Original Research Article

Mortality characteristics of the second wave of COVID 19 pandemic in a tertiary hospital in Manipur, India: A retrospective study

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Abstract

Introduction: The second wave of COVID 19 pandemic reached Manipur in April 2021. For effective policy planning in JNIMS which was the sole government-run tertiary level care in the state by the government as well by the authority, the necessity to understand the mortality pattern and its backgrounds for the patients was felt. **Aims & objectives:** A study was taken up to explore into key areas like recovery rate, mortality rate and also the age and sex distribution, referral status, presenting features, delay in seeking healthcare, vitals at admission, comorbidities, hospital stay and vaccination status of the expired patients. The study also aimed to analyze the weekly changing pattern of all the COVID deaths. **Material & methods:** A hospital-based retrospective study was done by using hospital records of all COVID-19 patients admitted during Apr-Nov 2019. Data of COVID 19 positive patients were collected by using data abstraction form starting from admission until the end-point of either discharged or transferred out to non-COVID wards for post-COVID complications or died. It had sections on socio-demographic profile, referral status from other health centers, delay in seeking health care, presenting features and vitals at admission, comorbidities, vaccination status and hospital stay before the person died. **Results:** 4,293 patients were admitted during the study period. The recovery rate was 51.2% while the mortality rate was found to be 14.5%. Maximum death occurred among males of geriatric age group. Main presenting features of the deceased cases were shortness of breath (78.1%), Fever (53.1%) and Cough (41.3%). A total of 195 (38.2%) deaths occurred among patients who were admitted within three days of developing the serious symptoms of shortness of breath and/or altered sensorium. Nearly two-thirds (63.7%) of the deceased persons had comorbidities notably hypertension (58.3%) and type 2 diabetes mellitus (46.8%). Only 6.8% had a SpO_2 of 90 or more at room air at admission. Nearly a quarter of all the deaths (22.5%) happened on the day of admission. Almost all the cases (561; 90.2%) were not vaccinated at al.

Keywords: Comorbidities, COVID 19 pandemic, Mortality rate, Recovery rate, Second wave

Introduction

The second wave of COVID 19 pandemic reached the state of Manipur in the second half of April 2021. For tertiary care of the moderate to serious patients needing hospitalization, the two existing teaching medical institutions viz. Jawaharlal Nehru Institute of Medical Sciences (JNIMS), Porompat and Regional Institute of Medical Sciences (RIMS), Lamphelpat were entrusted the task. Of these two, JNIMS was the only state government-run hospital.

JNIMS had three COVID-dedicated blocks including ICU beds. The bed-strength was gradually increased to 190 general beds and 50 ICU beds. For effective policy planning by the government as well by the JNIMS authority, the necessity to understand the mortality pattern and its backgrounds for the patients was felt. Hence, the current study was taken up to explore into key areas like recovery rate, mortality rate and also the age and sex distribution, referral status, presenting features, delay in seeking healthcare, vitals at admission, comorbidities, hospital stay and vaccination status of the expired patients. The study further aimed to analyze the weekly changing pattern of all the COVID deaths.

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Material & methods

A hospital-based retrospective study was done in the COVID blocks of JNIMS Hospital. All patients who were admitted since April 2021 (starting point of the COVID-19 second wave in Manipur) till end of first fortnight of November 2021 were included in the study. Data were retrieved from the hospital records by using a data abstraction form. All COVID admissions and their follow-up from the day of admission until the end-point of either discharged after full recovery or transferred out to non-COVID wards for post-COVID complications or died were included as the study-participants. Those patients without the end-point viz. who left the hospital against medical advice and those who got discharged on request were excluded from the study.

The data abstraction form had sections on socio-demographic profile, referral status from other health centers, delay in seeking health care, presenting features and vitals at admission, comorbidities, vaccination status and hospital stay before the person died. Data collected were entered in SPSSv21. Only descriptive analyses were done by using means, percentages and standard deviations. Approval for accessing the patient case-sheets was obtained from the Medical Superintendent, JNIMS vide his Memo. No. 1209/01(Covid-19/20-JNIMS). Anonymity of the study-participants was maintained by using code numbers instead of identifiers. As only secondary data was used for the study, there was no other ethical issue involved.

