

Health care notifications related to surgery in a university hospital

Notificações de assistência à saúde relacionadas a cirurgia em um hospital universitário

Notificaciones sanitarias relacionadas con cirugías en un hospital universitario

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ABSTRACT: Objective: To characterize healthcare notifications related to surgery reported in a university hospital in Rio Grande do Sul. **Method:** A cross-sectional study conducted at a university hospital in the Southern Region of Brazil, analyzing notifications of surgery-related incidents contained in the Health Surveillance and Hospital Care Risk Management Application (*Vigilância em Saúde e Gestão de Riscos Assistenciais Hospitalares* - VIGIHOSP) database, from 2014 to 2022. Data analysis was performed using descriptive statistics. **Results:** A total of 258 notifications were identified, with a notable incidence of material-related incidents (24%), of which 57.8% were classified as incidents without harm. The most prevalent type of incident was related to medical-hospital articles (21%). Contributing factors to these events included organizational culture (58.1%), communication (57.4%), protocols/policies/procedures (53.1%), and team organization (51.9%). **Conclusion:** The study findings contribute to the improvement of work processes, serving as indicators of care outcomes and assisting in the prevention of incidents and enhancement of care for surgical patients.

Keywords: Notification. Patient safety. Operating room nursing. Teaching hospitals.

RESUMO: Objetivo: Caracterizar as notificações de assistência à saúde relacionadas a cirurgia notificadas em um hospital universitário do Rio Grande do Sul. **Método:** Estudo transversal realizado em um hospital universitário localizado na Região Sul do Brasil, no qual foram analisadas as notificações de incidentes relacionados a cirurgia, contidas no banco de dados do Aplicativo de Vigilância em Saúde e Gestão de Riscos Assistenciais Hospitalares (VIGIHOSP), no período de 2014 a 2022. A análise dos dados deu-se por meio da estatística descritiva. **Resultados:** Foram identificadas 258 notificações, com destaque para os incidentes relacionados a materiais (24%), das quais 57,8% foram classificadas como incidente sem dano. Quanto ao tipo de incidente, a prevalência foi relacionada aos artigos médico-hospitalares (21%) e, dentre os fatores contribuintes desses eventos, destacaram-se a cultura organizacional (58,1%), a comunicação (57,4%), o protocolo/políticas/procedimentos (53,1%) e a organização da equipe (51,9%). **Conclusão:** Os achados do estudo contribuem para o aperfeiçoamento dos processos de trabalho, visto que se configuram como indicadores do resultado da assistência, auxiliando na prevenção de incidentes e melhorias no cuidado com o paciente cirúrgico.

Palavras-chave: Notificação. Segurança do paciente. Enfermagem de centro cirúrgico. Hospitais de ensino.

RESUMEN: Objetivo: Caracterizar las notificaciones de asistencia sanitaria relacionadas con cirugías notificadas en un hospital universitario de Rio Grande do Sul. **Método:** Estudio transversal realizado en un hospital universitario ubicado en la Región Sur de Brasil, en el cual se analizaron las notificaciones de incidentes relacionados con cirugías, contenidas en la base de datos del Aplicativo de Vigilancia en Salud y Gestión de Riesgos Asistenciales Hospitalarios (VIGIHOSP), en el período de 2014 a 2022. El análisis de los datos se realizó mediante estadística descriptiva. **Resultados:** Se identificaron 258 notificaciones, destacándose los incidentes relacionados con materiales (24%), de los cuales el 57,8% fueron clasificados como incidentes sin daño. En cuanto al tipo de incidente, la prevalencia estuvo relacionada con los artículos médico-hospitalarios (21%) y, entre los factores contribuyentes a estos eventos, se destacaron la cultura organizacional (58,1%), la comunicación (57,4%), el protocolo/políticas/procedimientos (53,1%) y la organización del equipo

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(51,9%). **Conclusión:** Los hallazgos del estudio contribuyen al perfeccionamiento de los procesos de trabajo, ya que se configuran como indicadores del resultado de la asistencia, ayudando en la prevención de incidentes y en las mejoras en el cuidado del paciente quirúrgico.

