

## THE PORTRAIT ADVERSE EVENTS IN A MEDICAL CLINIC: ANALYSIS OF A DECADE

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**ABSTRACT:** This was a cross-sectional descriptive observational study aimed at analyzing adverse events in a medical clinic unit of a hospital in Goiás. Data were collected from the reading of 12 nursing registry books completed from January 2005 to December 2014. The analysis found 1,360 adverse events, of which 408 (30%) referred to accidental removal of probes, catheters, and cannulas; 288 (21.2%) to medication errors; 157 (11.5%) to errors involving vascular access; 134 (9.8%) to cases of healthcare-associated infections; 115 (8.4%) to allergic processes; 91 (6.7%) to patient falls; 72 (5.3%) to pressure ulcers; 56 (4.1%) to episodes of lack of blood derivatives; and 39 (2.9%) to evasions. The study shows an increase in the registry of adverse events over the decade, pointing out the need to adopt preventive measures and raising nursing personnel's awareness about the importance of reporting these incidents.

**DESCRIPTORS:** Nursing care; Medical errors; Risk management; Accident prevention; Patient safety.

### O RETRATO DOS EVENTOS ADVERSOS EM UMA CLÍNICA MÉDICA: ANÁLISE DE UMA DÉCADA

**RESUMO:** Estudo observacional do tipo descritivo transversal que teve como objetivo analisar os eventos adversos ocorridos em unidade de clínica médica de um hospital de Goiás. A coleta de dados foi realizada a partir da leitura de 12 livros de registros de enfermagem preenchidos de janeiro de 2005 a dezembro de 2014. Foram encontrados 1360 eventos adversos, dos quais 408 (30%) se referiam a retiradas acidentais de sondas, cateteres e cânulas; 288 (21,2%) erros de medicação; 157 (11,5%) erros envolvendo acesso vascular; 134 (9,8%) casos de infecção relacionada à assistência à saúde; 115 (8,4%) processos alérgicos; 91 (6,7%) quedas de pacientes; 72 (5,3%) úlceras por pressão; 56 (4,1%) episódios de falta de hemoderivados e 39 (2,9%) evasões. O estudo aponta o aumento dos registros dos eventos adversos ao longo da década, indicando a necessidade de adoção de medidas de prevenção e maior conscientização da enfermagem quanto à importância do relato desse incidente.

**DESCRIPTORIOS:** Cuidados de enfermagem; Erros médicos; Gestão de riscos; Prevenção de acidentes; Segurança do paciente.

### DESCRIPCIÓN DE EVENTOS ADVERSOS EN UN SERVICIO DE CLÍNICA MÉDICA: ANÁLISIS DE UNA DÉCADA

**RESUMEN:** Estudio observacional de tipo descriptivo transversal objetivando analizar los eventos adversos ocurridos en unidad de clínica médica de un hospital de Goiás. Datos recolectados a partir de lectura de 12 libros de registros de enfermería completados entre enero de 2005 y diciembre de 2014. Fueron hallados 1360 eventos adversos, de los cuales 408 (30%) hacían referencia a retiros accidentales de sondas, catéteres y cánulas; 288 (21,2%) errores de medicación; 157 (11,5%) errores involucrando acceso vascular; 134 (9,8%) casos de infección relacionada a atención de salud; 115 (8,4%) procesos alérgicos; 91 (6,7%) caídas de pacientes; 72 (5,3%) úlceras por presión; 56 (4,1%) episodios de falta de hemoderivados y 39 (2,9%) evasiones. El estudio expresa el aumento de registros de eventos adversos a lo largo de la década, indicando necesidad de adopción de medidas preventivas y mayor concientización de los enfermeros respecto de la importancia de informar estos incidentes.

**DESCRIPTORIOS:** Atención de Enfermería; Errores Médicos; Gestión de Riesgos; Prevención de Accidentes; Seguridad del Paciente.

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## ● INTRODUCTION

When admitted to a hospital, patients should receive safe and quality care. However, health care failures have caused incidents in care environments, and are considered to be a serious global public health problem.

The publication of the report by the Institute of Medicine named "To Err is Human: Building a Safer Health System" showed that 1,000,000 preventable adverse events (AE) occur every year in the United States of America, contributing to the death of 44,000 to 98,000 individuals in hospitals every year. This has placed the AE as the fourth and ninth most important cause of death<sup>(1)</sup>.

