



Factors influencing the hospital length of stay in Covid-19 patients in Calicut, Kerala - A cross-sectional study

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ABSTRACT

Background

During the recent Covid-19 pandemic, the illness spread around the globe with about 346 million confirmed cases and over 5.5 million deaths. There was varied morbidity and mortality among patients. In this study, we evaluated the association of sociodemographic parameters and Covid-19 vaccination with the hospital length of stay for covid patients.

Material and Method

The study was a hospital-based, cross-sectional study conducted at Malabar Medical College Hospital and Research Centre, Calicut. The study included all the Covid-19 patients admitted to the hospital during the months of September to December 2021. Patients admitted in the Covid ward and Covid ICU were included. Data regarding the socio demography, covid related history, co-morbidities, vaccination history, and duration of hospital stay were collected. The chi-square test was used to find the association between categorical variables and hospital length of stay. P value <0.05 was considered statistically significant.

Result

Total number of patients included in the study was 191. The male-female ratio was 1.08. The mean duration of hospital stay was 10.88 ± 3.5 days. A significantly more number of hospital days was observed with the female gender ($p .007$) and single dose or no Covid-19 vaccination ($p .000$). Age, education, religion, type of residence, nutritional status, and co-morbidities were not found to be associated with the duration of hospital stay.

Conclusion

Female gender, incomplete and no Covid-19 vaccination were associated with higher lengths of hospital stay. We recommend complete Covid-19 vaccinations for all.

Key Words: Covid-19, Covid-19 vaccination, Hospital length of stay.

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INTRODUCTION

Covid 19 is an infectious disease caused by the SARS-CoV-2 virus. It belongs to a large family of viruses called coronaviruses. The virus is thought to spread from person to person through droplets and fomites. Most of the affected experience mild to moderate respiratory illness and recover without any special treatment. The most common symptoms seen in infected individuals include fever, cough, tiredness, and loss of taste and smell. Some of the less common symptoms are sore throat, headache, aches and pains, diarrhea, skin rashes, and irritation of the eyes. Older people and those with underlying medical conditions like cardiovascular disease, diabetes, chronic respiratory disease, or cancer are more likely to develop serious illness¹. Understanding the reasons for varied morbidity and mortality among Covid patients may allow the scientific, public health, and clinical community to efficiently implement interventions to mitigate these outcomes. In this study, we evaluated the association of sociodemographic parameters and Covid-19 vaccination with the hospital length of stay for covid patients.

Material and methods

The present study was a hospital-based, cross-sectional study conducted at Malabar Medical College Hospital and Research Centre. The hospital is a designated Covid-19 treatment center in Calicut, Kerala. Ethical clearance was obtained from the Institutional Ethics Committee. Patient confidentiality was maintained. The study included all the covid patients admitted to the hospital towards the end of the second wave of the Covid-19 pandemic. Patients admitted during the months of September to December 2021 were taken for the study. Patients admitted in the Covid ward and

Covid ICU were included. Patients who got transferred to higher centers were excluded. The total number of patients included in the study was 191. Data regarding the sociodemography, covid related history, relevant past medical history, covid treatment history, vaccination history, and duration of hospital stay, were collected. Data was entered into Microsoft Excel. All categorical variables were presented as percentages. Quantitative variables were presented as mean and standard deviation. Data was analysed using IBM SPSS statistics for Windows version 20.0. The chi-square test was used to find the association between categorical variables and hospital length of stay. P value <0.05 was considered statistically significant.

Results

A total of 191 patients were included in the study. Of these, 92 (48.2%) were females and 99 (51.8%) were males. About two-thirds (118, 61.8%) were above 60 years of age. About four-fifths (155, 81.2%) belonged to rural areas and 36 (18.8%) belonged to urban areas. Education-wise, 66 (34.6%) were graduates and 125 (65.4%) were non-graduates. (Table 1)

Based on Body Mass Index (BMI), 15 (7.8%) were underweight, 62 (32.5%) had normal BMI, 43 (22.5%) were overweight, and 71 (37.2%) were obese. A third (63, 33.3%) were unvaccinated for Covid-19, 49 (25.6%) had received a single dose and 79 (41.4%) had taken two doses. During admission, 67 (35.1%) reported dyspnoea. Comorbidities prevalent were diabetes (73, 38.2%), respiratory disorders (29, 15.2%), hypertension (92, 48.2%), and cardiovascular disorders (46, 24%). (Table 1)

