

Title:

Identification of Outliers from Case-mix analysis in a Teaching hospital in Malaysia.

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Abstract

Introduction:

The findings from case-mix analysis are commonly used by healthcare organizations for the strategic allocation of resources. The study on the length of stay for inpatient episodes enables the assessment of efficiency in managing the patients with the subsequent estimation of hospital beds and allows subsequent budget allocation to be done appropriately. The integration of a comprehensive case-mix system, supported by comprehension of outliers, surpasses mere data analytics in its significance. It serves as a fundamental basis for the advancement of patient-centred, evidence-based clinical pathways that align with the complex dynamics of healthcare provision.

Methods:

There were a total of 48,248 inpatient episodes in the year 2022 at the studies teaching hospital, The distributions of the length of stay (LOS) for cases from various disciplines were determined and outliers were identified by applying the formula of Quartile 3 plus 2 times the interquartile range (IQR), where the IQR represents the gap between Quartile 3 and Quartile 1. This formula facilitates the identification of long-stay outliers by taking into account the upper range of the usual length of stay (LOS) and incorporating a variable threshold to accommodate exceptional instances, while short-stay outliers are characterized as admissions that necessitate only one day.

Results:

The analysis of 48,248 hospital admissions in the year 2022 unveiled a significant presence of outliers, as seen by 6,272 admissions, accounting for 13% of the overall sample. The majority of the outliers (52%) were classified as long-stay outliers which exceeded the calculated LOS than the cases with the same case-mix codes. These extended periods of time spent in medical facilities they were validated by either the presence of complicated medical conditions, sophisticated procedures for diagnosis, or difficulties in ensuring smooth transfers of patient care. Another 48% of the outliers were classified as short-stay outliers which in general suggesting that these patients required only a limited period of hospitalization due to rapid recovery. However, we found that the majority of the cases were patients admitted for elective surgery which were cancelled due to various reasons, and cases that were not seen for discharge by the respective discipline's specialist at the emergency department.

Discussion:

Outliers exhibit extended durations of hospitalization which arises from a combination of various variables, such as complex medical ailments, delayed diagnosis processes, and inadequacies in the management of care transitions. Determining the outliers is one of the many benefits of implementing the case-mix system for inpatient episodes. Knowing the short-stay and long-stay outliers could guide in developing a near-accurate clinical pathway for standardised and efficient management of cases. It helps to ensure appropriate use of resources and ultimately enhances efficiency in hospital management.

In conclusion, the implementation of this comprehensive strategy not only guarantees the prudent utilisation of resources but also acts as a driving force in enhancing the overall effectiveness and excellence of healthcare administration in the modern context.