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# Risk management of adverse events in a maternity hospital

*Gestão de riscos dos eventos adversos em uma maternidade*

*Gestión de riesgos de eventos adversos en una maternidad*

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## ABSTRACT

**Objective:** To investigate the root causes of adverse events in a maternity hospital through risk management.

**Method:** Action research with seven nursing professionals given their expressive capillarity in the service. The study was conducted between January 2020 and February 2021. The field of study was a public maternity hospital, in which a situational diagnosis of adverse events was carried out, and a questionnaire was applied to employees. In the thematic seminars, quality improvement tools were applied to identify the root causes of adverse events. Similar reports were grouped and analyzed.

**Results:** With risk management, the root causes for adverse events related to patient identification, falls and prescription, use and administration of medications were identified.

**Final considerations:** Weaknesses were observed in many fields that support adverse events. The institution must adopt consistent investments and collective attention. The study is still ongoing.

**Keywords:** Health services. Patient safety. Risk management. Safety management. Nursing.

## RESUMO

**Objetivo:** Investigar as causas raízes dos eventos adversos em uma maternidade através da gestão de riscos.

**Método:** Pesquisa-ação com sete profissionais de enfermagem dada sua expressiva capilaridade no serviço. O período do estudo foi de janeiro de 2020 a fevereiro de 2021. O campo do estudo foi uma maternidade pública, na qual partiu-se de um diagnóstico situacional dos eventos adversos e aplicação de questionário com os colaboradores. Nos seminários temáticos, aplicaram-se ferramentas de melhoria da qualidade para identificar as causas raízes dos eventos adversos. Os relatos semelhantes foram agrupados e analisados.

**Resultados:** Identificou-se com a gestão de riscos causas raízes para os eventos adversos relacionados à identificação do paciente, quedas e prescrição, uso e administração de medicamentos.

**Considerações finais:** Observaram-se fragilidades em muitos campos que sustentam os eventos adversos. Investimentos consistentes e atenção coletiva devem ser adotados pela instituição. O estudo continua em curso.

**Palavras-chave:** Serviços de saúde. Segurança do paciente. Gestão de riscos. Gestão da segurança. Enfermagem.

## RESUMEN

**Objetivo:** Investigar las causas fundamentales de los eventos adversos en una maternidad mediante de la gestión de riesgos.

**Método:** Investigación – acción con siete profesionales de enfermería dada su capilaridad expresiva en el servicio. El período de estudio fue de enero de 2020 a febrero de 2021. El campo de estudio fue una maternidad pública, en la que se realizó un diagnóstico situacional de eventos adversos y se aplicó un cuestionario a los empleados. En los talleres de trabajos temáticos, se aplicaron herramientas de mejora de la calidad para identificar las causas fundamentales de los eventos adversos. Se agruparon y analizaron informes similares.

**Resultados:** Fueron identificados con la gestión de riesgos las causas fundamentales de los eventos adversos relacionados con la identificación de pacientes, caídas y prescripción, uso y administración de medicamentos.

**Consideraciones finales:** Se observaron debilidades en muchos campos que apoyan los eventos adversos. La institución debe adoptar inversiones consistentes y atención colectiva. El estudio está en curso.

**Palabras clave:** Servicios de salud. Seguridad del paciente. Gestión de riesgos. Administración de la seguridad. Enfermería.

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## INTRODUCTION

Risk management refers to the systematic planning for identification and prevention of adverse events, these nominated incidents with damage to an individual in the health service, resulting from the care offered. This damage can be from the most common, physical, as well as social and/or psychological. The adverse events have serious implications if not properly managed, since they can increase comorbidities, length of stay in the institution and, consequently, costs for health recovery. Thus, risk management is a challenge for health organizations in Brazil and worldwide[1].

Among the most diverse environments in which adverse events can occur, the prevalence is higher in hospitals. Because, among other factors, for the improvement of care, which has transformed hospitals into complex institutions that require high specialization of professionals, a strengthened safety culture and well-constructed work processes, a reality not observed in the practice of many institutions, providing higher risk for the occurrence of adverse events[2].

In an effort to mitigate the risks of adverse events and increase the quality of health care, the Brazilian Ministry of Health has published documents that encourage risk management in all health services, such as Ordinance No. 529 of April 1, 2013, Resolution of the Collegiate Board of Directors No.36, of July 25, 2013 and Consolidation Ordinance No.5, of September 28, 2017. Its focus is the prevention of adverse events and its implementation is a necessary measure to reduce the probability, frequency and relapse of adverse events related to health care[3].

Although risk management is still not a routine in all Brazilian hospitals, its capacity to provide answers to services that look forward to improve their processes, increase safety and quality of care is real and has aroused the scientific interest of many researchers on this methodology[4].

In this way, it is essential to carry out studies that present strategies capable of mitigating adverse events, with maternity and obstetric services highlighted in this regard, as they are environments in which adverse events are periodic, due to the institutional and social characteristics of Brazil, such as high demand and huge volume of procedures[5].