A study carried out in Italy analyzed 1,501 clinical registries in the e-file of hospital discharges, and showed that 3.3% of the patients hospitalized experienced at least one AE<sup>(2)</sup>.

A study performed in Brazil identified the magnitude and severity of AE taking place in surgery clinics. Of the 218 events reported, 78% resulted in minor injury; 16.5% in moderate injury; and, 2.3% in serious injury; while 3.2% resulted in death<sup>(3)</sup>.

The retrospective analysis of 826 AE notice reports in a university hospital in the state of São Paulo showed the occurrence of 1,219 AE incidents and administrative occurrences, of which 12.8% were in medical clinic unit<sup>(4)</sup>.

Regarding the place of occurrence of AE, a study that investigated the medical reports of three teaching hospitals in the state of Rio de Janeiro, comprising a sample of 1,103 patients, identified that 56 suffered preventable AE and 56.9% of these happened in the bedroom or ward<sup>(5)</sup>.

The consequences of AE include extended hospitalization periods; temporary or permanent disability; and even death of the patient<sup>(6)</sup>.

A survey of the National Service United Kingdom Health database found the occurrence of 2,010 fatal AE in 17 months, and the most frequent ones were: failures in acting or recognizing injury caused to the patient (23%); falls (10%); and healthcare-associated infections (10%)<sup>(7)</sup>.

In this context, care systems must be improved and professionals should be attentive to the reality of their institutions, identifying and analyzing adverse events, managing risks and, above all, planning and adhering to the required conducts to reduce injuries and increase the quality and safety of patients' care.

By becoming acquainted with the events that occurred, nursing personnel, as well as managers and the whole multi-professional team, are expected to work in a more visionary fashion, taking on a vanguard position in the search for actions to change this panorama.

Considering that patient's safety and reduction of failures in health care should be priority concerns to health institutions and professionals, this study intends to analyze adverse events in a medical clinic unit of a teaching hospital in Goiânia, Goiás, providing information to plan improvement strategies to increase patient safety.

## ● METHOD

This was a cross-sectional descriptive observational study developed in the medical clinic of a teaching hospital in Goiania. Today, the medical clinic has 59 hospital beds distributed in 13 wards. The unit is responsible for providing care to adult patients in the following medical specialties: cardiology; endocrinology; gastroenterology; hematology; immunology; nephrology; oncology; pulmonology; and rheumatology; and in 2013 had 240 hospitalizations/month on average<sup>(8)</sup>.

Data were collected between January and April 2015 from books used by nursing personnel to record shift transfer, internal communications, requests, and registry of complications between January 2005 and December 2014. However, in 2012 only the period from January to July was analyzed, due to the misplacement of the remainder books. Altogether, 12 minute-like books of 400 pages each

were analyzed.

The nursing record was the analysis unit. Notes were read to identify the entries related to AE occurrence that, when found, were fully transcribed to a semi-structured data collection instrument designed by the researchers. The instrument was composed of open and closed items that comprised information about the event time, kind of event, consequences to the patient, conducts adopted, and category of professionals involved, as well as the transcription of the record found.

Data were structured on a Microsoft Office Excel spreadsheet, version 2011, and were statistically analyzed using the Statistical Package for Social Sciences (SPSS) software, version 19.0, presenting the absolute and relative frequencies. The AE incidence was calculated using the following expression: number of AE/total number of patients admitted to the medical clinic in the period x 100<sup>(9)</sup>.

The study was approved by the Committee of Ethics in Medical Human and Animal Research of the Clinics Hospital of the Federal University of Goiás (report # 064/2008) and developed according to Resolution 466/12 issued by the National Health Council<sup>(10)</sup>.

## ● RESULTS

Between January 2005 and December 2014, there were 13,314 admissions to the medical clinic. In that period, 1,360 adverse events were identified. Consequently, the AE incidence per 100 admitted patients was 10.2 (1,360 of 13,314; CI 95%: 9.7-10.7). The AE distribution is presented in Table 1.