Table 1: Distribution of socio-demographic characteristics of the study patients (N=191)

Characteristics	Level	Number (n)	Percentage (%)
Age	<60 years	73	38.2 %
	≥60 years	118	61.8 %
Gender	Female	92	48.2 %
	Male	99	51.8 %
Religion	Christian	10	5.2 %
	Hindu	134	70.2 %
	Muslim	47	24.6 %
Education	Graduate	66	34.6 %
	Non-graduate	125	65.4 %
Residence	Urban	36	18.8 %
	Rural	155	81.2 %
BMI (Body Mass Index)	Underweight (<18.5)	15	7.8 %
	Normal range (18.5 – 24.9)	62	32.5 %
	Overweight (25 – 29.9)	43	22.5 %
	Obesity I (30 – 34.9)	62	32.5 %
	Obesity II (>35)	9	4.7 %
Vaccination status	2 doses	79	41.4 %
	1 dose	49	25.6 %
	Not vaccinated	63	33.0 %
Dyspnea on admission	Present	67	35.1 %
Diabetes	Present	73	38.2 %
Hypertension	Present	92	48.2 %
Cardiovascular disorder	Present	46	24.1 %
Respiratory disorder	Present	29	15.2 %

The mean duration of hospital stay was 10.88 ± 3.5 days. Based on the number of days in the hospital, we divided the study subjects into 2 groups – those who stayed in the hospital for less than 10 days and those who stayed 10 days or more. A significantly more number of hospital

days was observed with the female gender ($p .007$) and single dose or no Covid-19 vaccination ($p .000$). Age, education, religion, type of residence, nutritional status, and co-morbidities were not found to be associated with the duration of hospital stay. (Table 2)

Table 2: Association of the duration of hospital stay with the patient factors

Factors	Level	Hospital days (< 10 days) N (%)	Hospital days (≥ 10 days) N (%)	Chi-square value	P value
Age	<60 years	29(39.7)	44(60.3)	1.397	0.237
	≥60 years	37(31.4)	81(68.6)		
Gender	Female	23(25)	69(75)	7.166	0.007
	Male	43(43.4)	56(56.6)		
Religion	Christian	3(30)	7(70)	0.149	0.928
	Hindu	46(34.3%)	88(65.7)		
	Muslim	17(36.2)	30(63.8)		
Education	Graduate	14(50)	52(31.9)	3.461	0.063
	Non-graduate	14(50)	111(68.1)		
Residence	Municipality	10(27.8)	26(72.2)	0.901	0.343
	Panchayat	56(36.1)	99(63.9)		

BMI (Body Mass Index)	Underweight (<18.5)	4(26.7)	11(73.3)	1.643	0.801
	Normal range (18.5 – 24.9)	24(38.7)	38(61.3)		
	Overweight (25 – 29.9)	13(30.2)	30(69.8)		
	Obesity I (30 – 34.9)	21(33.9)	41(66.1)		
	Obesity II (>35)	4(44.4)	5(55.6)		
Vaccination status	2 doses	40(50.6)	39(49.4)	15.82	0.000
	1 dose	13(26.5)	36(73.5)		
	Not vaccinated	13(20.6)	50(79.4)		
Dyspnea on admission	Yes	25(37.3)	42(62.7)	0.347	0.556
	No	41(33.1)	83(66.9)		
Diabetes	Yes	24(32.9)	49(67.1)	0.147	0.701
	No	42(35.6)	76(64.4)		
Hypertension	Yes	29(31.5)	63(68.5)	0.722	0.395
	No	37(37.4)	62(62.6)		
Cardiovascular disorder	Yes	13(28.3)	33(71.7)	1.061	0.303
	No	53(36.6)	92(63.4)		
Respiratory disorder	Yes	14(48.3)	15(51.7)	2.846	0.092
	No	52(32.1)	110(67.9)		

Discussion

In the study, we found a significant association between gender and the number of days the patient had to stay in the hospital (p value=0.007). This is similar to the study by Pijls BG et al² which found that gender had a significant association with covid 19 infection. The study conducted by Maraqa B et al³ in Palestine also found a higher association between gender and covid 19 related hospital stay and death.

Vaccination status and the number of days the patient was required to stay in the hospital were found to have a significant association (p-value=.000). A similar finding was observed in the study conducted by Antonelli M et al⁴ which reported that post-vaccination infection was less severe, had lesser symptoms than the unvaccinated individuals.

