Original Research Article

Journal of College of Medical Sciences-Nepal, Vol-19, No 1, Jan-Mar 2023
ISSN: 2091-0657 (Print); 2091-0673 (Online) Open Access
DOI: 10.3126/jcmsn.v19i1.53330

Outcome of Covid-19 Patients Admitted In Emergency Department of Karnali Academy of Health Sciences, Teaching Hospital

Tula Krishna Gupta,[1] Kushal Bhattarai,[2] Anusmriti Pal,[3] Smriti Mayur Kasaudhan,[4] Nilu Manandhar[5]

[1]Department of General Practice and Emergency Medicine, [2]Department of Biochemistry, [3]Department of Internal Medicine, [4]Department of Community Medicine, [5]Department of Physiology, Karnali Academy of Health Sciences, Jumla, Nepal.

ABSTRACT

Introduction

COVID-19, a global health problem, was first identified in the Hubei province, China. While various clinical features of the diseases have been documented, the complete clinical profile is yet to be understood. The purpose of this study is to evaluate the outcome of Covid-19 patients after admission in the emergency of Karnali Academy of Health Sciences (KAHS) during the year 2020 January to 2021 January.

Methods

This is a hospital-based, retrospective, observational study done in the emergency department of Karnali Academy of Health Sciences (KAHS), Jumla. The data was taken from the registry, including the record files of patients with Covid-19 admitted in the hospital from 2020 January to 2021 January. The retrieved data was initially entered in an Excel sheet followed by its analysis. We carried out Kaplan Meier survival distribution analysis to determine the survival probability and predictors of Covid-19.

Results

Of the 516 Covid-19 positive patients who were admitted in the hospital, 53.5% were males. For the total patients, the mean duration of hospital stay was 8.02±5.32 days with the proportion of patients who died during treatment being 3.7% (n=19). As described by the Kaplan-Meier curve and the accompanying survival table, the mean survival time of the overall patients was 36.74 days (95% CI=35.6–37.8). Moreover, the cumulative survival rate was seen prominently decreased for older patients and those admitted in the intensive care unit and/or ventilator.

Conclusions

The increased mortality rates seen in the older patients and those admitted in critical care setting clearly calls for the importance of proper and timely intervention.

Keywords: Covid-19; Mortality; Cumulative Survival; Kaplan-Meier.

Correspondence: Dr. Tula Krishna Gupta, Department of General Practice and Emergency Medicine, Karnali Academy of Health Sciences, Jumla, Nepal. Email: guptatk@hotmail.com. Phone: +977-9852056087.

INTRODUCTION

Coronaviruses are a large family of viruses that mostly cause respiratory illness in humans. The virus (which was initially called the novel Coronavirus 2019) COVID-19 has been named SARS- CoV2 was first identified in the Hubei province in China. The Covid-19 pandemic has done catastrophic damage to several human lives globally and especially in low and low-middle countries.[1] According to an Asian Development Bank report Covid-19 pushed 4.7 million more people in Southeast Asia into extreme poverty in 2021.[2] Covid-19 prevention measures like social distancing, closure of activities and borders, and movement restrictions were most helpful to decrease the spread in 2020 but the occurrence of the common variants of concern (VOCs), especially Alpha (B.1.1.7), Beta (B.1.351), Delta (B.1.617.2), in Southeast Asia lead to a significant increase in the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) infections.[3]The purpose of this study is to evaluate the outcome of Covid-19 after admission in the emergency of KAHS during the yearduring the year 2020 January – 2021 January.