The search for continuous improvement in health care, as well as the adoption of new practices that allow to get rid of chronic habits, capable of hindering consistent advances in patient safety in health institutions, requires collective action, pointing out the need for action research to carry out the risk management of adverse events as it allows, together with the actors who experience the limitations and potentialities of the service, to build a knowledge that contributes positively to the praxis of professionals[6].

A previous study carried out in a maternity hospital identified a fragile safety culture with the use of the Safety Attitudes Questionnaire[7]. Consequently, the guiding question of this study was raised: what root causes would be involved with the adverse events of this institution? To answer the question, the study aimed to investigate the root causes of adverse events in a maternity hospital through risk management.

## METHOD

This is an action research. Action research aims at understanding and interacting between researchers and members of an investigated situation to develop a collective action, in terms of problem solving. It has 12 phases that interrelate, but do not follow an exact order. In this study, the 12 phases were organized into four stages: stage 1 – situational diagnosis; stage 2 – thematic seminars; stage 3 – elaboration of actions; and stage 4 – dissemination of the study[8].

The setting of this study was a maternity hospital, located in the city of Caxias, in the state of Maranhão, in the Northeast region of Brazil. A health institution of municipal public management, with 77 beds, of which 11 are for critical care and 05 for intermediate care in neonatology, offering medium and high complexity services in obstetric and neonatal care for an estimated population of two hundred thousand inhabitants. Its infrastructure includes: a reception room for risk classification of spontaneous demand for the service, with the presence of a nurse on duty; a pre-delivery room, where monitoring during labor is carried out, with the presence of a multidisciplinary team (nursing, medicine, physical therapy professionals); a clinical obstetrics unit, to house pregnant and/or postpartum women in need of hospitalization for treatment of complications of pregnancy, childbirth and/or puerperium, with the presence of a multidisciplinary team; a rooming-in, where the postpartum woman, the newborn and a family member stay together after natural childbirth, with the presence of a multi-professional team.

The sample consisted of nursing professionals working in the maternity hospital who met the inclusion criteria: to belong to the nursing team; to be at least three months working in the sector; to work at least 20 hours a week. Exclusion criteria were: being on vacation and/or leave during the data collection period. Invitations were made to all nursing professionals by non-probabilistic sampling. Initially, 24 professionals participated, including nurses and nursing technicians, and due to dropouts, seven individuals effectively collaborated in this study.

Data collection comprised the period from January 29, 2020 to February 2, 2021. In stage 1 (January 29 to February 9, 2020), it was conducted a situational diagnosis of adverse

events, which are reported anonymously by the professionals immediately after the incident or by active search, carried out by the person responsible for the patient safety center; next, application of a questionnaire to identify the profile of the subjects.

The situational diagnosis of adverse events comprised data from 2017 to January 2020, corresponding from the implementation of the patient safety center to the most recent data reported by the center, and were presented to employees who decided to participate in the study through graphs, tables.

The most frequently reported adverse events were elected according to the notifications of the patient safety center, to investigate their root causes through risk management in the thematic seminars, which were: adverse events related to patient identification, falls and prescription, use and administration of medications.

In stage 2 (November 24, 2020 to February 2, 2021), thematic seminars and implementation of risk management were carried out, considered a pilot action since this practice was not held in the institution. For that, it was innovated by using for the first time the following quality improvement tools: Brainstorming, Five Whys and Ishikawa Diagram adapted for hospital reality. Brainstorming was associated with the Five Whys, having as a triggering question "What do you believe is related to the high frequency or the reason for this adverse event?". Then, the Ishikawa Diagram adapted for the hospital reality was applied, questioning the root causes based on each dimension of the tool (equipment; organizational; environment; processes; patients; and people).

The Ishikawa diagram (or fishbone diagram, because of its shape) was conceived by Kaoru Ishikawa in 1943 and is a useful technique for organizing and identifying the root causes of a given problem by directing investigation into its contributing factors divided by domains[3]. Elaborating prevention actions becomes more efficient by organizing and prioritizing problems in this way.

There were 16 thematic seminars, each meeting lasted approximately 40 minutes and, due to the Covid-19 pandemic, took place remotely, with the presence of all the authors of the study, through the Google Meet platform. The data were recorded in the field diary as guided by the action research and validated at the end of each session together with the collaborators.

Data analysis followed the elaboration of the profile of the collaborating subjects of the study presented descriptively; the elaboration of a situational diagnosis table of adverse events notified by the institutional patient safety center and their relative frequencies; and also, the exploration of the material produced in the thematic seminars and description of the root causes reported by the study subjects, which were synthesized and presented in a chart that summarizes similar ideas. The other stages of the study are still ongoing.

This study was submitted to the Research Ethics Committee (REC) by *Plataforma Brasil* for compliance with Ordinance No. 466/2012 that regulates research with human beings and approved by CAAE: 20565919,0,0000,5554 and opinion number 3,628,060. All participants signed the free and informed consent form after its full reading and in order to preserve the anonymity of the research subjects, the codename Hospital Alfa identified the maternity hospital.