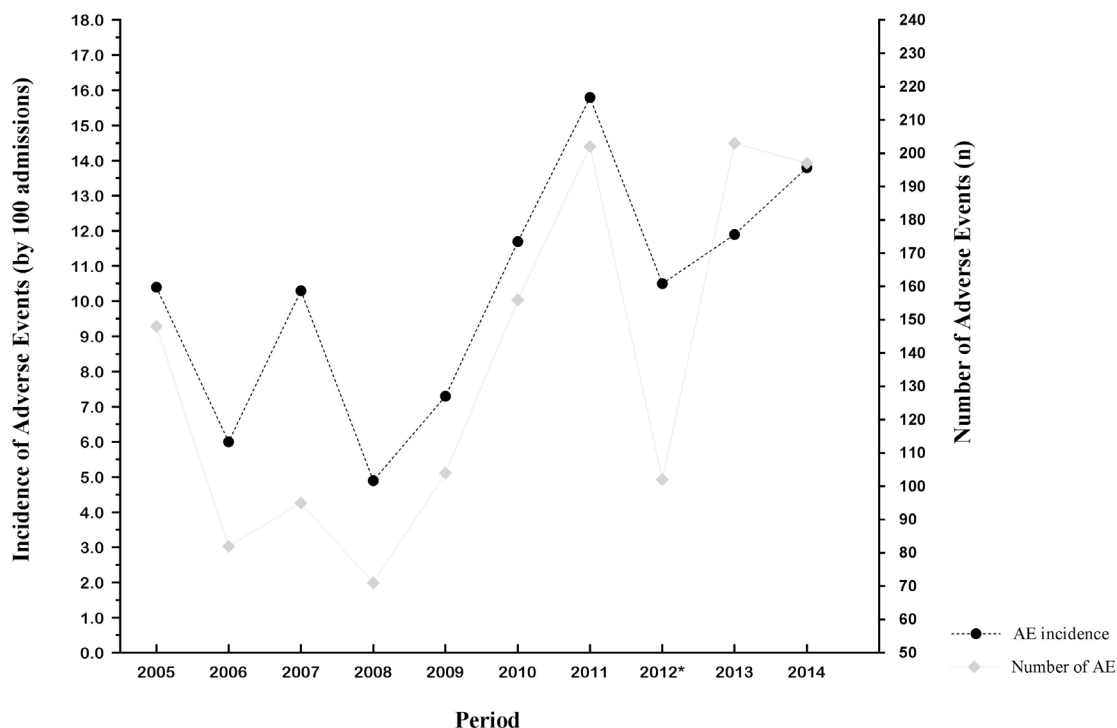
Table 1 shows that the most frequent adverse events were accidental removal of probes, catheters, and drains (408; 30%), followed by medication errors (288; 21.2%) and vascular access-related events (158; 11.5%). It is worth mentioning that more than one AE was identified in some notes.

Figure 1 shows the historical series of adverse events by number and incidence over the period under analysis.

Table 1 - Distribution of adverse events in the medical clinic unit of a teaching hospital, according to type and year of occurrence. Goiânia, Goiás, Brazil, 2015

Type of Adverse Event	Year										Total	
	2005	2006	2007	2008	2009	2010	2011	2012*	2013	2014	N	%
Accidental removal of probes, catheters, and drains	55	35	34	27	46	41	47	24	48	51	408	30
Medication errors	20	5	12	11	11	22	49	25	71	62	288	21.2
Vascular access-related events	18	8	13	5	5	19	32	12	16	29	157	11.5
Healthcare-associated infections	20	11	4	5	8	26	26	14	18	2	134	9.8
Allergic process	12	16	13	13	6	11	14	8	11	11	115	8.4
Patient's fall	9	3	5	7	7	15	15	2	11	17	91	6.7
Pressure ulcers	8	2	9	1	14	7	6	6	11	8	72	5.3
Lack of blood derivatives	1	1	1	0	1	10	11	7	13	11	56	4.1
Evasion	5	1	4	2	6	5	2	4	4	6	39	2.9
<b>TOTAL</b>	<b>148</b>	<b>82</b>	<b>95</b>	<b>71</b>	<b>104</b>	<b>156</b>	<b>202</b>	<b>102</b>	<b>203</b>	<b>197</b>	<b>1.360</b>	<b>100</b>

\* Analysis of nursing registries in a seven-month period.



\* Analysis of nursing registries in a seven-month period.

Figure 1 - AE incidence (per 100 patients) and number of AE. Jan 2005–Dec 2014

Figure 1 shows a decrease in adverse events in 2012; however, it is worth mentioning that the books from August to December for that year were not analyzed. The proportionality calculation for that year shows an increase in the number of AE to 175 in 12 months. In other words, nursing registries of AE kept on increasing from 2008 onwards.

The results related to the event “accidental removal of probes, catheters, and drains” were the most frequent, segregated by kind of device involved and year of occurrence, and are presented in Table 2.

