

# ADVERSE EVENTS IN A HOSPITAL SURGICAL UNIT: A DESCRIPTIVE STUDY

*Eventos adversos em uma unidade de internação cirúrgica: estudo descritivo*  
*Eventos adversos en una unidad de internación quirúrgica: estudio descriptivo*

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**ABSTRACT: Objective:** Verify the occurrence of infection at surgical sites, loss, or infection of venous access and falls in patients hospitalized in the Surgical Inpatient Unit of a Teaching Hospital. **Method:** Descriptive study with a quantitative approach. The period of data collection was between March 23 and April 14, 2015 on alternating days, totaling 94 patients. **Results:** The average hospitalization time was 8.46 days, with a standard deviation of 11.294. A total of 20 (7.9%) adverse events were observed. There were nine (3.6%) records of venous access loss, seven records of surgical site infections (2.8%), and four (1.6%) records of venous access infection. **Conclusion:** It was observed that the occurrence index of the adverse events was greater than in a similar study, showing the need for actions that stimulate the recording of adverse events and the promotion of patient's safety.

**Keywords:** Perioperative nursing. Patient Safety. Iatrogenic disease.

**RESUMO: Objetivo:** Verificar a ocorrência de infecção do sítio cirúrgico, perda ou infecção do acesso venoso e quedas em pacientes internados em Unidade de Internação Cirúrgica de um Hospital de Ensino. **Método:** Estudo descritivo de abordagem quantitativa. O período de coleta de dados foi entre 23 de março e 14 de abril de 2015, em dias alternados, totalizando 94 pacientes. **Resultado:** A média do tempo de internação foi de 8,46 dias, com desvio padrão de 11,294. Observou-se um total de 20 (7,9%) eventos adversos. Houve nove (3,6%) notificações de perda do acesso venoso, sete notificações de infecção do sítio cirúrgico (2,8%) e quatro (1,6%) notificações de infecção do acesso venoso. **Conclusão:** Observou-se que o índice de ocorrência dos eventos adversos foi superior a um estudo semelhante, evidenciando a necessidade de ações que estimulem a notificação de eventos adversos e a promoção da segurança do paciente. **Palavras-chave:** Enfermagem perioperatória. Segurança do paciente. Doença iatrogênica.

**RESUMEN: Objetivo:** Verificar la ocurrencia de infección del sitio quirúrgico, pérdida o infección del acceso venoso y caídas de pacientes internados en Unidad de Internación Quirúrgica de un Hospital Escuela. **Método:** Estudio descriptivo de abordaje cuantitativo. El período de colecta de datos fue entre el 23 de marzo y el 14 de abril de 2015, en días alternados, totalizando 94 pacientes. **Resultado:** El promedio del tiempo de internación fue de 8,46 días, con desvío estándar de 11,294. Se observó un total de 20 (7,9%) eventos adversos. Hubo nueve (3,6%) notificaciones de pérdida del acceso venoso, siete notificaciones de infección del sitio quirúrgico (2,8%) y cuatro (1,6%) notificaciones de infección del acceso venoso. **Conclusión:** Se observó que el índice de ocurrencia de los eventos adversos fue superior a un estudio semejante, evidenciando la necesidad de acciones que estimulen la notificación de eventos adversos y la promoción de la seguridad del paciente.

**Palabras clave:** Enfermería perioperatoria. Seguridad del Paciente. Enfermedad iatrogénica

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## INTRODUCTION

The health system develops curative and preventive actions in order to promote patient safety; however, even in the best institutions, patients present risks of being victims of adverse events (AE).<sup>1</sup>

To foster the commitment toward the promotion of patient safety in all of states that are a member of the World Health Organization (WHO), the World Alliance for Patient Safety, every two years, formulates the Global Challenges for patient safety. In 2009, surgical assistance was listed as a problematic area for the second global challenge for patient safety, and a Manual for Safe Surgery was prepared, entitled *Safe Surgery Saves Lives*, with the purpose of minimizing unnecessary loss of life and serious complications.<sup>2</sup>