METHODS

This retrospective study was conducted at the Emergency Department of Karnali Academy of Health Sciences (KAHS) in Jumla. Right: The study approval was obtained from the Institutional Review Board of KAHS (Ref: 2078/2079/30). Data was collected by reviewing the record file from data store of KAHS and comprised of the clinical record files of the Covid-19 patients who were admitted in the hospital from January 2020 to January 2021. The collected data was initially entered in the Microsoft Excel sheet wherein preliminary data management (e.g. cleaning) was performed. Subsequent data entry was done in SPSS version 16 and descriptive analysis was performed. Categorical variable was described as frequency with percentage and depicted in the form of tables. To study the association of the outcome (death/discharge) with the various clinico-demographic variables, a non-parametric test (chi-squared test) was performed. Survival analysis was done to know the survival probability and predictors of Covid-19 infections in the hospital. To perform the survival analysis, death of the patients was considered as an 'event' while the discharge of the patients after successful treatment during admission was considered as 'censor'. From the survival table, cumulative survival rates were calculated for days 3, 5, 7, and 14 and Kaplan-Meier curves were constructed. Moreover, comparisons of the survival distributions were performed across the different categories of variables (age, gender, maximum stay at the different units of the hospital, admission status in the ICU and/or ventilator). Statistical significance was defined as $p<0.05$ at 95% confidence interval (CI).

RESULTS

A total of 5570 patients were admitted to our emergency department during the period of one year (2020 January to 2021 January). Among these 1245 were COVID-19 positive. A total of 516 patients were admitted. The mean (SD) age of the patients was 44.84±18.9 years, and the mean (SD) duration of hospital stay was 8.02±5.32 days (with a range of 1–39 days) after admission. The demographic profile and the clinical outcome of the patients admitted to our hospital have been demonstrated in table 1. Of the total admitted patients, 53.5% (n=276) were males. Similarly, most of these patients were in the adult age group (18–64 years) (77.3%; n = 399). A total of 53.1% (n=274) of the admitted patients had a maximum stay at the high dependency unit (HDU), with 39.5% and 7.4% having the maximum stay at the general bed and ICU/ventilator, respectively. Likewise, 13.0% (n=67) of these patients we admitted to the ICU and/or ventilator. The overall death rate of the patient was 3.7% (n=19) (Table 1).

Table 1. Demographic profile and clinical outcome of the admitted COVID-19 patients.

Variables	Category	Frequency (n=516)	Percentage
Gender	Male	276	53.5
	Female	240	46.5
Age-groups	1-12 (Children)	24	4.7
	13-17 (Adolescents)	11	2.1
	18-64 (Adults)	399	77.3
	≥ 65 (elder)	82	15.9
Maximum Hospital Stay	General Bed	204	39.5
	High Dependency Unit (HDU)	274	53.1
	ICU/Ventilator	38	7.4
Admission to ICU and/or Ventilator	No	499	87.0
	Yes	67	13.0
Outcome	Discharge	497	96.3
	Death	19	3.7

The mean (SD) stay in the hospital among discharged patients was 8.12±5.34 days whereas the mean (SD) stays among patients who died during hospital stay was 5.42±4.14 days. Similarly, the mean (SD) age of the patients who were discharged was 44.23±18.84 years and that of the patients who died during treatment was 60.90±14.00 years.

Table 2 describes the various factors affecting the outcome of COVID-19 patients admitted to our centre. As depicted, there were statistically significant associations of the clinical outcome with variables like age groups (p=0.013), maximum stay of the patient at different units such as general bed, HDU, ICU/ventilator (p<0.001), and Admission into ICU and/or ventilator (p<0.001).

Table 2. Association of various clinico-demographic variables with the clinical outcome.

Variable	Categories	Outcome		Chi-Square Test	p-value
		Discharge	Death		
Gender	Female	233 (97.1%)	7 (2.9%)	0.741	0.389
	Male	264 (95.7%)	12 (4.3%)		
Age group (years)	1 – 12	24 (100%)	0	10.831	0.013
	13 – 17	11 (100%)	0		
	18 – 65	388 (97.2%)	11 (2.8%)		
	≥ 65	74 (90.2%)	8 (9.8%)		
Place of admission	General Bed	204 (100%)	0	128.279	<0.001
	HDU	269 (98.2%)	5 (1.8%)		
	ICU/Ventilator	24 (63.2%)	14 (36.8%)		
ICU and/or Ventilator	No	449 (100%)	0	132.19	<0.001
	Yes	48 (71.6%)	19 (28.4%)		

Table 3 depicts the probability of cumulative survival of COVID-19 patients at days 3, 5, 7, and 14 in the overall patients and comparisons across different categories of clinico-demographic variables. As shown, the cumulative survival of the overall admitted patients decreased from 98.2% on day 3 to 92.7% on day 14. Among these patients, the mean (SD) survival time was 36.7±0.57 days (95% CI: 35.6–37.8) as described by the Kaplan-Meier curve (Figure 1).