Results

In the second wave of COVID-19 pandemic, a total number of 4,293 SARS-COV 2 positive patients were admitted in JNIMS during the period of April – first half of November 2021. Out of these, 1,196

patients were discharged after full recovery thereby giving a Recovery Rate of 51.2%. A total of 623 deaths occurred out of which 622 were COVID-related deaths in spite of providing the institute's standard treatment protocol which was similar to the Standard Treatment Protocol provided by the Ministry of Health & Family Welfare, Govt. of India. Thus, the Mortality Rate was found to be 14.5%.

There was a male preponderance among the COVID deaths (M:F=1.39:1). The mean (SD) age of the deceased persons was 62.5 (16.03) years. The maximum deaths occurred among the geriatric age group of 60 up-to 75 years (243; 39.1%). (Table 1)

Table 1: Age distribution of deceased COVID patients

Age-group (in years) (n=557)	Frequency (%)
<15	02 (0.3)
15 up-to 45	83 (13.3)
45 up-to 60	148 (23.9)
60 up-to 75	243 (39.1)
≥75	146 (23.5)

A total number of 149 (24%) deaths occurred among those patients referred from COVID Care Centers, Public or Private Hospitals while the remaining 473 (76%) deaths occurred among those who came directly from home.

Out of all the 662 deaths, the main presenting symptoms on admission, either singly or in combinations were mainly (i) Shortness of breath (486; 78.1%) (ii) Fever (330; 53.1%) (iii) Cough, usually dry (257; 41.3%) (iv) General weakness (161; 25.9%) and (v) Loss of appetite (131; 21.1%). Altered sensorium, loose motion, sore throat, hemoptysis, backache, hemiparesis, Loss of smell, Loss of taste, urinary retention, seizure and pain abdomen were also seen. (Table 2)

Table 2: Main presenting symptoms on admission among COVID deaths

Presenting symptoms (n=425)	Frequency (%)
Shortness of breath	486 (78.1)
Fever	330 (53.1)
Cough	257 (41.3)
General weakness	161 (25.9)
Loss of appetite	131 (21.1)
Altered sensorium	32 (5.1)
Loose motion	27 (4.4)

A total of 511 (82.2%) patients presented with serious symptoms of shortness of breath and/or altered sensorium. Among them, the gap in time period between development of the symptom and getting admitted in COVID blocks is shown in the following table (Table 3). A total of 195 (38.2%) deaths occurred among patients who were admitted within three days of developing the serious symptoms.

Table 3: Gap in getting admitted after developing serious presenting symptoms

Gap in seeking health care (n=458)	No. of deceased pts. (%)
Within 24 hours	30 (5.9)
On 2^{nd}-3^{rd} day	165 (32.3)
On 4^{th}-5^{th} day	98 (18.8)
After 5^{th} day	123 (24.1)
Data missing	92 (18.0)

Nearly two-thirds of the deceased persons (396; 63.7%) had comorbidities. Out of all the comorbidities, the common ones were Hypertension (231; 58.3%) and Type 2 Diabetes Mellitus (185; 46.8%) either singly or in combination (Table 4). Being a post-Cardiovascular accident patient (CVA), Chronic Kidney Disease (CKD), Chronic Obstructive Pulmonary Disease (COPD), Coronary Artery Disease (CKD), Chronic Liver Disease (CLD), HIV/AIDS, Obesity, Cancers, Organ transplants, Schizophrenia, Hypothyroidism, Deep Vein Thrombosis (DVT), Parkinson's disease were also seen.

Table 4: Distribution of common comorbidities among deceased patients (either singly or in combination)

Comorbidity (n=267)	Frequency (%)
Hypertension	231 (58.3)
Type 2 Diabetes mellitus	185 (46.8)
CVA/Post-CVA sequelae	26 (6.6)
Chronic Kidney Disease	22 (5.6)
COPD/ Br asthma	20 (5.1)

At the time of admission only a small proportion (42; 6.8%) of the deceased cases had a SpO_2 reading of 90 or more at room air. And a total of 106 (17.1%) had a SpO_2 reading of less than 70 at room air. More than half (355; 57.1%) were already on O_2 assistance when they presented for the first time.