Despite WHO announcing surgical assistance as a problematic area, the second global challenge contemplates the operating period with little or no emphasis on the pre-operating and post-operating periods. However, other actions are recommended and stimulated by WHO, contributing to the surgical patient's safety in all phases, such as avoiding the exchanging of patients to provide any care, ensure proper communication between the teams, and avoid bad connection tubes and catheters.<sup>3</sup>

Even with the creation of commissions, alliances, and public policies aimed at the promotion of patient safety in various aspects, the occurrence of incidents and AE exists in the reality of health services. These occurrences can impact the Single Health System (SUS) by resulting in, in some situations, the increase of mortality, morbidity, length of patient's treatment time, assistive costs, among others.<sup>4</sup>

As such, under this scenario, the health and nursing teams have a fundamental role in the promotion of patient safety and quality of services, which influences directly in the prevention of occurrence of the incidents, errors, and AE<sup>5</sup>. The occurrence of AE may have many causes, among them, those related to the sizing up of professionals; the professional training and qualification; the available materials and equipment; structural conditions; access to new technologies and information; work process, among others.<sup>6</sup>

In relation to surgical AE, a study was performed by means of retrospective revision of records of patients admitted in 2003 at three general public and teaching hospitals located in the state of Rio de Janeiro. The final

sample was composed of 1,103 patients, of which 18 had some surgical AE, configuring an incidence of 3.5%. Among the patients with surgical AE, three (7.9%) had more than one AE, resulting in an average of 1.1 events per patient, and the proportion of avoidable surgical AE was estimated at 68.3%. The most common surgical AE were related to surgical wounds, which occur in 46.3% of the AE. 19.5% were because of surgical wound infection and 26.8% were because of other problem with a surgical wound. Infection not related to surgical wounds occurred in 14.6%, and hemorrhages in 12.2% of the AE.<sup>7</sup> Some studies performed in surgical inpatient units highlighted the occurrence of several specific AE, like, for example, falls, removal of probes, drains, and catheters, and surgical site infection (SSI).<sup>7-9</sup>

In light of this context, and recognizing of the fact that the actions of the nursing team can prevent the occurrence of errors and AE promoting patient safety, this study has the following research question: what is the occurrence of infection of the surgical site, loss or infection of the venous access, and falls in hospitalized patients in a Surgical Inpatient Unit of a Teaching Hospital (TH)?

Thus, the objective of the study was to verify the occurrence of surgical site infection, venous access loss or infection, and falls in patients hospitalized in the Surgical Inpatient Unit of a TH.

## METHODS

Descriptive, quantitative research, performed in a surgical inpatient unit of a university hospital in southern Brazil. Data collection was conducted between March 23 and April 14, 2015, on alternate days. The unit of choice attends to head and neck surgery, gastrointestinal and biliary tract, chest, otolaryngology, maxillofacial, liver transplantation, and neurosurgery. In the year 2013, 1,489 patients were hospitalized in that unit, with a monthly average of approximately 730 hospitalizations. 2,259 surgeries were performed, 738 clean surgeries, 1,248 potentially contaminated surgeries, 233 contaminated surgeries, and 40 infected surgeries.<sup>10</sup>

To calculate the sample size, we considered the number of patients admitted in this surgical unit in 2013, with data obtained from the Epidemiological Bulletin of the Hospital Infection Control Commission, which was from 1,489 patients. SestatNet, the teaching and learning statistics computer

program was used, resulting in a sample of 94 patients, with a 95% confidence level. This study included all patients of both sexes, older than 15 years old, admitted to the Inpatient Surgical Unit I (UIC I) until reaching the minimum number of 94 patients.

Four instruments were used for data collection:

1. A guide for the characterization of patients and identification of EA;
2. A guide for assessing the occurrence of falls;
3. A guide for assessing the occurrence of SSI;
4. A guide for assessing the occurrence of venous access loss or infection.