Palabras clave: Notificación. Seguridad del paciente. Enfermería de quirófano. Hospitales de enseñanza.

INTRODUCTION

Patient safety is recognized as a dimension of quality, emphasizing actions aimed at continuous improvement and accountability for access and effectiveness of care. This approach, combined with patient-centered care, seeks to avoid unnecessary harm associated with healthcare¹.

The issue of patient safety gained worldwide importance with the publication of the report “To Err is Human” by the American Institute of Medicine (IOM) in 1999. This report highlighted that approximately 44,000 to 98,000 deaths occur annually in the United States due to failures in hospital medical care.

However, a decade after the publication of the report, rates of adverse events (AEs) have not reduced as planned, despite the implementation of some recommended strategies, mainly feedback and data analysis, which are fundamental to determining lessons learned and make improvements².

In this context, surgical safety represents a global public health goal, culminating in the theme of the Second Global Challenge for Patient Safety — “Safe Surgery Saves Lives,” launched by the World Health Organization (WHO). The manual presents the Safe Surgery Checklist, which includes a series of items that must be checked at crucial stages of surgery. This tool not only contributes to better communication between the surgical team but also helps systematically follow patient safety protocols. Non-adherence to this tool is a reportable condition, as an unfilled item can result in a serious incident for surgical patients³.

In Brazil, one of the key allies in promoting a safety culture are the Patient Safety Centers (PSC). These centers operate within health institutions to identify risks and failures in care, contributing to learning and improving care processes. They also encourage reporting, focusing on failures as learning opportunities. In this context, notifications can support actions planned within the nursing field regarding the systematization of care to minimize incidents².

In this scenario, Incident Notification Systems (INS), such as the Health Surveillance Notification System (*Sistema de Notificação de Vigilância Sanitária* – NOTIVISA), are considered important tools for patient safety. They enable the reporting of healthcare-related incidents and technical complaints,

allowing for the identification of risks and failures in care, which contributes to learning and improving care processes. However, the actual number of detectable adverse events is still considered low due to underreporting².

In view of this, it is crucial to analyze databases available in notification systems so that institutions can perform a situational diagnosis. This involves checking the type of notification, prevalence, and factors associated with incidents related to surgical procedures. Such a diagnosis will enable the identification of potential gaps in care, contributing to the quality and safety of care for surgical patients.

The present study addresses the following research question: What are the characteristics of healthcare notifications related to surgery in a public university hospital in Rio Grande do Sul?

OBJECTIVE

To characterize healthcare notifications related to surgery reported in a university hospital in Rio Grande do Sul.

To characterize health care notifications related to surgery reported in a university hospital in Rio Grande do Sul.

Caracterizar as notificações de assistência à saúde relacionadas a cirurgia notificados em um hospital universitário do Rio Grande do Sul.

METHOD

This cross-sectional study was conducted in a public university hospital in the South of Brazil. Data collection was carried out in June 2023 using the database of the Health Surveillance and Hospital Assistance Risk Management Application (*Vigilância em Saúde e Gestão de Riscos Assistenciais Hospitalares* – VIGIHOSP). VIGIHOSP is a institutional software that allows professionals, patients, and companions to report risk situations, healthcare-related failures, and technical complaints.

In this study, notifications related to surgery were included, recorded from August 2014 to December 2022. The initial period chosen is justified by being the year of VIGIHOSP’s implementation in that institution.

The data were organized in a Microsoft Excel® spreadsheet generated by VIGIHOSP itself. This spreadsheet encompassed variables related to the patient, the notification, and the incident, including details such as the gender and race of the patient, patient situation, surgical specialty, type of anesthesia, date of notification, location of notification, characteristics of the incident, whether there was harm to the patient, professional category of the reporter, classification of the report, type of incident, classification of the incident, location of the incident, and factors related to the incident.