Similarly, the cumulative probability of female patients decreased from 98.3% (day 3) to 94.0% (day 14). In males, the change was from 98.1% (day 3) to 91.8% (day 14). The Kaplan-Meier curve analysis shows the difference in survival distribution to be statistically not significant (Log Rank Test; $\chi2=0.436$; $p=0.509$) between the two gender groups. (Table 3, figure 2). Furthermore, the survival distribution was found to be significantly different across different categories of age ($\chi2=8.763$; $p=0.033$), maximum stay of the patient (in general bed, HDU, ICU/ventilator) ($\chi2=108.738$; $p<0.001$) and admission status of the patient in ICU and/or ventilator ($\chi2=93.029$; $p<0.001$) (table 3, figures 3, 4, and 5).

Table 3. Depiction of the probability of cumulative survival of COVID-19 patients at 3, 5, 7, and 14 days.

	Cumulative Survival (95% CI)			
	3 Days	5 Days	7 Days	14 Days
Overall (n=516)	98.2% (97.0%–99.4%)	97.7% (96.3%–99.1%)	97.0% (95.4%–98.6%)	92.7% (88.8%–96.6%)
Gender				
Female	98.3% (96.5%–100.0%)	97.7% (95.7%–99.6%)	97.7% (95.7%–99.6%)	94.0% (88.5%–99.5%)
Male	98.1% (96.5%–99.7%)	97.7% (95.9%–99.5%	96.5% (93.9%–99.0%)	91.8% (86.5%–97.1%)
Age-group				
1 – 12 Years	100%	100%	100%	100%
13 – 17 Years	100%	100%	100%	100%
>18 & < 65 Years	98.7% (97.5%–99.9%)	98.4% (97.2%–99.6%)	98.0% (96.4%–99.6%)	94.1% (89.9%–98.2%)
>= 65 Years	95% (90.3%–99.7%)	93.4% (87.7%–99.1%)	91.5% (84.8%–98.2%)	85.1% (74.3%–95.9%)
Maximum stay of the patient at				
General Bed	100%	100%	100%	100%
HDU	99.6% (98.8%–100.4%)	98.7% (97.3%–100.1%)	98.1% (96.1%–100.0%)	97.3% (94.8%–99.8%)
ICU/Ventilator	78.8% (65.7%–91.9%)	78.8% (65.7%–91.9%)	75.5% (61.4%–89.6%)	51.2% (31.2%–71.2%)
Admission into ICU and/or Ventilator				
No	100%	100%	100%	100%
Yes	86.6% (78.4%–94.8%)	83.6% (74.8%–92.4%)	80.4% (70.8%–90.0%)	66.9% (54.2%–79.6%)