The instruments were validated by means of a pretest conducted with 28 patients, prior to data collection, the results of which were not used for data analysis. These instruments were built from the concepts and studies found in the literature review.

In the days of data collection, all hospitalized patients were evaluated and interviewed in order to identify the occurrence of EA. 252 assessments were made in 94 selected patients.

Data were recorded in the Statistical Package for the Social Sciences (SPSS) statistical software. For the analysis of categorical variables, the frequency distribution and the  $\chi^2$  test were used, and for quantitative variables the mean, standard deviation (SD), and analysis of variance with a fixed factor were utilized. For inferential analyses, the significance level was 5%.

The project was submitted to the Ethics and Research Committee with Humans Beings of the original Teaching Institution, and received a favorable opinion - Presentation of Certificate for Ethics Assessment 39652314.6.0000.0115.

## RESULTS

The data found were analyzed and divided into three categories for analysis, which were patient demographics; occurrence of surgical site infection; occurrence venous access loss; and occurrence venous access infection.

### Patient Demographics

An age variation between 15 and 83 years was observed. The average patient age was 50.04 years with SD of 16.928. Regarding gender, 57 patients (60.6%) were women and

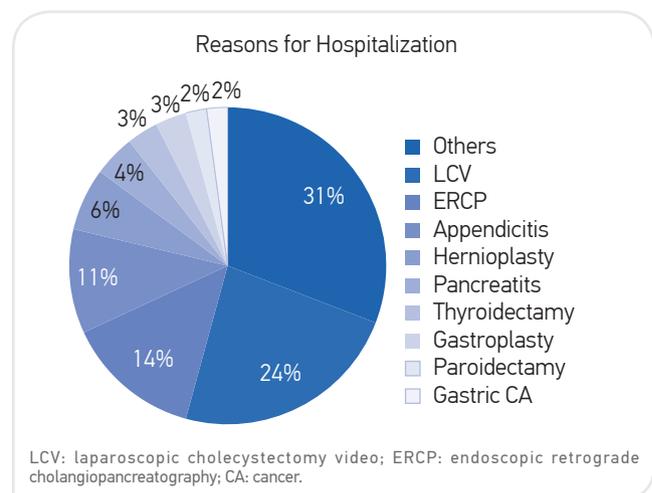
37 (39.4%) were men. Assessing marital status, it was found that 51 of them (54.3%) were married, 21 (22.3%) were single, 12 (12.8%) were widowed, 6 (6.4%) were divorced, and 4 (4.3%) had stable partners. Observing education, it was found that 27 (28.7%) patients had not completed elementary education; 26 (27.7%) had completed high school; 14 (14.9%) had completed elementary education; 10 (10.6%) had not completed higher education; 8 (8.5%) had not completed high school; 7 (7.4%) had completed higher education; and 2 (2.1%) patients were illiterate.

The length of stay of patients ranged from 0 to 59 days, with a mean of 8.46 hospital stay days, with PD of 11.294.

The reasons patients were admitted were different. Hospitalizations for laparoscopic cholecystectomy video (LCV) and endoscopic retrograde cholangiopancreatography (ERCP) were the most prevalent. Admissions for appendicitis, hernioplasty, gastroplasty, and thyroidectomy were also observed. With a lower prevalence, gastric cancer and parioectamy were observed. It is possible to view this data in Figure 1.

Regarding the presence of infection prior to the admission date, it was observed that 76 (80.9%) patients did not show any previous infection and 18 (19.1%) patients were admitted with some type of previous infection.

In relation to the occurrence of EA, SSI, venous access loss, venous access infection, and falls in 252 evaluations, a total of 20 (7.9%) EA were observed. There were nine (3.6%) records of venous access loss, seven (2.8%) SSI records,



**Figure 1.** Percentage of Reasons for Hospitalization. Florianópolis, Santa Catarina, Brazil, 2015.

four (1.6%) records venous access infection, and there was no occurrence of falls (Figure 2).