Nearly a quarter of all the deaths (140; 22.5%) happened on the same day of admission. Two-fifths of the deaths (227; 36.5%) happened within the first three days of admission. Another two-fifths of the deaths (251; 40.8%) occurred in 4-10 days of admission. The remaining deaths (144; 23.2%) occurred after it. (Figure 1)

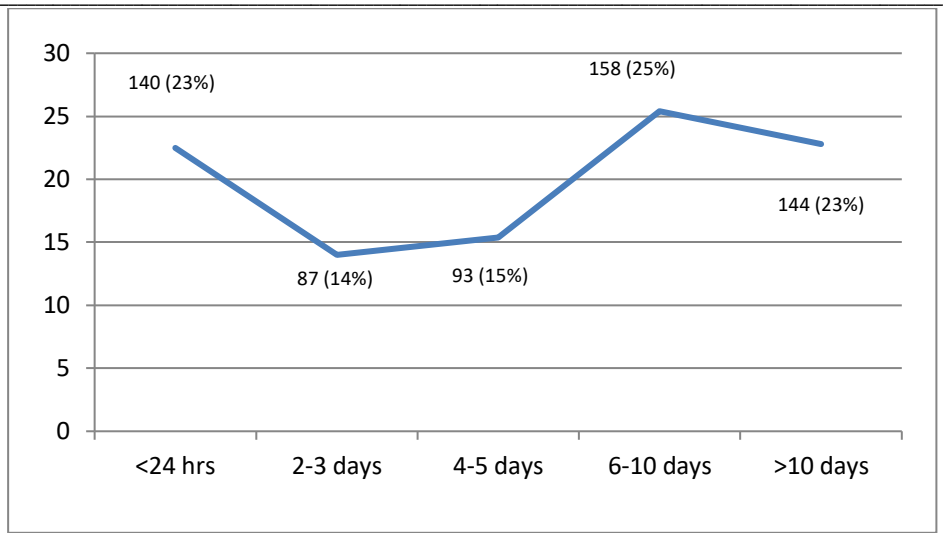

Fig. 1 Distribution of deaths by days of admission

Regarding vaccination against COVID-19, a small proportion of the deceased cases (49; 7.9%) have had the first dose of COVID (Covishield) vaccine and a meager proportion (12; 1.9%) have had both doses. The remaining 561 (90.2%) cases did not get any vaccination.

