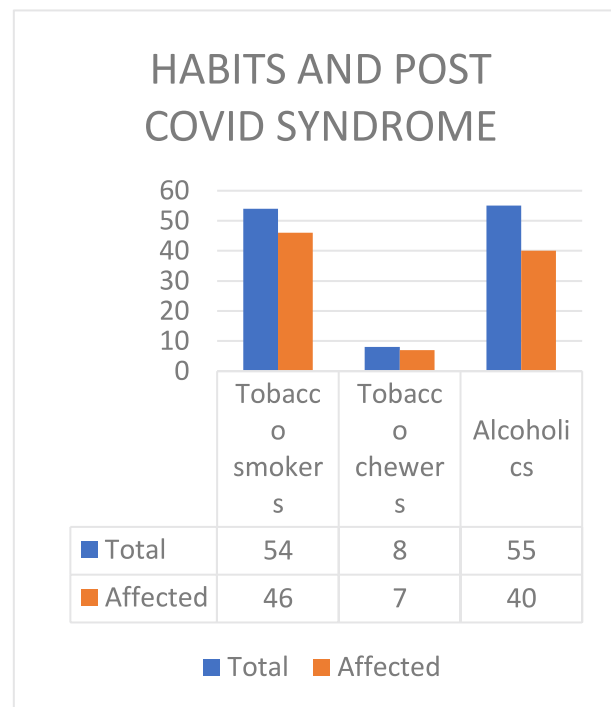
There were 500 individuals infected with COVID- 19 and out of which 155 were categorized with co-morbid diseases, amongst to which, 118 (76.12%) were reported to have at least one post- COVID symptom. Fifty six out



Graph 2 Comparison between gender



Graph 3 Prevalence of post- COVID syndrome among vaccinated and nonvaccinated individuals

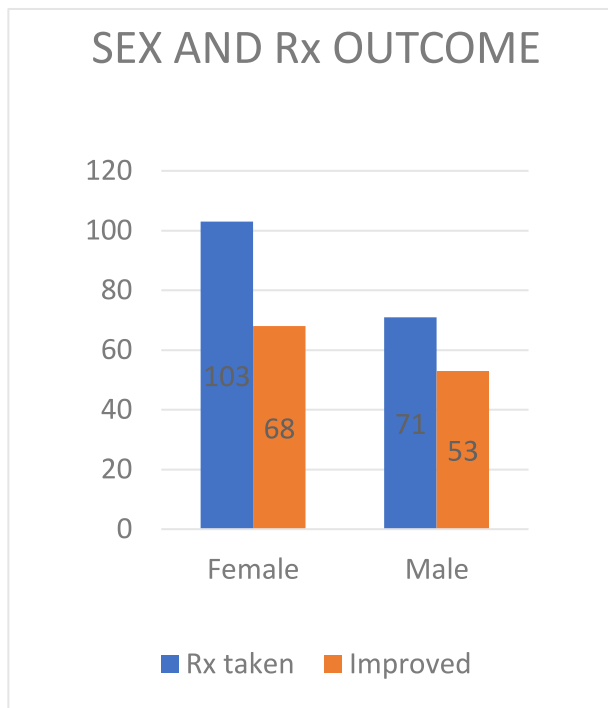


Graph 4 Prevalence of post- COVID syndrome among tobacco smokers, tobacco chewers and alcoholics

