

# Epidemiology patterns of COVID-19 mortality in Kelantan state, Malaysia from 2020-2023

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## ABSTRACT

**Introduction:** The COVID-19 pandemic has had a significant impact on global health, with Malaysia being one of the countries affected. First case of COVID-19 death in Kelantan was recorded on 18 March 2020. On 16 April 2020 COVID-19 deaths in Malaysia were classified as “Death Due To COVID-19” or “Death with COVID-19” to ensure death statistics in Malaysia comply with WHO Guidelines. This study aims to describe the epidemiological patterns of COVID-19 death in Kelantan, a state in Malaysia. **Materials and Methods:** Using retrospective data from the period of March 2020 to June 2023, we examined a total of 1,425 confirmed deaths due to COVID-19 in Kelantan. Data were obtained from Kelantan COVID-19 Death Registry and Lampiran 3 BID forms. Demographic information, comorbidities, and clinical characteristics were collected and analysed. Data were analysed descriptively using Microsoft Excel. **Results:** A total of 1425 deaths Due To COVID-19 were identified during the study period and included in this study. The total deaths by year were 2020 (8,0.6%), 2021(1243,87.2%), 2022(174,12.2%) and no deaths in 2023. The Case Fatality Rate (CFR) by year were 2020 (1.06%), 2021 (0.74%), 2022(0.19%) and 2023(0). Out of total 1425 deaths, 1025 deaths (71.9%) occurred in the hospital and 400 deaths (28.1%) were outside the hospital. Three districts with highest CFR were Pasir Puteh (0.92%), Gua Musang (0.85%) and Kuala Krai(0.83%). The death rate was almost equal between male (693,48.6%) and female (732,51.4%). Our findings revealed that COVID-19 mortality in Kelantan predominantly affected individuals above the age of 60 with the mean age of COVID-19 deaths was 67.1 years. A total of 604 COVID-19 deaths had at least 1 pre-existing medical illness. The prevalent comorbidities identified were cardiovascular diseases including hypertension & heart problems (474); and Diabetes Mellitus (318). Majority of deaths were among individuals who had not or partially received COVID-19 vaccination (1342). **Conclusion:** Elderly, who were not vaccinated or partially vaccinated with presence of comorbidities were at higher risk for deaths due to COVID-19 in Kelantan. These findings emphasize the importance of targeted interventions for vulnerable populations, particularly the elderly and individuals with comorbidities, to reduce COVID-19 mortality in Kelantan. The study highlights the need for continuous public health efforts to ensure adequate healthcare infrastructure, widespread vaccination coverage, and effective preventive measures to mitigate the impact of future waves and potential variants of the virus.