After checking for errors and possible inconsistencies, the data were analyzed using the PASW Statistics® program (Predictive Analytics Software, from SPSS Inc., Chicago, USA), version 18.0. Categorical variables related to demographic data and incident characterization were described using absolute frequencies (N) and relative frequencies (%).

The research project, which adhered to all ethical and legal procedures, was submitted to the Research Ethics Committee and received a favorable opinion under code CAAE 52813121.6.0000.5346.

RESULTS

269 notifications related to surgery were initially identified. After excluding 11 duplicate registrations, a total of 258 notifications were included for analysis.

Table 1 presents the distribution of demographic and clinical characteristics of patients who experienced surgical incidents, based on data collected from VIGIHOSP.

Among the demographic characteristics, there was a higher prevalence of females (46.9%) and individuals of white race (58.5%). However, it is notable that a significant percentage of entries were not filled out in the race variable (34.1%).

Regarding the care regime, there was a predominance of hospitalized patients (70.9%). Notifications related to orthopedic and traumatology surgery were prominent (38.7%), with equal percentages of peripheral block and general anesthesia (26.8%).

Table 2 presents the distribution of notification characteristics based on data collected from VIGIHOSP.

Regarding the characteristics of the notifications, in 2017 there was the highest number of notifications (20.5%), with a predominance of occurrences in the surgical suite (69%). In terms of classification, the highest occurrence was related

to surgery (58.1%), followed by the “other” category (13.6%), which may include issues such as the absence of pre-anesthetic and cardiological exams, incomplete surgical team, and communication failures within the team. Among the professional categories of notifiers, nurses (63.6%) and physician assistants (15.5%) stood out.

Table 3 presents the distribution of incident characteristics based on data collected from VIGIHOSP.

Table 1. Distribution of demographic and clinical characteristics of the patient. Santa Maria (RS), 2014-2022. (n=258).

Characteristics	n	%
Gender		
Female	121	46.9
Male	108	41.9
Not filled out	29	11.2
Race		
White	151	58.5
Brown	13	5.1
Black	6	2.3
Not filled out	88	34.1
Care setting		
Hospitalization/elective	183	70.9
Urgency/emergency	18	7.0
Outpatient	3	1.2
Not filled out	37	14.3
Other	17	6.6
Surgical specialty		
Orthopedics and traumatology	100	38.7
Obstetrics	28	10.8
General surgery	27	10.5
Plastic surgery	15	5.8
Gastrointestinal	13	5.0
General urology	10	3.9
Vascular	10	3.9
Head and neck	8	3.1
Cardiology	7	2.7
Oncology	7	2.7
Thoracic surgery	4	1.6
Coloproctology	4	1.6
Neurosurgery	3	1.2
Not filled out	22	8.5
Anesthesiology		
Block	69	26.8
General	69	26.8
General + block	13	5.0
Sedation	7	2.7
Local	6	2.3
Not applicable	94	36.4

Source: Research data, 2023.

In Table 3, it was observed that among the characteristics of the incidents, the highest percentage was related to materials (24%), followed by failures to follow institutional routines/protocol (22.1%), and conduct related to the surgical team (17%).

Regarding harm to patients related to surgical incidents during the period, 28.3% of the notifications reported that no harm was suffered, while one incident (0.4%) resulted in death. Additionally, concerning incident classification, there

Table 2. Distribution of notification characteristics. Santa Maria (RS), 2014-2022. (n=258).

