

TITLE: COVID-19 and Diagnosis Related Group In An Asian Middle-Income Country: Patient classifications and associated hospital costs

Introduction

COVID-19 pandemic impacted healthcare systems in many aspects, with the most immediate need being the increased healthcare burden and the increased demand for healthcare resources including personnel, clinical consumables and medical facilities. Limited data is available on the estimation of the economic implications associated with the COVID-19 admissions in Malaysia. This study aimed to determine the distribution of Diagnosis-Related Group (DRG) and the associated costs among patients admitted to one of the teaching hospitals in Malaysia to understand the magnitude of economic implications related to the pandemic.

Methods

Data on hospital admissions in 2021 were obtained from the electronic medical record. Admissions related to COVID-19, either as a primary diagnosis or secondary diagnosis was extracted and the data was coded by trained coders, with ICD-10 for the diagnosis and ICD9-CM for the procedures. The combination of ICD-10 and ICD9-CM codes were imported into a case-mix grouper to generate the DRG codes. The DRG codes used for COVID-19 were A-4-13-I, A-4-13-II and A-4-13-III for mild, moderate and severe classification respectively. Simultaneously, clinical pathways for the three DRGs were collected from experts. Following the clinical care pathways obtained, healthcare resource utilisation was estimated by combining top-down and bottom-up costing approaches when necessary. Available unit cost data from the Ministry of Health and published articles were used whenever relevant. Discounting and inflation of cost data was based on local guidelines and official rates. The distribution of COVID-19 patients based on DRG was presented as frequencies and percentages while cost data were reported in US\$, the price year 2021.

Results

A total of 4889 patients with COVID-19 diagnosis were admitted to the hospital in 2021. Of that, 4813/4889 (98%) had a primary diagnosis of COVID-19. The remaining 76/4889 (2%) patients were admitted for other medical reasons, however, was found to be positive during the admission. Therefore, for those patients, COVID-19 infection was considered the secondary diagnosis during the treatment episode. Among the 4813 patients, 3909 (81%) were admitted with mild COVID-19 (A-4-13-I), 630 (13%) had moderate COVID-19 (A-4-13-II) and the remaining 274 (6%) were admitted for severe COVID-19 (A-4-13-III). More than half of patients with COVID-19 as the secondary diagnosis (56%) were admitted for cardiac catheterisation and other elective procedures. The average length of stay (ALOS) for mild COVID-19 (A-4-13-I) was 9 days and the cumulative hospital costs were estimated to be USD 1,543. The ALOS for both moderate COVID-19(A-4-13-II) and severe COVID-19(A-4-13-III) was 21 days and the cumulative hospital costs were estimated at USD 23,527 and USD 26,731 respectively. The total costs incurred by the hospital for 2021 for COVID-19 were estimated to be USD 19,259,153.

Conclusions

In conclusion, COVID-19 resulted in significant economic implications to the healthcare system. This study provides local data and assessment of the economic burden of Covid-19 infection in Malaysia. The findings of this study can be used to inform the Government's policies on preparedness for future outbreaks and the efficient allocation of healthcare resources.