Table 2 - Distribution of adverse events of the type “accidental removal of probes, catheters and drains” in the medical clinic unit of a teaching hospital, according to type and year of occurrence. Goiânia, Goiás, Brazil, 2015

Type of Device	Year										Total	
	2005	2006	2007	2008	2009	2010	2011	2012*	2013	2014	N	%
Nasoenteral Probe	44	23	19	23	36	36	34	19	37	31	302	74
Nasogastric Probe	5	4	10	0	3	0	1	2	4	3	32	7.8
Long-term urinary catheters	4	2	2	2	3	2	4	2	1	4	26	6.4
Orotracheal Tube and Joints	0	1	0	0	2	0	2	0	1	5	11	2.7
Gastrostomy	0	2	0	0	0	2	0	0	1	1	6	1.5
Jejunostomy	0	0	0	0	0	0	0	0	2	1	3	0.7
Rectal Probe	0	0	0	0	0	0	0	1	0	1	2	0.5
Others**	2	3	3	2	2	1	6	0	2	5	26	6.4
<b>TOTAL</b>	<b>55</b>	<b>35</b>	<b>34</b>	<b>27</b>	<b>46</b>	<b>41</b>	<b>47</b>	<b>24</b>	<b>48</b>	<b>51</b>	<b>408</b>	<b>100</b>

\* Analysis of nursing registries in a seven-month period.

\*\* Tubes, O2 catheter, and drains

Table 2 shows that the nasoenteral probe was the device most frequently involved in cases of accidental removal. According to some reports of nasoenteral and nasogastric probe removal, patients removed it because they believed they could eat by themselves. This brings about a question of the proper indication and potential uncontrolled use of the device. This question is reinforced by the fact that sometimes after removing the probe and providing oral feeding, the professional did not establish a new procedure and discuss the actual need with the team.

Regarding the moment of occurrence of events such as “accidental removal of probes, catheters, and drains” removals happened when the patient was moving, bathing, going to the toilet, sleeping, or during episodes of confusion without contention.

Medication errors were the second type of adverse event with the largest number of cases identified, as shown in Table 3.

Table 3 shows that errors of omission had a higher incidence (120; 41.1%), followed by errors of time (72; 24.6%) and of dosage (33; 11.3%).

Among the 120 errors of omission, 50 (41.7%) were in detriment of medications not administered by the nursing team, with no justification, while 20 (16.7%) were due to delay in the delivery of the prescription, card, control, or label to the pharmacy. It is worth mentioning that the hospitalization unit investigated follows a routine that defines the time of delivery and receipt of forms regarding controlled drugs and antibiotics in the pharmacy. If the schedule is not complied with, it impairs the distribution and preparation of medications.

Table 3 - Distribution of “medication errors” adverse events in the medical clinic unit of a teaching hospital, according to type and year of occurrence. Goiânia, Goiás, Brazil, 2015

Kind of Error	Year										Total	
	2005	2006	2007	2008	2009	2010	2011	2012*	2013	2014	N	%
Error of omission	11	2	6	5	3	9	21	14	30	19	120	41.1
Error of time	4	2	2	1	0	2	8	4	23	26	72	24.6
Error of dosage	3	1	4	2	3	0	6	2	5	7	33	11.3
Wrong infusion speed	0	0	0	2	2	4	9	0	3	6	26	8.9
Change of patients	2	0	0	0	0	3	2	0	4	1	12	4.1
Non-adherence of the patient to the treatment	0	0	0	0	0	2	2	0	3	1	8	2.7
Change of medication	0	0	0	1	0	0	2	0	2	2	7	2.4
Error in medication manipulation	0	0	0	0	0	0	0	3	0	1	4	1.4
Wrong route	0	0	0	0	1	1	0	0	0	0	2	0.7
Error of prescription	0	0	0	0	0	0	0	2	0	0	2	0.7
Accident with medication available**	0	0	0	0	1	0	0	0	0	1	2	0.7
Damaged medication	0	0	0	0	0	0	0	1	0	0	1	0.3
Unauthorized medication	0	0	0	0	0	0	0	0	0	1	1	0.3
Wrong presentation of medication	0	0	0	0	1	0	0	0	0	0	1	0.3
Error of administration	0	0	0	0	0	1	0	0	0	0	1	0.3
<b>TOTAL</b>	<b>20</b>	<b>5</b>	<b>12</b>	<b>11</b>	<b>11</b>	<b>22</b>	<b>50</b>	<b>26</b>	<b>70</b>	<b>65</b>	<b>292</b>	<b>100</b>

\* Analysis of nursing registries in a seven-month period.