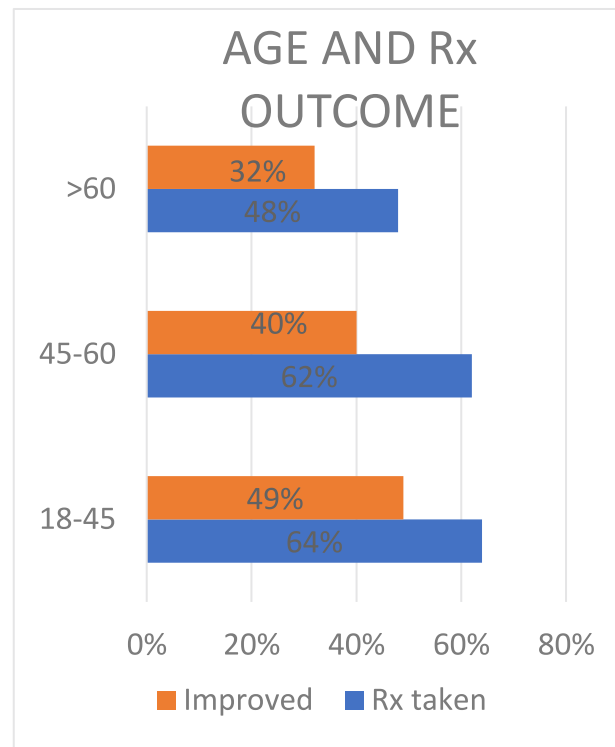
of 75 diabetic patients, 4 out of 4 cancer patients, 55 hypertensives out of 69, 15 allergic patients out of 17, 17 cardiac patients out of 20, 8 obese patients out of 10, 18 asthma/COPD patients out of 19, 3 patients with cerebrovascular diseases out of 3, 4 out of 4 patients with kidney diseases, 1 immunodeficiency patient out of one and 16 out of 21 patients with hormonal disorders reported at least one post-COVID symptom which suggest that co-morbid diseases can be considered as risk factor for the development of post- COVID syndrome. The said finding is in consistency with the results of a cohort study done in non-hospitalized patients by Stevem K et al.¹¹ Reaz Muhmud et al., in a prospective study reported that female sex, respiratory distress, lethargy, and long disease duration are critical risk factors for the development of post-COVID-19 syndrome¹². Out of 54 smokers, 46 developed post-COVID syndrome (85%) with $p = <.01$, 7 out of 8 tobacco chewers and 40 out of 55 alcoholics also developed post-COVID symptoms. Steffen Leth et al. evaluated age, BMI, smoking, and comorbidities and suggested them as potential independent risk factors for the most common persistent symptoms: fatigue, dyspnea, and difficulty in concentrating¹³(Graph 4).

Post-COVID treatment outcome

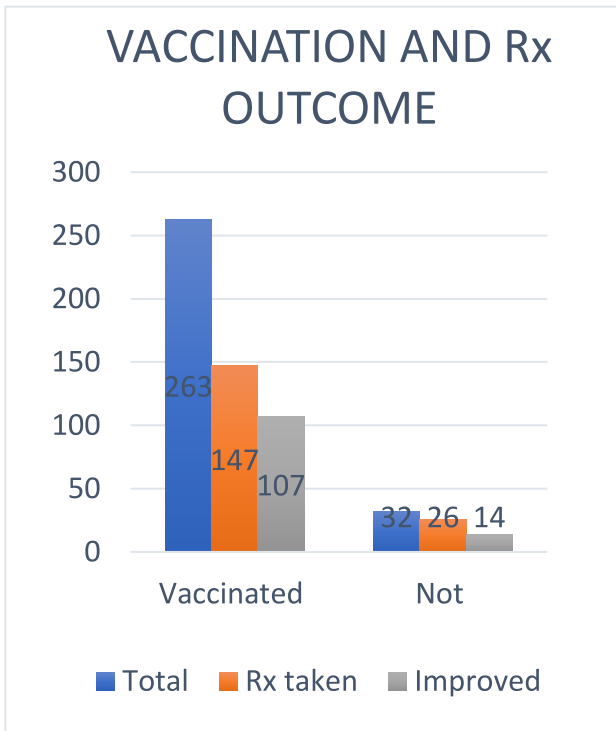
Out of 296 individuals, 174 patients (69.7 %) underwent treatment for post- COVID symptoms and 121 (59.1%) reported improvement on receiving treatment. Out of the aforesaid figure, 64(36.8 %) were within the age group of 18-45, 62(35.6%) were ranging from 45-60 and 48(27.6%) belong to more than 60 years old shows a high statistical significance ($p=<.01$) which suggest that age has impact on the post-COVID treatment outcome. No statistical significance observed between males and females. Out of 32 non-vaccinated individuals 26 (81.2%) had to seek treatment for post-COVID symptoms compared to 55.89% of vaccinated individuals which shows high statistical significance ($p=<.01$). Furthermore, 88.4 % of vaccinated individuals reported to have improvements compared to 11.6% non-vaccinated individuals ($p=<.05$) which indicates that vaccination positively influence the treatment outcome. It could be observed that 78.3% tobacco smokers ($p=<.01$), 62.8% tobacco chewers and 65% of alcoholics had to seek treatment for their symptoms. 42 out of 56 (75%) diabetics underwent treatment for post COVID ($p=<.01$) and 66.7 % improved on treatment. More than