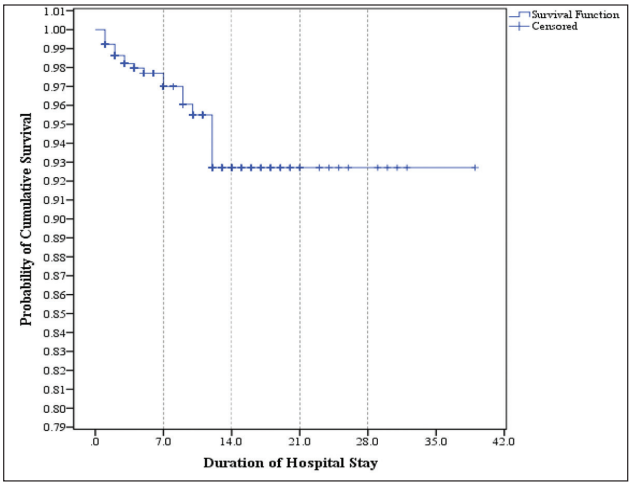

Figure 1. Overall survival distribution of the study participants

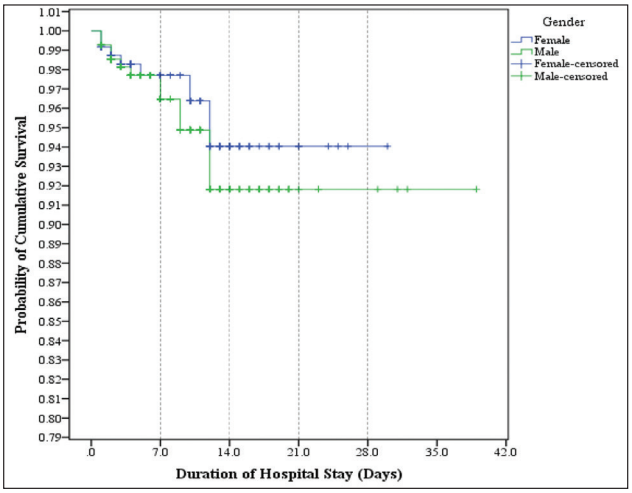

Figure 2. Kaplan-Meier curve showing the survival distribution of admitted COVID-19 patients across the gender groups

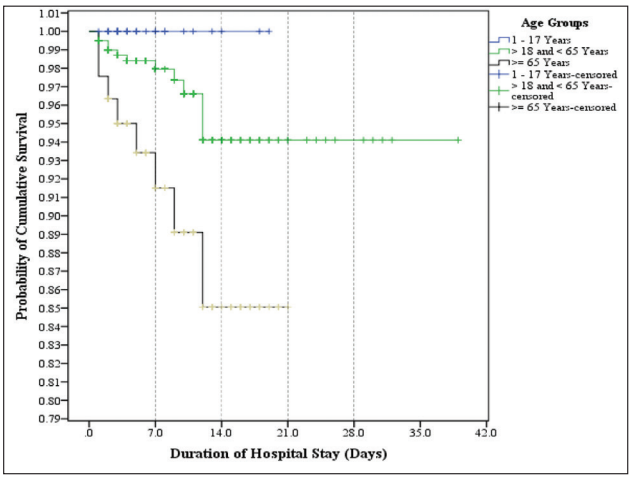

Figure 3. Kaplan-Meier curve showing the survival distribution of admitted COVID-19 patients across the different age-categories

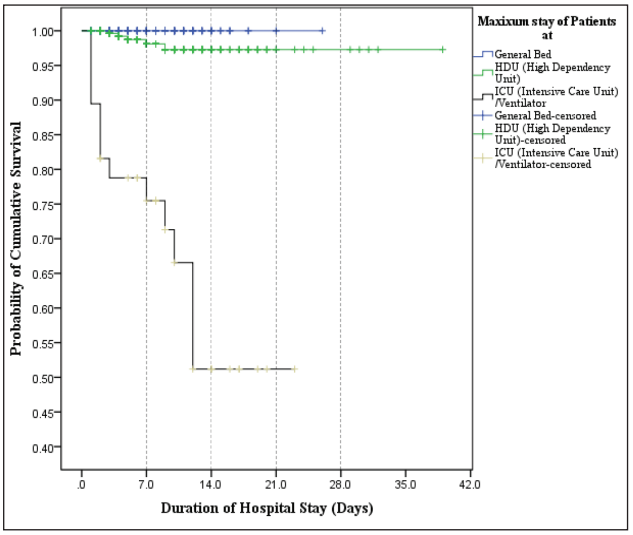

Figure 4. Kaplan-Meier curve showing the survival distribution of admitted COVID-19 patients across the different units where the patients were admitted for the maximum number of daysgroups