Characteristics	n	%
Year		
2014	8	3.1
2015	12	4.7
2016	27	10.5
2017	53	20.5
2018	30	11.6
2019	47	18.2
2020	38	14.7
2021	24	9.3
2022	19	7.4
Location of notification		
Surgical block	178	69.0
Reception/pre-anesthesia	33	12.8
Recovery/post-anesthesia	26	10.1
Patient's residence	4	1.5
Not filled out	17	6.6
Classification of notification		
Surgery	150	58.1
Medical-hospital article	29	11.2
Healthcare-associated infections	19	7.4
Medical-hospital equipment	10	3.9
Skin lesions	7	2.7
Medication	4	1.5
Shortage of health technologies	2	0.8
Patient identification	2	0.8
Others*	35	13.6
Professional category of notifier		
Nurse	164	63.6
Attending physician	40	15.5
Resident physician	21	8.1
Teaching physician	16	6.2
Nursing technician	8	3.1
Student	2	0.8
Not filled out	1	0.4
Other [†]	6	2.3

Source: Research data, 2023.

*Lack of pre-anesthetic and cardiological exams, incomplete surgical team, and communication failures among the surgical team; [†]Other healthcare professionals such as nutritionists and physiotherapists.

Table 3. Distribution of incident characteristics. Santa Maria (RS), 2014-2022. (n=258).

Characteristics	n	%
Incident characteristics		
Failure and/or lack of materials	62	24.0
Failures in following institutional routines/protocols	57	22.1
Conduct related to the surgical team	44	17.0
Risk of contamination/infection	35	13.6
Surgery canceled/suspended	19	7.4
Failures and/or lack of equipment	10	3.9
Skin injuries due to surgical positioning	10	3.9
Not filled out	21	8.1
Was the patient harmed?		
No	73	28.3
Under observation	47	18.2
Unknown	43	16.7
Prolonged hospitalization	37	14.3
Not severe (did not cause or prolong hospitalization)	32	12.4
Caused temporary disability	10	3.9
Led to hospitalization	10	3.9
Caused significant or persistent disability	5	1.9
Death	1	0.4
Incident classification		
Harmless incident	149	57.8
Potential adverse event	72	27.9
Incident with harm (adverse event)	30	11.6
Not filled out	7	2.7
Location of the incident		
Surgical block	179	69.4
Central materials and sterilization center	35	13.5
Obstetric center*	16	6.2
Anesthetic recovery room	11	4.3
Adult emergency room [†]	8	3.1
Intermediate recovery room	2	0.8
Surgical clinical unit/3 rd floor	1	0.4
Not filled out	7	2.7
Type of incident		
Medical-hospital articles/equipment	54	21.0
Clinical management	46	17.8
Care process	35	13.6
Conduct/behavior	24	9.3
Resource/organizational management	17	6.6
Patient incident	14	5.4
Documentation	14	5.4
Hospital-acquired infection	7	2.7
Infrastructure/buildings/human resources	1	0.4
Medication/intravenous solutions	—	
Blood/blood components	—	
Nutrition, oxygen/Other gases and vapors	—	
Others [‡]	46	17.8

Source: Research data, 2023.

*Cesarean room; [†]Surgical procedure in the emergency room; [‡]Incident that does not fit the available options.

was a predominance of incidents without harm (57.8%), followed by potential adverse events (27.9%), and incidents resulting in harm (11.6%).

Regarding the location of the incidents, the surgical block predominated (69.4%), followed by the materials and sterilization center (13.5%), and the obstetric center (6.2%). In terms of the type of incident, those related to medical-hospital articles/equipment (21%) and clinical management (17.8%) stood out.

Table 4 presents the distribution of factors related to the incident according to data collected from VIGIHOSP.

Regarding external factors, technology-related issues accounted for 23.6%, followed by infrastructure (22.1%) and products (20.2%). Among factors related to professionals and patients, communication issues accounted for 57.4%, while performance issues accounted for 48.1%.

Finally, concerning factors related to the environment and system, higher percentages were observed for items related to organizational culture (58.1%), protocol/policies/procedures (53.1%), team organization (51.9%), and infrastructure (36%).

