

Introduction

The emergency department is vulnerable to the socioeconomic impact of the pandemic as it provides 24-hour services to cater to the demand of the pandemic. Cost information associated with Pre-hospital Care in the local context has been scarce. This study aims to determine the cost of providing ambulance response before and during the pandemic.

Methods

This was a cross-sectional study. Data on the Pre-Hospital Care services were collected for the years 2019 (pre-pandemic) and 2021 (during the pandemic) from a University-Affiliated Tertiary Centre. Activity-based costing was used to estimate the cost based on the work process involved in ambulance response. The analysis includes human resources, vehicle, equipment and consumable costs. Ethical approval was obtained prior to data collection.

Results

There was an 8% increase in calls requiring ambulance response during Covid pandemic in 2021 (5409 cases) compared to 2019 (4977 cases).

- Medical case including Covid and PUI contributed 66% (3618 cases) in 2021
- Trauma related cases were reduced by 30% in 2021 (863 cases) compared to 2019 (1250 cases)

There was a 51% increase in cost associated with consumables

- Mainly contributed by PPE as there was 72% increase in cost in 2021 (RM 61,804) compared to 2019 (RM 17,025)

There was a 21% increase in cost associated with personnel in 2021 (RM 1793,339.06) from 2019 (RM 1409,865,16)

- The cost consists of healthcare personnel wages and allowances.

There was an increase in ambulance service cost by 33% in 2021 (RM 193,466.6 compared to 2019 (RM 127,941.71).

- Despite the rise in ambulance service cost, we found that the ambulance maintenance cost was reduced by 16% in 2021 (RM 112,564.60) from 2019 (RM 135,619.89)

We found that the total cost of ambulance response per call before Covid pandemic in 2019 was RM 424 (USD 103) compared to RM 453 (USD 109) during Covid pandemic in 2021.

Discussion and Conclusion

The 22% increase in ambulance response's total cost was mainly contributed by the rise in personal costs.

- The rise in personnel cost was caused by an increased number of staff, increased overtime claims, and payment of Covid allowances for healthcare workers.
- Personnel cost contributed to 75% of the total cost of ambulance transport in our study in 2019 & 2021.
 - Similar findings reported by Bahari MB et al and Muchiri FW et al that personnel cost contributed 44% and 49%, respectively, from the total cost of ambulance transport.

The cost of consumables rose by 55%-72% due to the increase in Personal Protective Equipment (PPE) utilisation per ambulance response.

- The PPE cost averaged RM 2.31/ ambulance response in 2019
- In 2021, the average cost increased to RM 9.12 for non-Covid cases and RM 34.12 for Covid cases.

Ambulance maintenance costs were reduced in our centre despite increased ambulance responses during the Covid pandemic.

- Probably due to disrupted scheduled maintenance due to the restriction imposed during the lockdown

Component	2019	2021
Personnel	RM 1419,615.16 (75.5%)	RM 1793,339.06 (74.6%)
Consumables	RM 3913.29 (0.25%)	RM 61,804.51 (2.5%)
Ambulance Fuel	RM 179,852.2 (9.6%)	RM 179,852.2 (7.5%)
Ambulance Maintenance	RM 135,619.89 (7.2%)	RM 112,564.60 (4.7%)
Service Cost	RM 127,941.71 (6.8%)	RM 193,466.6 (8%)
Total	RM 1866,943.36	RM 2402,774.83

Table 1: Total cost of ambulance response in 2019 & 2020

Limitation

We were unable to calculate the cost of ambulance transport based on patients' complaints and diagnoses in ED due to the unavailability of the data. This possibly contributed to the underestimation of the total cost.

References

1. Bahari, M. B., Aminuddin, F., Raman, S., Hanafiah, A. N. M., Kunusagaran, M. S. J. M. N. S., Zaimi, N. S. M., Hassan, N. A., & Nor, A. T. M. (2022). Analysis of costs and utilization of ambulance services in the ministry of health facilities, Malaysia. *PLOS ONE*, 17(11), e0276632. <https://doi.org/10.1371/journal.pone.0276632>
2. Muchiri FW, Kariuki K, Otundo D, Mwanandi L, Karanja S. Cost efficient evaluation of ambulance services for community critical care transport need in Machakos County, Kenya. *East Afr. Med. J.*2017; 94(1): 12-9