## Occurrence of surgical site infection

Patients who developed SSI were an average age of 46.7 years. Four of them were female and three were male. Most of them had a low level of education. Reasons for hospitalization were hepatic abscess, acute abdomen, cholecystitis, appendicitis, exploratory laparotomy, liver cell carcinoma, and choledocholithiasis.

The average preoperative hospital stay of seven patients who developed SSI was 4.86 days with a DP of 7,493. The minimum preoperative hospital stay time was zero days, and the maximum time was 21 days.

Regarding the degree of surgery contamination of the patients who developed SSI, two performed what is considered clean surgery, three practiced surgery that was considered potentially contaminated and there were two surgeries that were considered contaminated. Regarding the type of surgery of patients who developed SSI, three surgeries were chosen and four were in an emergency situation. Regarding the size of the surgery, patients who developed SSI, two surgeries were small, three surgeries were medium-sized, and two were large. Regarding the surgical risk all patients who had developed SSI presented ASA II – a score for a subjective evaluation of the general health of the patient by the American Society of Anesthesiologists (ASA).

In relation to the classification of the wounds of the patients who developed SSI, six wounds were classified as deep incisional infections and one as an organ/space infection.

After the first record of SSI, the wounds were accompanied and evaluated in their evolution, resulting in 24 evaluations of infected wounds. Figure 3 to follow, shows the presence of phlogistic signs during the evaluations of the infected surgical wounds:

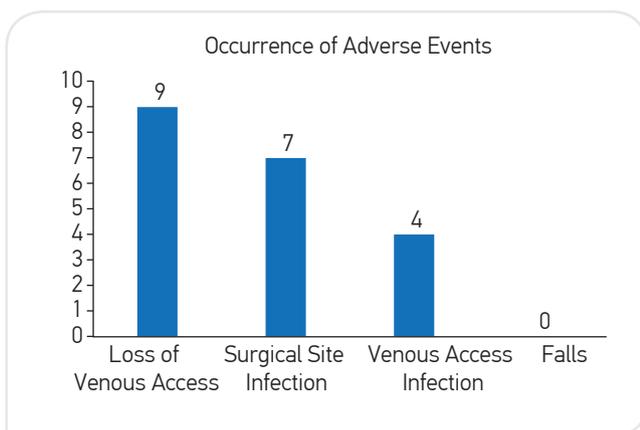
Pain was mentioned in 9 (37.5%) evaluations and wasn't mentioned in 15 (62.5%) of them; flushing was identified in 3 (12.5%) evaluations and wasn't identified in 21 (87.5%) of them; edema was verified in 6 (15%) evaluations and absent in 18 (75%); and fever was absent in all of them.

In relation to the presence of suture dehiscence during the evaluations of the infected wounds, 4 (16.6%) wounds were observed with an absence of dehiscence and 20 (83.3%) with dehiscence. In relation to the presence of exudate in the infected wound, the presence of exudate in all of the wounds was found.

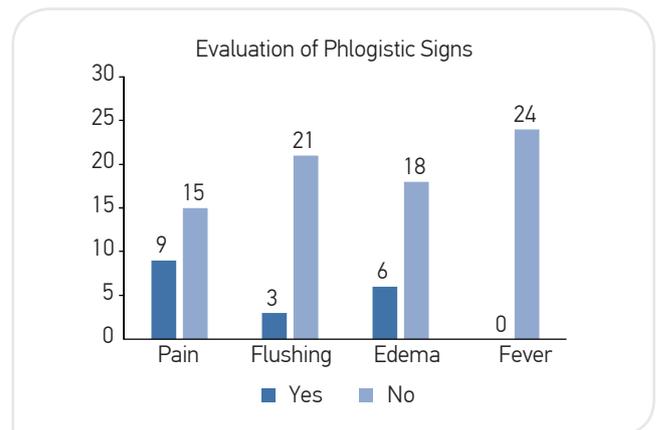
With respect to the presence of drainage in the patients with SSI, the absence of drainage was observed in 11 (45.8%) evaluations, 10 (41.6%) with penrose drainage, and 3 (12.5%) with tubular drainage. About the type of drainage exudate, it was observed that in 11 (45,8%) evaluations exudate was absent, in 5 (20,8%) the drainage was purulent, in 3 (12.5%) the drainage was serosanguineous, in 2 (8.3%) the drainage was bilious, in 2 (8.3%) the drainage was serous, and in 1 (4.1%) the drainage was seropurulent.