DISCUSSION

Over the years, the data demonstrate a decrease in notifications, which may indicate a reduction in incidents or could be attributed to underreporting, due to insufficient information dissemination about the software used for processing notifications or a fear of punitive measures.

The absence of regular educational activities for professionals regarding the significance of reporting can hinder

Table 4. Distribution of factors related to the incident. Santa Maria (RS), 2014-2022. (n=258)

Distribution of factors related to the incident				
Characteristics	Yes		No	
	n	(%)	n	(%)
External factors				
Technology	61	(23.6)	197	(76.4)
Infrastructure	57	(22.1)	201	(77.9)
Products	52	(20.2)	206	(79.8)
Services	40	(15.5)	218	(84.5)
Environment	30	(11.6)	228	(88.4)
Systems/policies	27	(10.5)	231	(89.5)
Not applicable	75	(29.1)	183	(70.9)
Others	1	(0.4)	257	(99.6)
Factors related to professionals and patients				
Communication	148	(57.4)	110	(42.6)
Performance	124	(48.1)	134	(51.9)
Illness	27	(10.5)	231	(89.5)
Cognitive, emotional, and social factors	2	(0.8)	256	(99.2)
Not applicable	36	(14.0)	222	(86.0)
Other	3	(1.2)	255	(98.8)
Environmental factors				
Infrastructure	93	(36.0)	165	(64.0)
Distance between services	37	(14.3)	221	(85.7)
Environmental risks	26	(10.1)	232	(89.9)
Legal risks	6	(2.3)	252	(97.7)
Not applicable	83	(32.2)	175	(67.8)
Other	1	(0.4)	257	(99.6)
System factors				
Organizational culture	150	(58.1)	108	(41.9)
Protocols/policies/procedures	137	(53.1)	121	(46.9)
Team organization	134	(51.9)	124	(48.1)
Workload	74	(28.7)	184	(71.3)
Not applicable	16	(6.2)	242	(93.8)

Source: Research data, 2023.

event notification due to lack of awareness and confidence among the team, coupled with apprehensions about potential repercussions. It is crucial to note that this approach perpetuates a punitive culture. Hence, fostering a culture that encourages non-punitive reporting is imperative to mitigate underreporting rates. This shift can enhance health facility metrics by identifying shortcomings and devising strategies to mitigate patient risks⁴.

In terms of classification, 13.6% of notifications fell under the “other” category, encompassing issues such as inadequate pre-anesthetic and cardiological examinations, incomplete surgical team composition, and communication gaps within the team. Effective surgical care necessitates a multidisciplinary team approach that ensures comprehensive patient management, acknowledging variations in safety perceptions across disciplines. This diversity in professional perspectives underscores the need for cohesive surgical care, which hinges on effective communication, thorough evaluations, and preoperative guidance crucial for anesthesia and surgical procedures⁵. The study underscored that nurses were the primary reporters of AE, consistent with another study attributing 70.6% of notifications to nurses².

Nursing plays a pivotal role in patient care, actively participating in all surgical stages, documenting care, and reporting healthcare incidents. However, it is crucial to recognize that all healthcare professionals can contribute to reporting risk situations or incidents. Effective cooperation among the multidisciplinary team is vital, especially considering the workload and the diverse responsibilities nurses manage, which can contribute to weaknesses in patient safety⁶.

Regarding incident characteristics, material-related issues are prominent. These include items being wet, contaminated, incomplete, broken equipment, unsealed, or lacking material. Such complications can significantly impact care quality and safety. SU nurses have responsibilities encompassing material forecasting, provision, implementation, evaluation, and quality control. Moreover, these professionals constitute essential human resources for surgical procedures.

The link between structural issues and the workflow inevitably disrupts care quality and health service performance, resulting in incidents⁷.

