

Risk factors of mortality among elderly COVID-19 patients in Kelantan state, Malaysia

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ABSTRACT

Introduction: The COVID-19 pandemic has had a disproportionate impact on the elderly, as they exhibit a greater vulnerability to severe symptoms and a higher risk of mortality compared to younger individuals. This study aims to determine the risk factors contributing to death due to COVID-19 among the elderly population in Kelantan, Malaysia. **Materials and Methods:** A case-control study was conducted using secondary data from the Surveillance Unit of the Kelantan State Health Department, which included COVID-19 cases diagnosed between 1st April 2020 to 31st March 2022. Sample size was calculated using two proportion formulas and cases were selected by simple random sampling. The term "elderly" in this study refers to individuals who are aged 60 years and above. COVID-19 mortality was classified into two categories: deaths due to COVID-19 and deaths with COVID-19. However, only deaths due to COVID-19 were included in the National COVID-19 Mortality Statistics. Data analysis was performed utilizing both simple and multiple logistic regression methods. **Results:** There were 28,295 elderly COVID-19 patients (≥60 years old) diagnosed within this study period. These patients were then divided into case and control groups, with 780 patients randomly selected from the case group and 3,120 patients from the control group. Out of the total 28,295 elderly COVID-19 patients, 27,204 patients (96.1%) successfully recovered from the COVID-19 infection, 1,024 patients (3.6%) died due to COVID-19, and 67 patients (0.2%) died with COVID-19. The significant risk factors contributing to death due to COVID-19 included: (i) age at diagnosis (adjusted OR 1.09; 95% CI: 1.07, 1.10; $p < 0.001$); (ii) receiving a single dose of the COVID-19 vaccine (adjusted OR 0.70; 95% CI: 0.51, 0.97; $p = 0.034$); (iii) receiving two doses of the COVID-19 vaccine (adjusted OR 0.13; 95% CI: 0.11, 0.16; $p < 0.001$); and (iv) receiving three doses of the COVID-19 vaccine (adjusted OR 0.004; 95% CI: 0.001, 0.030; $p < 0.001$). **Conclusion:** The findings of this study provide valuable information about the risk factors contributing to death due to COVID-19 in this vulnerable population. Recognizing the significance of age at diagnosis and vaccination status in determining outcomes for elderly COVID-19 patients allows healthcare professionals and policymakers to develop targeted interventions and public health strategies aimed at lowering mortality risk and improving the overall prognosis for this vulnerable population.