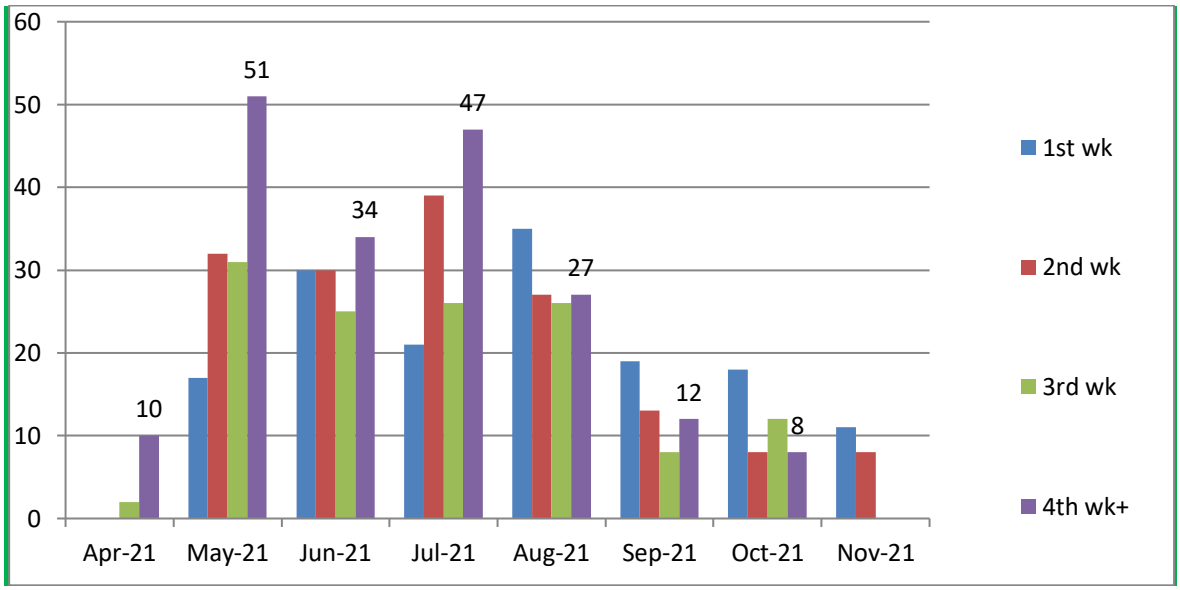

Fig. 2: Week-wise distribution of deaths

(NB: The apparently higher number of deaths in the last weeks may be because of higher number of days in the week counting from 22nd to end of the month)

The weekly trend of death showed maximum number of deaths during the months of May, June, July and August. It started showing a declining trend from September onwards.

Discussion

The recovery rate of 51.2% found in the current study was more or less comparable with the finding made by ISARIC4C study by WHO (41%) in acute care hospitals in England, Wales and Scotland[1]. The slight increase rate might be because of the fact that, the present study-setting although being a tertiary level institute, might be admitting some less severe cases of COVID-19. Being a state-run government institute mild cases even might have been admitted as in-patient due to political reasons. Because of the same reason the mortality rate in the present study (14.5%) might be lower while compared to the same aforementioned study (26%)[1]. Yet, the current mortality rate was found to be more or less comparable with figures reported from the US and other institutions from both abroad and India[2-6]. The mortality being higher among males and among those aged 60 years or more is not different findings of other studies done earlier[6-8].

Less than a quarter (24%) of the deaths occurring among those patients referred from Community Care Centers or other Public/Private Health Clinics/Hospitals implies that the majority of the infected patients preferred home treatment. And only when the condition became serious they were brought to the tertiary center. This would cause delays in provision of timely prompt treatment.

Shortness of breath/Dyspnea, Fever and Cough being the commonest manifestation when the patients were first brought to the study-hospital was not different from other study-findings reported by other scholars[9-10].

It is a well-known fact that, serious patients developing Shortness of breath (SOB) and/or Altered Sensorium should be brought to the tertiary health care centers as soon as possible for providing prompt treatment. Yet, the difficult hilly terrain situation and poor transport facilities available in the State need to be considered. Still, it is expected that, these serious patients should attend the tertiary centers at least within three days. The present study showed that only 5.9% of them came to JNIMS on the same day of developing the serious manifestations. And only one-third (36.5%) of these serious patients got admitted within third day of developing the serious manifestations. This might be a critical factor for determining patient prognosis.

Comorbidities markedly increase the disease seriousness and fatality in COVID 19[9,11]. Among the deaths happened in the COVID wards of JNIMS, nearly two-thirds of them (63.7%) had associated comorbidities. The common comorbidities present were Hypertension and Type 2 Diabetes mellitus. These comorbidities may be different in different parts of the world depending upon the socio-demographical characteristics.

In the present study it was found that, out of all the COVID deaths which occurred during the study-period, only 6.8% had 90% Oxygen saturation at room air at the time of first presentation to the study-hospital. This implies that the remaining 93.2% were already suffering from serious COVID 19. And obviously prognosis had to be poorer among them.

Nearly two-fifths (38.2%) of all the deaths happened within the first three days of admission before their clinical conditions could not be stabilized properly. This may be primarily attributed to the seriousness or advanced state of the disease when the patients presented themselves to the study-hospital.

Vaccination against COVID 19 still remains as one of the key strategies in primary prevention of the infection. Only a small proportion (1.9%) deceased persons getting the required two doses while a meager proportion (7.9%) got the first dose is disappointing. There is need to give more impetus to this activity in the study-place so that lives could be saved.