Regarding patient harm, findings indicated that 28.3% experienced no harm from the incident. However, 14.3% of incidents led to extended hospital stays and subsequently increased treatment costs. International studies indicate that surgical AE are frequent and account for a significant portion of healthcare-related harms, ranging from two-thirds

to three-quarters. Unlike AE in non-surgical settings, those arising from surgical procedures tend to result in more severe consequences such as prolonged hospitalization, additional medical interventions, permanent disabilities, and fatalities. Moreover, they substantially escalate treatment expenses^{8,9}.

Regarding incident types, the highest prevalence was associated with medical-hospital equipment (21%). This contrasts with a study from a surgical clinic at a university hospital in Goiânia (Goiás – GO), which found that the majority of incidents and AE were linked to clinical procedures or processes¹⁰.

Medical-hospital articles encompass instruments, equipment, materials, or similar items used for medical purposes (diagnosis, prevention, monitoring, treatment, and relief). These articles are required to be safe and should not compromise the clinical condition or safety of patients¹¹.

In Brazil, techno-surveillance is overseen by the Brazilian National Health Surveillance Agency (*Agência Nacional de Vigilância Sanitária – ANVISA*), which handles technical complaints regarding the sale of medical and hospital articles. The agency encourages the reporting of non-conformities encountered during the use of these materials to identify deficiencies in their quality management¹².

In relation to factors influencing incident outcomes, organizational culture stands out significantly (58.1%). A study focusing on the challenges nurses encounter in safety management at the surgical unit (SU) emphasized interpersonal conflicts within the team (38.3%), insufficient organizational support (35.8%), and team engagement in adhering to safe surgical checklist protocols (25.8%)⁶ as primary barriers.

Implementing safety management protocols and tools based on the non-punitive principle encourages professionals to report incidents, fostering a positive safety culture and enhancing healthcare safety effectively. Additionally, institutional managers should prioritize investment in training and courses to continuously educate professionals and bolster the culture of patient safety¹³.

As this is a cross-sectional epidemiological study based on voluntary notifications from an electronic system, it has inherent limitations in generalizing results, including the possibility of underreporting incidents.

While voluntary notifications are widely adopted globally and prove to be one of the most effective methods for driving behavioral changes that promote learning from mistakes and enhancing quality and safety in surgical patient care, there are limitations. These include inadequate information in notifications regarding patient characteristics (gender, race, care regimen, and surgical specifics), which hinders the comprehensive characterization of incidents.

In this context, the variables presented in the tables are predefined options available in the software for notifiers to select. It is evident that the software does not provide detailed fields for certain variables, such as the “Type of incident” tab described in Table 3, which limits the ability to provide specific details and complicates the interpretation of results.

CONCLUSION

The study identified 258 notifications related to the surgical process. The findings underscore the importance for institution managers to focus on logistics and quality control of equipment and materials essential for ensuring healthcare quality and safety. Furthermore, it emphasizes the crucial and interdependent relationship between SU nurses and the materials and sterilization center in ensuring the success of surgical procedures.

The evidence contributes to enhancing health and nursing processes in SU by serving as indicators of care outcomes. These findings can guide managers in implementing best practices aimed at improving care quality and ensuring the safety of surgical patients.

The importance of conducting research focused on incidents related to anesthetic-surgical procedures is emphasized to identify care gaps and foster improvements in surgical patient safety. Additionally, there is a suggestion for studies

aimed at developing indicators and tools that can be implemented in practice, thereby enhancing perioperative care.

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CONFLICT OF INTERESTS

The authors declare there is no conflict of interests.

AUTHORS' CONTRIBUTIONS

GDC: Project administration, Formal analysis, Conceptualization, Data curation, Investigation, Methodology, Resources, Writing – original draft, Writing – review & editing, Validation, Visualization. CZPG: Formal analysis, Investigation, Writing – review & editing, Software, Visualization. GMRC: Formal analysis, Investigation, Writing – original draft, Writing – review & editing, Supervision, Visualization. TSBSM: Project administration, Formal analysis, Methodology, Resources, Writing – review & editing, Software, Supervision, Validation, Visualization.

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