## Occurrence of venous access loss

It was found in this study that in the nine occurrences of venous access loss, the type of access was peripheral, so there was no occurrence central venous access loss in any of the observations.



**Figure 2.** Occurrence frequency of the adverse events in the 252 evaluations. Florianópolis, Santa Catarina, Brazil, 2015.



**Figure 3.** Presence or absence of Phlogistic Signs in Surgical Site Infections. Florianópolis, Santa Catarina, Brazil, 2015.

In relation to the length of time of venous puncture, in days, in the occurrences of venous access loss, a statistical significant difference was not observed. In three occurrences, the length of time of venous puncture was in one day; in two occurrences, the length of time was two days; in two occurrences, the length of time was three days; and in two occurrences the nursing team did not register the length of time of puncture.

In relation to the exchange of treatment of the venous access, it was noted that 100% of the treatment exchanges were performed every 72 hours, by mid-level nursing professionals, using alcoholic chlorhexidine 0.5% as an antiseptic. And, in relation to the fixing of the catheter, five were fixed with micropore and four with transparent film.

Regarding the site of venous puncture, in the occurrence of venous access loss, it was observed that four punctures were in the arm, three in the forearm, one in the antecubital fossa, and one in the dorsum of the hand. In relation to the coloration of the skin in the occurrence of loss of venous access, five patients were observed with white skin color, two patients with brown skin, and two patients with black skin.

Upon observing the occurrence environment of the loss of venous access, it was found that in six occurrences the serum medium was fixed on a wall and in three, the serum medium was rotating. In relation to the type of venous infusion, it was perceived that in seven occurrences, the infusion was continuous and in two the infusion was slow.

Concerning the solution infused in the venous access, the presence of a physiological solution was observed in nine occurrences and antibiotics in four occurrences, and the absence of the infusion of glucose solutions at 5, 10, and 50%; ringer; ringer lactate; vasoactive drugs; antifungal and parenteral nutrition. Upon observing the devices used in venous access, it was perceived that eight of them used intermediate extenders and one used only equipment with a lateral injector. In relation to the size of the catheter under the needle used for venipuncture, eight were a 24 gauge and one was a 22 gauge.

In relation to the presence of the phlogistic signs, there was a local pain in four occurrences and flushing in four occurrences. Phlebitis, fever, and purulent exudate were absent.

## Occurrence of venous access of

Upon analyzing the instances of venous access infection, it was observed that of the four instances of venous access infection, the type of access was peripheral, and there was not an instance of loss of central venous access in any of the observations.

In relation to the length of time of venous puncture in days, in the instances of venous access infection, it was observed that in two instances, the length of time of venous puncture was one day, in one instance it was two days, and in one instance, it was three days, showing the absence of statistically significant difference.

Upon observing the frequency of exchange treatment of the venous access, it was found that in 100% of the instances, mid-level nursing professionals, using alcoholic chlorhexidine 0.5% as an antiseptic, performed the healing exchange every 72 hours. In relation to the fixing of the catheter, one was with micropore and three were with transparent film.

Concerning the site of venous puncture in the instance of access infection, three punctures in the arm and one in the forearm were observed. In relation to the skin coloring in the instance of venous access infection, two patients were observed with white skin, one patient with brown skin, and one black patient.