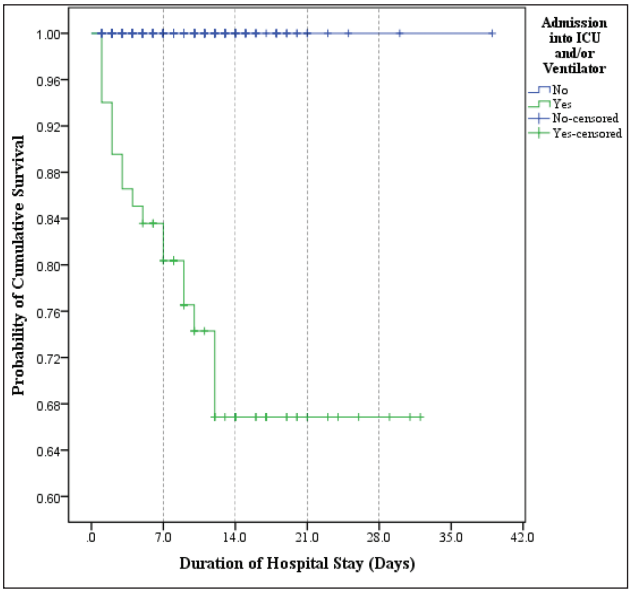

Figure 5. Kaplan-Meier curve showing the survival distribution of admitted COVID-19 patients based on the admission status into ICU and/or ventilator.

DISCUSSION

The paucity of literature suggesting the relationship between clinical outcome and clinico-demographic profiles of Covid-19 patients prompted the present hospital-based, retrospective, observational study. Conducted over the period of one year, the study aimed

at determining the survival distributions and association between different clinico-demographic factors and clinical outcome in these patients. As per the findings of the study, in the total 516 patients who got admitted due to Covid-19, the mean (SD) age of the patient was 44.84±18.9 years. This finding was similar to the study by Rafati Shideh et al demonstrating the mean (SD) age of the patients being 46.57±21.33 years (with the range being 1–97 years).[4] The cases admitted in our centre were mostly male (53.5%) predominance with most of these patients being in the adult age group (18–64 years) (77.3%; n = 399) and elder (≥ 65 years) patients being 15.9%. Similar findings were revealed in the Habtewold et al study where the median age was 48 (IQR 35–62) years among which 74% were aged 18–60 years and 26% were above age 60 years among which 64.75% (n=854) were male.[5] Study by Kaso et al demonstrated the mean age (SD) to be 41.06±20.61 years with the majority (61.4%) being males.[3] The death rate among COVID-19 hospitalized patients in our center was 3.7% whereas Kaso et al reported the mortality rate as 11.1% which was comparable to findings from India (8.1%), New York (13.1%) and Mexico (9.37).[6] A total of 53.1% (n=274) of the admitted patients had a maximum stay at the high dependency unit (HDU), with 39.5% and 7.4% having the maximum stay at the general bed and ICU/ventilator, respectively. In our study, the mean (SD) age of the patients who were discharged was 44.23±18.84 years and that of the patients who died during treatment was 60.90±14.00 years. A similar finding was observed by Hosseini et al which revealed that the mean (SD) age of the deceased patients was significantly higher than the surviving patients (71.09 ± 15.71 years vs. 54.20 ± 15.81 years, $p < 0.001$) but was not significant as per the gender difference.[7] In our study, the survival functions according to sex indicate no significant difference between the Kaplan-Meier survival curves of male and female patients with COVID-19, this was similar to the study done by Kundu et al and Linasari.[8,9] In our study, the mean (SD) stay at the hospital among discharged patients was 8.12 ± 5.34 whereas the mean (SD) stay among patients who died during hospital stay was 5.42± 4.14. Similarly, a study done in Somalia also revealed that the average length of hospital stay for COVID-19 patients was 7.7 days (range 1–35D).[10] In Habtewold et al study the median survival time of patients after admission was 9 (IQR 9–10) days.[5] In our study, the cumulative survival of the overall admitted patients decreased from 98.2% on day 3 to 92.7% on day 14. Among these patients, the mean (SD) survival time was 36.7±0.57 days (95% CI: 35.6–37.8) as described by the Kaplan-Meier curve. Lapo-Talledo et al study reveals that the cumulative incidence of death for the first, second, and third weeks of hospitalization was 8.88% (95%CI: 8.6-9.2), 13.97% (95% CI: 13.6-14.4), and 16.72% (95%CI: 16.3-17.1), respectively.[11] Regarding age-specific mortality, the highest rate was observed among patients above 60 years of age (16.4) compared to younger age groups.The limitations of the present study stems from its design. Due to its retrospective nature, many clinico-pathological variables could not be accounted for. Cox regression analysis (especially with many covariates considered) could not be performed due to the nature of data. Nevertheless, the findings of this study points towards the possibility of conducting further studies in the successfully treated patients regarding any long-term complication they might suffer from.

