EDITORIAL

In-hospital mortality in Poland: what can we learn from administrative data?

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by Walicka et al, see p. 268

In the 19th century, Florence Nightingale postulated the use of in-hospital mortality to evaluate the quality of care in healthcare facilities.[1] Since 1821, Massachusetts General Hospital has been annually reporting mortality figures, which are made available to the public.[2] Nowadays, we are fully aware that in-hospital mortality allows us to monitor safety and quality of healthcare services[3] by setting up country-specific benchmarks, with which each hospital can be compared. Moreover, the data are routinely collected in hospitals and, therefore, quite easily accessible. However, data quality is of paramount importance. In-hospital mortality is a multidimensional and complex metric. Multiple factors can contribute to its value, and only some of them are associated with the quality and safety of care.[4]

The hospital standardized mortality ratio (HSMR), which was first developed in England, is one of the most relevant and universal measures.[5] It compares the number of deaths observed in a hospital with the expected number of deaths calculated with a statistical model based on the national average This measure is adjusted to patients' age, sex, type of hospital admission, diagnosis, and comorbidities. Several countries use HSMR to evaluate, monitor, compare, and identify areas for care improvement in hospitals.[6] However, the current literature also indicates that divergence in coding of diagnosis, recording of comorbidities, severity of disease, and occurrence of readmissions can limit the comparability of data on HSMR.[7] This is why HSMR should be analyzed and assessed with other indicators measured longitudinally.

Another useful measure is summary hospital-level mortality indicator (SHMI), which is used by the National Health Service in the United Kingdom. However, the use of this indicator is limited, as it is sensitive to variations in standards of clinical coding and quality of administrative data collection.[2,8] This hampers both the comparison between hospitals and the inference of the care quality indicator. Several studies showed that different factors, such as the level of care, number of patients at the intensive care unit, site of death, and end-of-life care, can significantly affect the indicator value.[2] The United States Agency for Healthcare Research and Quality developed several quality indicators based on hospital administrative data, which can be useful in other settings where administrative data are collected. Several of them include mortality rates regarding particular diseases, procedures, or groups of diagnoses, such as deaths in low-mortality diagnosis-related groups, constituting less than 0.5% of mortality in patients aged 18 years and older. A Norwegian analysis showed that indicators based only on in-hospital deaths, not including other variables nor adjusted analyses, may be misleading.[9] Van Gestel et al[7] also stated that the association between adjusted mortality rates and quality of care is inadequate due to several limitations and can lead to inaccurate conclusions, which is why this indicator should be analyzed with caution and in a broader context.

In this issue of *Polish Archives of Internal Medicine* (*Pol Arch Intern Med*), the study on independent predictors of in-hospital mortality in patients hospitalized in nonsurgical departments can be found.[10] The approach adopted by Walicka et al[10] is comprehensive, covering 2 855 029 records of patients hospitalized in Polish hospitals between January 2014 and December 2014. This study confirms previous findings indicating that age, male sex, emergency admission, and admission at the weekend are positively associated with in-hospital mortality. However, the associations observed by Walicka et al[10] for in-hospital mortality in general may be not specific enough to be used in clinical practice, as the characteristics of hospital departments and, therefore, patients can significantly affect the results. Moreover, particular patient characteristics,

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including results of laboratory tests, comorbidities, medical history, and many other factors, can considerably affect the mortality risk. For example, heart rate, systolic blood pressure, and comorbidities are potential variables, which influence the risk of death in patients with cardiac diseases.[11,12] Such detailed analyses help to create tools, which can be used to predict in-hospital mortality in patients with particular conditions.

The "weekend effect," indicating that more deaths occur in patients admitted on nonworking days than in those admitted on working days, is an interesting finding of the study. A similar relationship was found in the analysis of 14 217 640 admissions, reported by the National Health Service hospitals in England.[13] It showed that admissions at weekends were associated with an increased risk of subsequent death compared with admissions on working days (hospital mortality was defined as a number of deaths that occurred in and out of the hospital during the 30-day period).[13] Similar findings were reported in an international comparative analysis of hospital administrative data from 4 countries with various healthcare systems, which suggests that these observations are not incidental. The causes accounting for these findings are multifactorial and not fully explained: they could include a smaller number of medical professionals or staff changes, lower availability of senior specialists, limited availability of diagnostic modalities, and many others.[13,14] Further research is needed to elucidate this issue.

Notwithstanding this fact, as mentioned above, the crude in-hospital mortality cannot be used to assess healthcare quality and patient safety,[5] without being adjusted to the characteristics of patients admitted to the hospitals. The study by Walicka et al[10] can be considered the first important exploratory step for future studies. First, it promoted collaboration between research institutions and data owners, which will allow the researchers to further refine the analysis and test diverse adjustment procedures. Second, it will prompt the researchers to examine the potential usefulness of various mortality-based indicators in monitoring and benchmarking the quality of healthcare services.[15] Third, it may facilitate more detailed analyses of in-hospital mortality determinants in different types of hospitals and in patients with various conditions, as well as help to identify areas for care improvement.

To conclude, Walicka et al[10] have made a great effort to study in-hospital mortality based on a large number of available administrative records and to expand knowledge about factors associated with a higher mortality risk. The study also contributes to the currently available statistics and offers new opportunities for further research on in-hospital mortality.

ARTICLE INFORMATION

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