







ORIGINAL ARTICLE

CHARACTERIZATION OF ADVERSE HOSPITAL EVENTS: ACTIVE SEARCH VERSUS SPONTANEOUS REPORTING

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ABSTRACT

Objective: to comparatively characterize adverse events reported spontaneously and through active search. **Method:** Evaluation documentary cross-sectional study aimed to track cases that occurred from July 1 to December 31, 2019, in critically ill patients, using the methodology of the Canadian Adverse Events Study. For data analysis, McNemar's non-parametric test was used to calculate prevalence rates of adverse events. **Results:** There was a predominance of cases of pressure ulcer, lung sepsis and unplanned removal of feeding tubes. Regarding preventability and severity, adverse events are more severe and less avoidable in spontaneous reporting, inferring underestimation in the reporting of low-severity and highly avoidable events. **Conclusion:** Characterization of adverse events in critically ill patients makes it possible to implement strategies to promote a safety culture.

DESCRIPTORS: Patient Safety, Medical Errors, Epidemiological Monitoring, Intensive Care Units, Reporting.

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INTRODUCTION

Actions for patient safety (SP) aim to promote safe and high-quality care, since although errors are committed by individuals, they can result from poor structural and process conditions. The care environment for critically ill patients admitted to Intensive Care Unit - ICU is highlighted in this study. In addition to unfavorable clinical conditions, the referred environment is equipped with advanced technical tools for performing multiple invasive procedures. Stressful working conditions are additional factors that contribute to predisposing patients to greater risk and, successively, to the occurrence of incidents with or without damage¹.

According to the International Classification of Patient Safety, an incident is defined as any event or circumstance that could have resulted, or did result, in unnecessary harm to the patient. When physical or psychological damage occurs, the incident is considered an adverse event (AE)². It is estimated that 10% of hospitalized patients are affected by these events, representing a direct impact on length of stay, costs and mortality, and demanding care and management actions, in order to reduce their occurrence and severity, since more than half of such events are preventable³. In Brazil, notification of these events is mandatory and is enforced by the Patient Safety Nucleus in Health Care Institutions, which is supposed to plan and disseminate preventive and control actions, based on structural and process indicators.

The most commonly applied methods are voluntary/spontaneous reporting and intentional review of medical records, in this study called active search. This type of epidemiological monitoring is considered the gold standard method, systematized and carried out by a specific team; it can be performed prospectively during hospitalization or after discharge⁴. Active search can be performed, or not, with the use of trackers, that is, explicit criteria that guide the investigation and registration of AE⁵. On the other hand, the spontaneous notification method stems from the voluntary demand of workers, patients and companions; requires guidelines for the correct and timely reporting and motivation. Although spontaneous reporting is more commonly used in hospitals, it is estimated that less than half (40%) of adverse events are documented⁶, resulting in gaps in situational diagnosis. The associated use of the two methods is recommended, in order to aggregate information⁴.

Since adverse events are prevalent in ICUs, spontaneous reporting is performed on demand from the team, and active search is a more reliable method for epidemiological monitoring⁷, the present study formulated the following guiding question: Is epidemiological monitoring of adverse events by active search, with the aid of trackers, a qualitatively superior method for case detection and characterization? Also, the study aims to comparatively characterize the adverse events reported spontaneously and by active search.

METHOD

Evaluation documentary cross-sectional study conducted in a trauma reference ICU in the city of Curitiba, Paraná, in August 2020, concerning patients admitted from July 1 to December 31, 2019. The case registration method was an active search in Group A, consisting of 418 medical records of patients admitted from July 1 to December 31, 2019, aged over 18 and admitted to the facility for more than 48 hours.

The medical records of psychiatric patients, unregistered or unavailable/non-existent records were excluded. For this group, 367 medical records were previously eligible; with the use of the GPower statistical program (87% test power, 95% confidence and 5% error margin), a random sample of 226 medical records was obtained. In Group B, the total

number of patients with case records was obtained through spontaneous reporting of 27 episodes documented in the July 1st -December 31, 2019 period and relevant information was transcribed into a report by the Patient Safety Nucleus of the health institution.

Identification and confirmation of adverse events, for both methods, was performed in two steps. In Step 1, data collection using the active medical record search method was guided by the Canadian Adverse Events Study (CAES)⁸ protocol, with the use of an instrument for tracking potential adverse events⁹. Information related to the events identified by active search and the information contained in the institutional report of notified cases were recorded in an instrument developed for the study. Patients' anonymity was preserved.

Step 2 consisted of the confirmation (or not) of the the adverse events recorded (Groups A and B) by a committee of experts in patient safety (PS), formed by a medical professional and two nurses, based on the concept of AE. Confirmed cases were classified by the medical professional in terms of preventability, ranging from non-preventable (Level one) to totally avoidable (Level six)⁹ and in terms of severity, from minimal effect (Index one) to very high harm (Index five)⁵.