\*\*Medication available: medication to which the companion and patient had access with no monitoring by nursing. Example: medications left on the headboard or brought by the patient.

Other causes identified to have caused this error were: shortage of medication in the institution (nine; 7.5%); non-attendance by a physician for intrathecal administration (four; 3.3%); non-distribution of medication by the pharmacy due to lack of prescription (three; 2.5%); non-distribution of medication by the pharmacy with no justification (three, 2.5%); patient not in bed at the time scheduled for medication (three; 2.5%); medication prescribed not standardized by the hospital (three; 2.5%).

Records showed problems in interpersonal relationships between different categories of professionals in the unit, and lack of awareness of their roles in the process, since some prescriptions were not even sent to the pharmacy because of ignorance or misunderstanding about personnel's respective responsibilities.

The medical team contributed to omissions of medication by taking slips and medical records from the clinic for undefined times, or by placing prescriptions and controls in other sites than those agreed on by the multi-disciplinary team, hindering the access of the nursing team to the prescriptions of the day, leading to delays and omission of primary nursing care such as medication.

Errors of time totaled 72, mostly related to delay of medication distribution by the hospital pharmacy (16; 22.2%); problems with infusion pumps (nine; 12.5%); inadequate temperature of chemotherapy drugs by the time of administration (seven; 9.7%); lack of prescription, slip, or control in the clinic (five; 6.9%); wrong drug scheduling (four; 5.5%); and patients with no venous access (three; 4.2%). Ten reports (13.9%) presented no justification for the delay.

Errors of time were associated with inadequate drug scheduling resulting from misinterpretation of the prescription or miscalculation of time intervals. Inadequate drug scheduling results in expenses to the institution, and can cause under- or over-dosing of medication.

Regarding delays in medication administration, the study found frequent delays in distribution by the pharmacy. Problems with infusion pumps were also found, mainly due to a shortage in the number of machines and long periods of use. In the period studied, the clinic received new infusion pumps that were associated with errors because the team was not skilled in handling them.

Sometimes the nursing team, by the time of medication administration, left the oral medications for patients or companions to administer. Errors related to this practice were also observed, such as intake of dosages higher than those prescribed, or changes in medication because of confusion with other patients.

Events related to vascular access reported an excessive occurrence rate and point out flaws in this procedure, which is routinely performed by the nursing team. These are presented in Table 4.

The most frequent events related to vascular access were: unscheduled removal (54; 34.4%) and inefficient access (48; 30.6%). However, the study found direct injuries related to events such as liquid overflow (28; 17.8%); phlogistic signs (14; 8.9%); and bleeding (nine, 5.7%).

Table 4 - Distribution of adverse events associated with vascular access in the medical clinic unit of a teaching hospital, according to type and year of occurrence. Goiânia, Goiás, Brazil, 2015

Kind of event	Year										Total	
	2005	2006	2007	2008	2009	2010	2011	2012*	2013	2014	N	%
Unscheduled removal	17	6	7	2	0	8	1	1	2	10	54	34.4
Inefficient access	1	1	3	1	3	8	16	4	4	7	48	30.6
Overflow	0	1	2	1	2	0	9	3	3	7	28	17.8
Phlogistic signs	0	0	1	1	0	0	4	1	3	4	14	8.9
Bleeding	0	0	0	0	0	3	1	3	2	0	9	5.7
Obstruction	0	0	0	0	0	0	1	0	2	1	4	2.5
<b>TOTAL</b>	<b>18</b>	<b>8</b>	<b>13</b>	<b>5</b>	<b>5</b>	<b>19</b>	<b>32</b>	<b>12</b>	<b>16</b>	<b>29</b>	<b>157</b>	<b>100</b>

\* Analysis of nursing registries in a seven-month period.

## ● DISCUSSION

In 10 years of nursing recording, according to the scientific literature, 1,360 adverse events were identified, that is, 11.3 AE per month on average, with 10.2% incidence<sup>(1,9)</sup>, where those related to accidental removal of probes, catheters, and drains were the most frequent.

A study that analyzed nursing records in a surgery clinic unit from 2005 to 2009, identified the occurrence of 264 AE, where the removal of probes, catheters, and drains was also the event with the highest incidence<sup>(11)</sup>. Nasoenteral probes are one of the most prevailing procedures in health care, being highly recommended in chronic and irreversible disorders<sup>(12)</sup>.