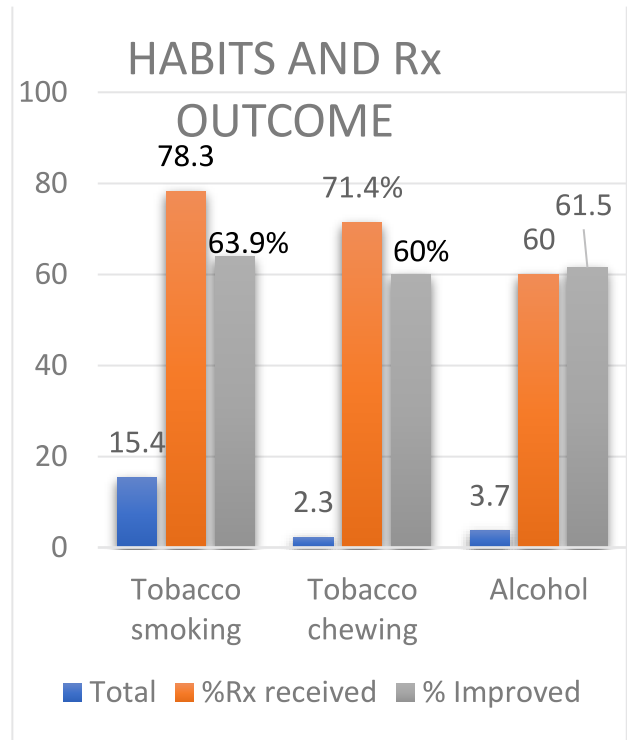
Graph 5



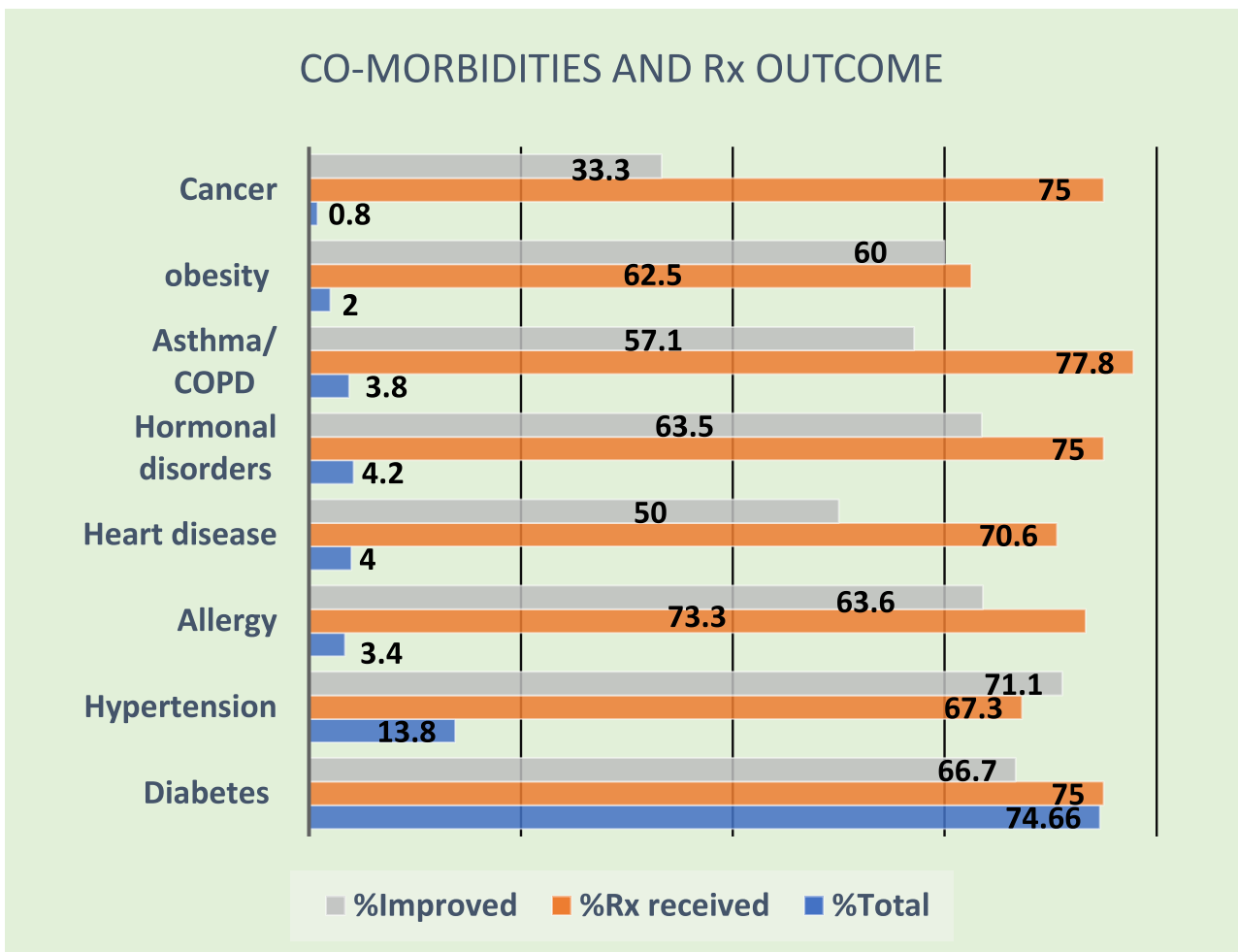
Graph 6



Graph 7



Graph 8



Graph 9

60% of participants with comorbidities had to seek treatment for post covid symptoms and less than 70% reported to have improvement (Graph 5-9).

Assessment of quality of life

In the present study, 34.21 % were not able to pursue their job after getting affected with post-COVID syndrome and 45.95% had to reduce/ avoid daily activities for an average of 9.02 ± 7.65 weeks which indicate that post- COVID syndrome adversely affects the quality of infected people. Aiyegbusi OL et al., in a study of previously hospitalized patients with COVID-19-related acute respiratory distress syndrome (ARDS) reported that 67% (61/91) had a decrease in their quality of life¹⁴. Another study by Chopra et al. reported that among 195 patients who were employed before hospitalization, 40% were unable to return to work within eight weeks of discharge due to ongoing health problems or joblessness there off¹⁵. These results are at par with the results of the present study.

Conclusion

The study conducted is benevolent to substantiate a comprehensive understanding of post COVID-19 related illnesses, associated risk factors, factors influencing the post- COVID treatment outcomes and how it affects the quality of life of the affected. It is concluded that age, gender, comorbid diseases, lifestyle are risk factors with respect to the development of post-COVID syndrome. It is also concluded that vaccinated persons who were affected with COVID pandemic are less risky. However, those who are having comorbid disease, habits such as smoking and alcoholism and people who were not vaccinated were found to have lesser improvement on receiving post-COVID syndrome therapy.