Observing the environment where the venous access infection occurred, it was found that in three instances the serum medium was fixed on the wall, and in one the serum medium was in rotation. In relation to the type of venous infusion, it was perceived that in three instances the infusion was continuous and in one the infusion was slow. Regarding the solution infused in the venous access, the presence of a physiological solution was observed in four instances and an antibiotic solution was observed in one. And therefore the infusion of glucose solutions at 5, 10, and 50%, ringer, ringer lactate, vasoactive drugs, antifungal drugs, and parenteral nutrition were absent. By observing the devices used in the venous access, it was perceived that three use intermediate extenders and only one used equipment with a lateral injector. Concerning the catheters used in venipuncture, all of them were of a 24 caliber.

Regarding the presence of the phlogistic signs, there was local pain observed in four occurrences and flushing in four occurrences. Phlebitis, fever, and purulent exudate were absent.

It was observed that there was a simultaneousness between the loss of venous access and the occurrence of infection of the venous access in four patients.

## DISCUSSION

The average time of the patients' hospitalization was 8.46 days. According to the National Supplementary Health Agency

(ANS), this data is an indicator of hospital performance, and an average over 7.0 days of hospitalization in acute hospitals increases the risk of hospital infection. This same document indicates that some general hospitals, without teaching activities, reported an average of patient hospitalization time between 3.5 and 6.4 days.<sup>11</sup> However, in this TH, the average length of hospitalization time was greater than indicated by ANS and greater than other general hospitals without teaching activities.

As such, we can consider that this prolonged hospitalization period is related to the characteristic of the hospital being studied that develops teaching activities and the specificity of treatment performed in clinical surgery, in which the patients find themselves in particular moments that make up the surgical experience, like the pre-, intra-, and post-operative periods.<sup>12</sup> However, the majority of patients were hospitalized for punctual and surgical situations and a few days after surgery, patients received discharge.

Regarding the index of occurrence of surgical AE, it was observed that this was greater than a similar study, performed in three general public hospitals and teaching hospitals, which with the incidence of the 1,104 patients with surgical AE was 3.5%.<sup>7</sup>

Among surgical AEs, SSI stands out in that it is contained in the scenario of hospital infections, defined as any infection acquired after admission and manifested during hospitalization or after discharge, when related to hospitalization or hospital procedures.<sup>13</sup> Even though it was the most characteristic surgery, the incidence of SSI in this study was small compared to another study that obtained a prevalence index of 3.68% in a total of 2,203 patients. Nevertheless, a similarity in relation to the classification of surgical risk was observed, and ASA II was the most prevalent, just like in relation to the characteristics of the patients who demonstrated low education levels, were of the female sex, were an average age of 48 years, and were submitted to CVL and Exploratory Laparotomy.<sup>14</sup>

The reasons for the interruption and complications related to intravenous therapy could arise from various factors, including simultaneous occurrence, as was observed in this study, just like in a study performed in 2011, which indicates the incidence of phlebitis in hospitalized adults were on average five times higher than accepted by the *Infusion Nurses Society*.<sup>15</sup>

In this study, the prevalent AE was the loss of the peripheral venous catheter, and it was found that of the nine losses, four resulted from infection of the venous access. A study performed in 2011, which involved 76 hospitalized patients in an infirmary, observed the prevalence in the occurrence of phlebitis in 25.8% of the patients with peripheral intravenous catheter, and of them, 40% showed clinical manifestations like pain, edema, and erythema. In this study, it was possible to observe the clinical manifestations of pain and erythema in four observations of venous access infection. There were also similarities in relation to the intravenous catheter dwell time, such that in both of the studies it was less than or equal to 72 hours.<sup>15</sup>