The present study, being based on secondary data might have missed some of the important parameters as sometimes records miss certain data. Also, exclusion of patients who could not be traced up-to the outcome end-point of complete recovery or death might lead to inaccuracies in the estimation of the recovery as well as death rates. Further, the findings may not be generalizable to other parts of the world.

Conclusion

The COVID 19 recovery rate from the present study was found to be 51.2% whereas, the mortality rate was found to be 14.5%. Fatality was found to higher among males and people aged more than 60. The main presenting features among the deceased persons were dyspnea, fever, cough, general weakness and loss of appetite. One-third of all the deaths happened to serious cases who got admitted within three days of developing serious manifestations. Two-thirds of all the deceased persons had comorbidities, mostly hypertension and Type 2 Diabetes mellitus either singly or in combination. Almost all the deceased cases (93.2%) had SpO_2 less than 90% at first presentation labeling them to have serious COVID 19. Two-fifths of all the deaths happened within three days of admittance. Vaccination status among the deceased cases was extremely low.

There is a strong need to strengthen both primary and secondary levels of prevention. Specific protection in the form of vaccination has a lot more to be given due importance. Also, communicating effectively to the mass on getting tested early and timely healthcare seeking need to be strengthened. The secondary level care institutions also need to be strengthened so that the tertiary level care centers are not overloaded and fatigued. Meanwhile, resources and capacity development to meet the health needs of the cases admitted need to be worked out and re-enforced on continuous basis in the study-hospital. Retrospective cohort studies also may be taken up in future to determine the association between case fatality and important risk factors.

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Conflict of interest

None

Source of funding

Nil

References

1. ISARIC4C, WHO. Features of 20 133 UK patients in hospitals with COVID 19 using ISARIC WHO Clinical Characterization Protocol: Prospective observation cohort study. BMJ 2020;369:m1985.
2. Rosenthal L, Cao Z, Gundrum J, Siane J, Safo S. Risk factors associated with In-hospital mortality in a US National Sample of patients with COVID 19. JAMA Open Access 2020;3(12):e2029058
3. Malhotra V, Basu S, Sharma N, Kumar S, Garg S, Dushyant K. Outcomes among 10,314 hospitalized COVID 19 patients at a tertiary care government hospital in Delhi, India. J Med Virol 2021 Mar;93(7):4553-58.
4. Olivas-Martinez S, Cardenas-Fragoso JL, Jimenez JV et al. In-hospital mortality from severe COVOD 19 in a tertiary care center in Mexico City, causes of death, risk factors and the impact of hospital saturation. PLoS ONE, 2021;16(2):e0245772
5. Roth GA, Ememoms-Bell S, Alger HM. Trends in patient characteristics and COVID 19 in-hospital mortality in the US during COVID 19 pandemic. JAMA Netw Open. 2021;4(5):e218828
6. Khamis F, Memish Z, bahrani MA. Prevalence and predictors of in-hospital mortality of patients hospitalized with COVID 19 infection. J Inf Pub Health 2021 June;14(6):759-65.
7. Marimuthu Y, Kunnavil R, Anil NS et al. Clinical profile and risk factors for mortality among COVID 19 inpatients at a tertiary care center in Bengaluru, India. Monaldi Arch Chest Dis 2021 May. doi :10.4081/monaldi.2021.1724. PMID:34006039
8. Rieg S, Cube MV, Kalbhenn J et al. COVID 19 in-hospital mortality and mode of death in a dynamic and non-restricted tertiary care model in Germany. PLoS ONE doi:10.1371/journal pone.0242127
9. Nasiri MJ, Haddadi S, Tahvildari A, Farsi Y. COHVID 19 clinical characteristics and sex-specific risk of mortality: systematic review and meta-analysis. Frontiers in Med 2020;7:459.
10. Gupta N, Agrawal S, Ish P et al. Clinical and epidemiologic profile of the initial COVID 19 patients at a tertiary care center in India. Monaldi Arch Chest Dis 2020 Apr;90(1) doi 10.4081/monaldi 2020.1294
11. Osbogun A, Balogun M, Abayoni A, Idris J, Kuyinu Y, Odukoya O et al. Outcomes of COVID 19 patients with comorbidities in Southwest Nigeria. PloS ONE;16(3):e248261.