To compare the data obtained by active search (Group A) and spontaneous reporting (Group B) methods, after calculation of the respective prevalence rates, statistical power (80%), significance (95%) and Phi and Cramer's V effect size were used. For the analysis, McNemar's non-parametric test was used in R software, version 3.6, open access.

This study was approved by the Ethics Committee of the Health Sciences Sector of Universidade Federal do Paraná (No 3,910,380) and of Secretaria do Estado da Saúde do Paraná (no 4,435,554), and all ethical and legal precepts regarding research with humans were respected.

RESULTS

In the active search for cases, of the 226 medical records analyzed, trackers were identified in 64 (28.3%), corresponding to 101 potential adverse events. After analysis by the expert committee, 90 cases were confirmed in 55 patients; 11 cases were classified as harmless incidents and were discarded, resulting in a prevalence rate of 24.3%. Events were prevalent in patients over 61 years of age (60%; n=33), men (62%; n=34), with a mean ICU stay of 25 days (ranging from two to 102 days) and with hospital discharge outcome (65%; n=36).

Regarding clinical conditions, there was a prevalence of hospitalization due to trauma (57.9%; n=32), comorbidities (67.2%; n=37), with systemic arterial hypertension being more frequent, in 25 cases (29%).

Table 1 shows the percentage of pressure ulcers; 52 (58%) cases were classified with evidence of moderate to strong possibility of preventability and 69 (76.4%) with low severity.

Table 1 – Type, preventability, and severity of adverse events identified through active search. Curitiba, Paraná, Brazil, 2020 (continues)

Type of adverse event	n	%	Preventability*	Severity**
Pressure ulcer	52	57,8	5	2

Sepsis	10	11,1	3	5
Unplanned removal of the feeding tube	8	8,9	2	2
Phlebitis	5	5,6	3	2
Surgical site infection	4	4,4	6	5
Nasal injury	2	2,2	2	2
Urethral injury	2	2,2	2	3
Transfusion reaction	2	2,2	2	4
Medication error	1	1,1	6	4
Central venous catheter-related infection	1	1,1	6	5
Unplanned extubation	1	1,1	6	5
Fall	1	1,1	6	2
Broncho-aspiration pneumonia	1	1,1	3	2

Legend *Degree of preventability: 6- Virtually certain evidence for possibility of preventability; 5- Moderate to Strong evidence for the possibility of preventability; 3-Unlikely evidence: slightly less than 50% for preventability; 2- Minimal to moderate evidence for the possibility of preventability. **Degree of Severity: 5 – Very high; 4 - High; 3 – Medium; 2 – Low
Source: The authors (2020).

In the same period, according to a hospital report, 27 cases were spontaneously reported in 27 patients, of the 226 medical records analyzed. Seven of these cases were confirmed as AE, resulting in a prevalence rate of 3%. Most cases were medication errors (57%; n=four) and classified as highly preventable and severe (Table 2).

Table 2 – Type, preventability and severity of spontaneously reported adverse events. Curitiba, Paraná, Brazil, 2020

Adverse event	Amount	%	Preventability*	Severity**
Medication error (not specified)	2	29	6	3
Medication error (intrathecal administration)	1	14	3	5
Medication error (ABO mismatch platelet transfusion)	1	14	6	5
Food-related error	2	29	6	3
Skin injury	1	14	6	5

Legend *Degree of preventability: 6 – Virtually certain evidence for the possibility of preventability; 3 - Unlikely evidence: I: slightly less than 50% for the possibility of preventability; **Degree of Severity: 5 – Very high; 3 –Medium.
Source: The authors (2020).

There was a significant difference ($p < 0.001$) between the prevalence identified by active search (24.3%) and by spontaneous reporting (3%). In the analysis by type of event, medication errors were prevalent in spontaneous reporting, and in active search this represented about 1% of the detected cases. Two adverse events related to diet administration accounted for 29% of spontaneous reporting, while in active search this type was not detected. However, skin injuries were the least spontaneously reported events,

with only one case (14%), while in active search it was the most prevalent event reported, with 52 cases (57.7%).

DISCUSSION

The data obtained show that the prevalence of adverse events identified by active search was about 13 times higher than those reported spontaneously (38.9% versus 3.0%), corroborating that this method is the gold standard for the epidemiological monitoring of AEs, contributing to an adequate situational diagnosis. It can be affirmed that the use of the active search method has positive results, promotes the recognition of the problem and favors the planning of preventive and corrective actions¹⁰. Thus, the use of this methodology, associated with voluntary reports of adverse events, is corroborated as a management tool aimed to obtain and qualify information, guide local actions and qualify the care delivered.