Results show that nurses seem to fail in adopting preventive measures against unscheduled probe removal, including guidance to patients and family members regarding the indications for the procedure, the care required with the device, and the risks of unscheduled removal, as well as the risks resulting from a new procedure such as those for nasal and oropharyngeal lesions.

Measures such as evaluation of the existence of delirium or dementia, information to the team and family about the risks of accidental removal, promotion of the participation of family members and companions in non-pharmacological efforts to reduce risks, and mechanical contention for less than 12 hours are some measures that nursing personnel can implement to try to reduce the accidental removal of catheters, probes, and drains<sup>(13)</sup>.

Medication-related adverse events were also very frequent, being quoted as very common events in the scenario of hospital care, largely approached by the scientific literature because of their severity and the risk of irreversible injuries or even death. There are several factors related to the occurrence of these events, notably the complexity of the medication system, which consists of interconnected and interdependent phases performed by more than one category of professional, in addition to poor communication within the multi-disciplinary team.

In Brazil, safety protocols in the prescription, use, and administration of medications by the Ministry of Health, prepared in partnership with the Brazilian Agency of Sanitary Surveillance (ANVISA), provide for several steps, including the nine correct ones, comprising the ways of prescribing, distributing, and administering medication in order to reduce injuries to the patient<sup>(14)</sup>.

It is worth mentioning that nursing personnel participate in the storage and identification of medications distributed to the ward, and these medications should be kept by them until the return to the pharmacy of remainders of medications administered, considering that medication stock in wards is an important source of errors of administration<sup>(14)</sup>.

Omission was the main medication error found in this study, and could be associated with the nursing team's overload, resulting from high absenteeism rates and a high number of medical licenses and unjustified absences observed in the institution, as pointed out by a survey carried out in the Mid-West region of Brazil<sup>(15)</sup>.

The use of technologies in the medication process may be a risk factor for the maintenance of patients' safety. This could be associated with a lack of or improper training or neglecting the information received, leading to increased complications in patients' therapy, notably the automatic infusion of dosages different from the prescribed ones<sup>(16)</sup>.

Vascular access is used, among others, to administer medications and is an open route that exposes patients to the risk of healthcare-associated infections when unduly handled. Unscheduled removal not only increases material costs to the institution and demands rework by the team, but also subjects the patient to a new invasive and painful intervention that can cause physical and psychological damage.

The prevention of infusion failures contributes to reducing repeated reinsertions that, besides causing pain, also cause injuries to the peripheral venous network, hurting the patient's defense network and generating uneasiness and concern<sup>(17)</sup>. Many times unscheduled removal happens because of the stress of the patient that is not contained mechanically or through medication, or even when the patient leaves the clinic to undergo procedures such as exams, hemodialysis, or surgeries.

Uncooperative patients also interfere in the medication process, showing failures of the nursing team regarding guidance to the patient and companions about the procedure and the importance of non-removal, in addition to the consequences of unscheduled vascular access removal.

Understanding that adverse events should be analyzed and their causes investigated using a systemic and multifactorial approach is the hugest challenge that health organizations must cope with to the benefit of patient safety.

## ● CONCLUSIONS

The study showed the problem and persistence of adverse events over the course of a decade, pointing out the need to adopt preventive measures to change this reality that depicts episodes of poor quality care. It has also shown the increase in reports of adverse events along the years, evidencing more awareness of nursing personnel regarding the importance of putting on record this kind of healthcare-related incident.

Although it is not the purpose of nursing reports to notify competent authorities of adverse events, these reports could serve as source of information and could allow the identification of occurrence and different types of AE.

Because of their complexity, there is a need for in-depth studies on each kind of adverse event and its causes and consequences. Medical records should also be analyzed to check whether the same events were recorded in the medical records of patients hospitalized in the medical clinic.

Considering the evidence presented in this study, measures should be adopted to halt the continuation of occurrence of injuries to patients seeking care in hospital institutions.

There is an urgent need for the adoption of a culture of patient safety and other measures to manage risk, improve communication in the multi-disciplinary team, establish organizational protocols oriented to patient safety, and consistently evaluate working structures and processes to improve care results.

The study presented limitations related to the quality of information disclosed in nursing records, because many notes lacked full and detailed information about adverse events, hindering an in-depth investigation and creating gaps around the causes and consequences of AE, as well as clinical and managerial conduct regarding occurrences, among others.

## ● ACKNOWLEDGMENT

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