There have been studies to test the association between diabetes mellitus and Covid-19. Shoaib N et al⁵ reported that Covid-19 patients with diabetes and hypertension were the most vulnerable groups for the poor outcome. Matsushita K et al⁶ also suggested that diabetes increases the risk of severe Covid 19 infection. Guo L et al⁷ also found that there was a significant association between pre-existing diabetes with disease severity and death. However, our study did not find an association between the presence

of Diabetes and higher hospital stay. This could be due to good diabetic control in the patients. Sohrabi MR et al⁸ found that hypertension and respiratory diseases led to poor outcomes in covid 19 infected individuals. However, our study found no association. This could be attributed to better control or less severe disease which was present in our patients.

Maraqa B et al³ reported a 52-fold higher risk of death among covid patients aged above 60 years. Our study also found a higher number of hospital days in patients above 60 years. However, it was not significant.

Conclusion

Our study found that the number of hospitalized days for Covid-19 patients was significantly higher with gender, incomplete, and lack of Covid-19 vaccination. Fully vaccinated patients had shorter hospital stays. Our study adds to the scientific evidence on the protective effects of Covid-19 vaccination. The limitations of the study are that it is a single-center study with a small sample size. This is a hospital-based study and does not include the patients who recovered at home. This brings a selection bias to the study sample. We recommend further multi-centric, record-based studies to find associations with Covid-19 disease morbidity.

REFERENCES

1. Wahid L, Ortel TL. Anticoagulant therapy in patients hospitalized with COVID-19. *JAMA Intern Med* [Internet]. 2021;181(12):1621–2. Available from: <http://dx.doi.org/10.1001/jamainternmed.2021.6212>
2. Pijls BG, Jolani S, Atherley A, Derckx RT, Dijkstra JIR, Franssen GHL, et al. Demographic risk factors for COVID-19 infection, severity, ICU admission and death: a meta-analysis of 59 studies. *BMJ Open* [Internet]. 2021;11(1):e044640. Available from: <http://dx.doi.org/10.1136/bmjopen-2020-044640>
3. Antonelli M, Penfold RS, Merino J, Sudre CH, Molteni E, Berry S, et al. Risk factors and disease profile of post-vaccination SARS-CoV-2 infection in UK users of the COVID Symptom Study app: a prospective, community-based, nested, case-control study. *Lancet Infect Dis* [Internet]. 2022;22(1):43–55. Available from: [http://dx.doi.org/10.1016/S1473-3099\(21\)00460-6](http://dx.doi.org/10.1016/S1473-3099(21)00460-6)
4. Maraqa B, Al-Shakhra K, Alawneh M, Jallad R, Alkaila M. Demographic factors associated with COVID-19-related death in Palestine. *Public Health Pract (Oxf)* [Internet]. 2021;2(100145):100145. Available from: <http://dx.doi.org/10.1016/j.puhip.2021.100145>
5. Shoaib N, Noureen N, Munir R, Shah FA, Ishtiaq N, Jamil N, et al. COVID-19 severity: Studying the clinical and demographic risk factors for adverse outcomes. *PLoS One* [Internet]. 2021;16(8):e0255999. Available from: <http://dx.doi.org/10.1371/journal.pone.0255999>
6. Matsushita K, Ding N, Kou M, Hu X, Chen M, Gao Y, et al. The relationship of COVID-19 severity with cardiovascular disease and its traditional risk factors: A systematic review and meta-analysis. *Glob Heart* [Internet]. 2020;15(1):64. Available from: <http://dx.doi.org/10.5334/gh.814>
7. Guo L, Shi Z, Zhang Y, Wang C, Do Vale Moreira NC, Zuo H, et al. Comorbid diabetes and the risk of disease severity or death among 8807 COVID-19 patients in China: A meta-analysis. *Diabetes Res Clin Pract* [Internet]. 2020;166(108346):108346. Available from: <http://dx.doi.org/10.1016/j.diabres.2020.108346>
8. Sohrabi M-R, Amin R, Maher A, Bahadorimnifared A, Janbazi S, Hannani K, et al. Sociodemographic determinants and clinical risk factors associated with COVID-19 severity: a cross-sectional analysis of over 200,000 patients in Tehran, Iran. *BMC Infect Dis* [Internet]. 2021;21(1):474. Available from: <http://dx.doi.org/10.1186/s12879-021-06179-4>