CONCLUSIONS

The increased mortality rates seen in the older patients and those admitted in critical care setting clearly calls for the importance of proper and timely intervention.

ACKNOWLEDGEMENTS

Medical record section, Mr. Megh Raj Budha, Medical Recorder.

Conflict of interest: None

FINANCIAL DISCLOSURE: None

REFERENCES

1. Cash R, Patel V. Has COVID-19 subverted global health? The Lancet. 2020;395(10238): 1687–1688. https://doi.org/10.1016/S0140-6736(20)31089-8.
2. COVID-19 Pushed 4.7 Million More People in Southeast Asia Into Extreme Poverty in 2021, But Countries are Well Positioned to Bounce Back — ADB | Asian Development Bank. https://www.adb.org/news/covid-19-pushed-4-7-million-more-people-southeast-asia-extreme-poverty-2021-countries-are-well [Accessed 17th March 2023].
3. Chu DT, Vu Ngoc SM, Vu Thi H, Nguyen Thi YV, Ho TT, Hoang VT, et al. COVID-19 in Southeast Asia: current status and perspectives. Bioengineered. 2022;13(2): 3797. https://doi.org/10.1080/21655979.2022.2031417
4. Rafati Shideh, Aghamolaei Teamur, Bahrampour Abbas, Khorrami Farid, Kheirandish Masoumeh, Khosravi Bahareh, Rafati Foozieh. Survival Analysis of COVID-19 Patients in an Iranian Population. Disease and Diagnosis. 2022;12(1):12-20. Doi: 10.34172/ddj.2023.432
5. Habtewold M Ephrem, Dassie A Godana, Abaya G Shileshi, Debela A Endashaw, Bayissa L Bekana, Girsha D Worku et al. Survival Patterns and Predictors of Mortality among COVID-19 Patients Admitted to Treatment Centers in Oromia Region, Ethiopia. Infection and Drug Resistance. 2022:5233-47. DOI: 10.2147/IDR.S355060
6. Kaso AW, Agero G, Hurissa Z, Kaso T, Ewune HA, Hareru HE, et al. (2022) Survival analysis of COVID-19 patients in Ethiopia: A hospital-based study. PLoS ONE 17(5): e0268280. https://doi.org/10.1371/journal.pone.0268280
7. Hosseini Elahe Seyed, Azadchehr Mohammd-Javad, Sarafrazi Mahla, Vaghari Leila, Parchebafi Atefeh, Nikzad Hossein, Kashani Hamed Haddad. Survival Analysis and Risk Factors for in-hospital mortality in COVID-19 Patients: A retrospective cohort study. Research Square. https://doi.org/10.21203/rs.3.rs-1732882/v1
8. Kundu S, Chauhan K, Mandal D. Survival Analysis of Patients with COVID-19 in India by DemographicFactors: Quantitative Study. JMIR Form Res. 2021; 5 (5):e23251. doi: 10.2196/23251
9. Linasari Desy. Survival Analysis of COVID-19 patients from two hospitals in Cimahi, Indonesia. Advances in Health Science research. 2021;37: 166-71.
10. Mohamud MFY, Hashi AS, Mohamed AH, Yusuf AM, Ali IH, Ahmed MA. Clinical characteristics, comorbidities, initial management and outcome of COVID-19 infected patients admitted to intensive care unit in Somalia: a national retrospective study. Research Square preprint; https://doi.org/10.21203/rs.3.rs-66767/v1
11. Lapo-Talledo German Josuet, Talledo-Delgado Jorge Andrés, Fernández-Aballí Lilian Sosa. A competing risk survival analysis of the sociodemographic factors of COVID-19 in-hospital mortality in Ecuador. Cad. Saúde Pública.
12. 2023; 39(1):e00294721. doi: 10.1590/0102-311XEN294721

Citation: Gupta TK, Bhattarai K, Pal A, Kasaudhan SM, Manandhar N. Outcome of Covid-19 Patients Admitted In Emergency Department of Karnali Academy of Health Sciences, Teaching Hospital. 2023; 19(1); 82-88.