Conflict of interest: None

Source of support: Nil

References

1. Lobanova I. History of SARS-CoV-2. In *Coronavirus Disease 2022* Jan 1 (pp. 13-20). Academic Press.
2. Covid CD, Team R, Bialek S, Gierke R, Hughes M, McNamara LA, Pilishvili T, Skoff T. Coronavirus disease 2019 in children-United States, february 12–april 2, 2020. *Morbidity and Mortality Weekly Report*. 2020,4;69:422.
3. Centers for Disease Control and Prevention. Post-COVID conditions. Centers for Disease Control and Prevention. February 2020.
4. Augustin M, Schommers P, Stecher M, Dewald F, Gieselmann L, Gruell H, Horn C, Vanshylla K, Di Cristanziano V, Osebold L, Roventa M. Post-COVID syndrome in non-hospitalised patients with COVID-19: a longitudinal prospective cohort study. *The Lancet Regional Health-Europe*. 2021; 1;6:100122.
5. Carfi A, Bernabei R, Landi F. Persistent symptoms in patients after acute COVID-19. *Jama*. 2020; 11;324:603-5.
6. Kamal M, Abo Omirah M, Hussein A, Saeed H. Assessment and characterisation of post-COVID-19 manifestations. *International journal of clinical practice*. 2021 ;75;13746..
7. Carvalho-Schneider C, Laurent E, Lemaigen A, et al. Follow-up of adults with noncritical COVID-19 two months after symptom onset. *Clin Microbiol Infect*. 2021;27:258-263.
8. Zhang H, Wu Y, He Y, Liu X, Liu M, Tang Y, Li X, Yang G, Liang G, Xu S, Wang M. Age-Related Risk Factors and Complications of Patients With COVID-19: A Population-Based Retrospective Study. *Frontiers in medicine*. 2021;8.
9. Fernández-de-Las-Peñas C, Martín-Guerrero JD, Pellicer-Valero ÓJ, Navarro-Pardo E, Gómez-Mayordomo V, Cuadrado ML, Arias-Navalón JA, Cigarán-Méndez M, Hernández-Barrera V, Arendt-Nielsen L. Female sex is a risk factor associated with long-term post-COVID related-symptoms but not with COVID-19 symptoms: The LONG-COVID-EXP-CM multicenter study. *Journal of clinical medicine*. 2022 14;11:413.
10. Ellaway-Barnard C, Killick H, Peryer G, Cross JL, Smith TO. The association between registration status and reported outcomes in physiotherapy

- randomised controlled trials. *International Journal of Therapy and Rehabilitation*. 2020; 2;27:1-5.
11. Stavem K, Ghanima W, Olsen MK, Gilboe HM, Einvik G. Persistent symptoms 1.5-6 months after COVID-19 in non-hospitalised subjects: a population-based cohort study. *Thorax*. 2021 1;76:405-7.
 12. Mahmud R, Rahman MM, Rassel MA, Monayem FB, Sayeed SJ, Islam MS, Islam MM. Post-COVID-19 syndrome among symptomatic COVID-19 patients: A prospective cohort study in a tertiary care center of Bangladesh. *PloS one*. 2021 8;16:0249644.
 13. Leth S, Gunst JD, Mathiasen V, Hansen K, Søggaard O, Østergaard L, Jensen-Fangel S, Storgaard M, Agergaard J. Persistent symptoms in patients recovering from COVID-19 in Denmark. In *Open forum infectious diseases 2021: 8.:4*, p. ofab042. US: Oxford University Press.
 14. Aiyegbusi OL, Hughes SE, Turner G, Rivera SC, McMullan C, Chandan JS, Haroon S, Price G, Davies EH, Nirantharakumar K, Sapey E. Symptoms, complications and management of long COVID: a review. *Journal of the Royal Society of Medicine*. 2021;114;:428-42.
 15. Chopra V, Flanders SA, O'Malley M, Malani AN, Prescott HC. Sixty-day outcomes among patients hospitalized with COVID-19. *Annals of internal medicine*. 2021 ;:174::576-8.

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