There was not an occurrence of fall during the data collection days; however, there is evidence in other studies of the frequency and relevance of this AE in the hospital and surgical sphere. A study performed in 2010 demonstrates that 10.7% of the record bulletins of AE are related to falls, resulting in a monthly average of 2.6 falls,<sup>16</sup> just like in a study performed in 2014, which shows the occurrence of 93.5% of falls in Inpatient Surgical Unit and 6.5% in the Emergency Services.<sup>17</sup>

In this context, the nursing team has the fundamental function in the prevention of AE in the Inpatient Surgical Unit, highlighting the occurrence of SSI, as well as in the reduction of complications related to peripheral venous access, keeping in mind that this procedure is the responsibility of the nurse and affects the cutaneous integrity of the patient, increasing the risk of infection. The prevention of infection related to the peripheral venous catheter is, principally, the nursing team's responsibility, reflecting in the quality of assistance given and the security of the patient in addition to reducing the length of hospitalization time and costs.<sup>18</sup>

One way to diminish the distance between ideal nursing care and real nursing care is to work with health teams on the occurrence of error and professional fault, taking this opportunity to discuss and engage professionals in critical thinking about the care actions and attitudes in relation to their own errors or their colleagues errors, using the occurrences as a learning moment, and, in this way, avoiding new errors related to the same cause.<sup>19</sup>

As such, it is essential to modify, in hospital environments, the way of accepting errors as individual mistakes and encouraging the notification of errors. Equally important, assistance should be centered on the patient, based on

## CONCLUSION

models that facilitate collaborative and interdisciplinary work in teams.<sup>3</sup>

Concomitantly to this, it is necessary that institutions and managers are committed to patient safety, establishing it as guiding axis of their organization. However, it is fundamental to offer subsidies to direct care providers, looking to understand the difficulties and challenges of assistance so that effective communication between all levels of the hierarchy are possible, which allows for the confidence between all of the professionals involved.<sup>19</sup>

The promotion of patient safety should be in line with the an institutional and professional culture of security, and it some changes must occur in hospital environments, namely changing the idea of errors as personal failings to understanding them as the cause of failings of the system; changing the environment from one of punishment to a culture in which error notification is stimulated; avoiding secrecy, showing transparency; centralizing patient care and not doctor care; not using care models based on individual and independent performance excellence, but rather on care models performed by interdependent professional teams, collaborators, and interdisciplinary workers; highlighting universal and reciprocal accountability, and not top down accountability.<sup>3</sup>

In this way, the creation of a culture of patient safety within health institutions allows for teams to feel more secure in reporting the occurrence of AE incidents, because it enables these changes.<sup>20</sup>

Still, a limitation of this study is in the data collection period. To obtain more consistent and impactful data, the length of time would need to be increased, resulting in more evaluations.

It became evident that the presence of AE in the surgical environment of this TH is relevant when compared to similar studies in which the incidence of occurrence of AE was less than in this study. Among the events observed, the most recurrent was venous access loss, followed by SSI and venous access infection. It is interesting to highlight that there was not an occurrence of falls in the data collection; however, it is not possible to exclude the possibility of this occurrence in a surgical inpatient unit, keeping in mind the reduced time of data collection in this study.

The presence of AE in the Surgical Inpatient Unit demonstrates failures in the quality of assistance provided. Therefore, after the occurrence, the EA should be analyzed to elucidate the possible causes and allow for reflections and moments of ongoing education for the health and nursing staff, aimed at measures that promote the prevention and reduction of errors.

The promotion of a security culture should be established among the professionals so that the notification of incidents, errors, and AE, does not denote a punitive character about the professional, but an understanding that the error is multifactorial and is not the responsibility of a single professional.

The main causes of EA occurrences should be investigated to make it possible to perform actions that are aimed at its prevention, such as continuing education, appropriate professional quantitative, devices and materials in excellent condition, well-established routines, prepared clinical protocols, standard operating procedures that are easily accessible and consistent with the institutional reality, and an EA notification tool that is available for the team.

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