The tracking instrument used was effective, for it contributed to the identification of trackers in 64 medical records of the sample (28.3%), a result similar to that obtained by another study that used the CAES instrument for the active search for surgical cases, with detection of triggers in medical records (21.8%)⁶. Therefore, the use of trackers assists in the search for clues in the medical records, configuring an important instrument for the active search for AE. ICUs stand out as one of the sectors that most perform spontaneous reporting, with adverse events more often related to medication and pressure ulcers¹¹. This result is consistent with the most frequently reported and actively detected events in this study, respectively.

The prevalence of adverse events varies according to the care context. Therefore, although it is an indicator of quality of care, in the analysis of the prevalence, patient conditions, the structure and the care process and, mainly, the evolution of these indicators over time must be considered. Based on a situational diagnosis, and considering the severity and potential for the prevention of adverse events, intervention actions must be planned and implemented, so that the indicators reflect the promotion of the high quality of care.

Infection (surgical site and catheter), medication errors, extubation and fall were classified as the events with the highest preventability potential when adverse events were individually analyzed. Press ulcer was an AE that showed moderate to strong evidence for preventability; the others were classified as having minimal to moderate and unlikely evidence of preventability. In short, all adverse events were classified as potentially preventable/avoidable, with preventability between medium and strong (58%). Regarding severity, the adverse events were mostly classified as having minor severity (77%). The results are consistent with another study that analyzed cases in medical and surgical units, presenting them as potentially preventable (49%) and with minimal severity (60%)¹². Thus, the importance of developing actions for the prevention of errors, both systemic and specific to the care context, is reaffirmed. Based on the results obtained, actions targeted to pressure ulcers, medication errors and adverse events associated with the use of devices as prevention priorities can be implemented.

The most prevalent problem in the active search was pressure ulcer (57.8%); in a retrospective search study, this AE also predominated (43.6%). It is classified as a low severity event. However, pressure ulcer is highly preventable. It causes suffering, greater demand for care, with substantial increases in hospital length of stay and costs. The use of technological devices, such as protective coverings and equipment for moving the patient without shear and friction, potentially contribute to avoid injuries. However, proper sizing and qualification of the nursing team are essential components to deliver high-quality individual care¹³.

Sepsis was the second most identified AE (11.1%); its preventability was considered unlikely, but it presents high severity. This condition impacts the mortality rate, as reported in a study carried out in an ICU in Pará, Brazil, which identified 181 patients with sepsis, 114 of whom died (63% lethality)¹⁴. The third most common AE was unplanned removal of feeding tubes, and was classified as a low severity event. In the literature, we found this occurrence classified as having medium damage, and with a high percentage of incidence (45%). Knowing the cause of the problem and the degree of damage can help to implement programs targeted to its prevention¹⁵.

Phlebitis had a low prevalence (5.6%), unlike the investigation conducted in Portugal, with high prevalence (36.7%) and associated with the length of time the catheter remained in place¹⁶. Surgical infection corresponded to 4.4% of the cases, and was classified as certainly avoidable and of very high severity, corroborating a study that claims that it is one of the most serious postoperative complications, and the third most common in health services¹⁷.

Diet-related AEs were not identified through active search. However, there were two notifications, and a medication error, which, despite having accounted for 1.1% in active search, was the most spontaneously reported AE. A study that described and characterized medication errors in pediatric patients had one limitation, namely the lack of records and relevant information in medical records, and the tracking instrument requires qualified information¹⁸, which may justify its non-detection. The low quality of medical records is a limiting factor for the active search method.

The AE with the lowest spontaneous reporting was coincidentally the one with the highest prevalence by active search: pressure ulcer. The low spontaneous reporting of such a condition is strange, since these injuries do not go unnoticed by the health team during daily physical examination, care and management of the wounds. Its high prevalence shows the importance of adopting prevention protocols, such as the use of moisturizers, protection of bony prominences and changes of patient positions¹³.

A limitation of the present study was the incomplete documentation in medical records, especially by nursing professionals who failed to report patients' daily progress and merely documented complications and procedures. Compared to records of other health professionals, these records contained misspelled words and inaccurate, not updated information that was not consistent with the patient's current health status, suggesting that it was a mere reproduction of previous records. Documentation in medical records reveal the fragmentation of knowledge, as workers from each professional occupation only record procedures and care provided, without documenting the general conditions of the patients.

CONCLUSION

In this study, the prevalence of AE was estimated, and it was characterized by the predominance of cases with a low degree of severity and high evidence for preventability. Pressure ulcer was the most detected event by active search and not reported by the team.

With the aid of trackers, active search resulted in a prevalence rate eight times higher compared to spontaneous reporting, corroborating its importance as a method of epidemiological monitoring for realistic situational diagnosis, and an important tool for managing actions targeted to patient safety.

The contribution of the present study concerns the possibility of a better characterization of adverse events in intensive care patients, enabling the implementation of practical and managerial strategies to reduce incidents, promote a culture of patient

safety and quality of care.

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