## RESULTS AND DISCUSSION

Effectively collaborated with the study: five nurses, a nurse and a nursing technician. Two worked in the prepartum sector, two in clinical obstetrics, one in management, one in rooming-in, and one in reception. Four participants were between 20 and 29 years old, two were between 30 and 39 years old and one between 40 and 49 years old. Five participants self-declared brown, one self-declared white and one self-declared black. Three reported an income of 5 to 6 minimum wages, two reported an income of 3 to 4 minimum wages, one reported an income of 2 to 3 minimum wages, and one reported an income of up to one minimum wage. Four participants did not work in another health institution. Three participants worked at the institution for 3 to 5 years, two worked for 6 to 10 years, one worked for more than 10 years and one worked for 1 to 2 years.

According to the profile of Brazilian nursing, 23% of nursing professionals are nurses, the majority being between 26 and 30 years old, working in the profession for 2 to 5 years and with a monthly income of 1 to 3 times the minimum wages, findings that are close to the profile of the collaborators in this study[9].

In stage 1, the situational diagnosis of adverse events reported by the institutional patient safety center showed the relevance of those related to patient identification (21.1%), falls (14.6%) and prescription, use and administration of medications (9.8%) (Table 1).

According to the Anvisa report that characterizes adverse events reported by all health institutions in Brazil, the highest occurrence of adverse events take place in hospital institutions, with pressure injuries being the most frequent, a finding that does not corroborate with those in this study[10]. Which highlights the importance of situational diagnosis and risk management to identify and mitigate relevant problems for each health institution.

In stage 2, risk management of the reactive type was performed with the subjects, that is to say, it was worked

with adverse events that had already happened in the institution, allowing with this knowledge to adopt a reaction to prevent and reduce cases when analyzing their root causes. To identify the root causes of adverse events, the following quality improvement tools were used: Brainstorming, Five Whys and Ishikawa Diagram adapted for hospital reality.

Brainstorming was associated with the Five Whys and was the first technique used in thematic seminars. This approach was useful in trying to identify an apparently obvious root cause for each adverse event. To identify the "initial why", Brainstorming was chosen to allow the participant greater freedom in choosing their answers, encouraging creativity without imposing any type of pressure for its definition. Upon finding the first why, assumed as an initial problem/symptom, the Five Whys technique was continued. This technique, created by Saikichi Toyoda, is used when it is intended to identify the root cause of a problem or defect that has occurred, carrying out successive inquiries (Whys) until finding its true cause[3].

Both techniques were chosen for their ease of execution and efficient in terms of the intended purpose and it was identified that for all adverse events, collaborators pointed out "Excess Work" and "Process Failures" as root causes. Studies identify as chronic problems in health services the excess of work among nursing professionals and the existence of gaps on institutional protocols. Consequences arising from this reality are greater numbers of errors made by nursing professionals, loss of service quality and safety[11].

**Table 1** – Adverse events reported by the Patient Safety Center of Hospital Alfa between 2017 and 2020. Caxias, Maranhão, Brazil, 2021

| Incident/Adverse Events | N=274 | % |
|---|---|---|
| Errors related to patient identification | 58 | 21.1 |
| Falls | 40 | 14.6 |
| Drug-related errors | 27 | 9.8 |
| Patient evasion | 14 | 5.1 |
| Phlebitis | 11 | 4.0 |
| Pressure injury | 8 | 2.9 |
| Accidental extubation | 6 | 2.2 |
| Unprogrammed removal of catheters, probes, drains, tube | 5 | 1.8 |
| Error related to surgical procedure | 4 | 1.4 |
| Risks related to the environment | 4 | 1.4 |
| Screening not performed-incomplete-inappropriate | 4 | 1.4 |
| Technovigilance | 3 | 1.1 |
| Suffering (physical, psychic, social) | 2 | 0.7 |
| Error related to blood products transfusion | 1 | 0.4 |
| Ignored | 17 | 6.2 |
| Others* | 70 | 25.9 |

Source: Research data, 2021.
*Situations not notifiable and/or not included in the notification categories of *Notivisa*.

In addition, the Ishikawa diagram was used to identify the root causes of adverse events. This tool followed six dimensions (Material, Organizational, Environment, Processes, Patients, People/Professionals). Its application takes place by relating one cause to the problem from the perspective of each dimension. Similar reports were grouped and summarized in Chart 1.

It was observed that in the material domain, the root causes of adverse events were related to the shortage of materials and supplies and their low quality. Materials are considered supplies or productive factors and, in their absence, may result in professional dissatisfaction and discouragement to use them. It is undoubtedly one of the biggest issues faced by hospitals and in most cases it is related to the scarcity of financial resources, insufficient managerial care, lack of a planning culture, logistical difficulties, among others[12].

The organizational dimension refers to the institution's habits, values, beliefs and its method of operation, directly reflecting on the way in which the structural components and people act. Thus, with a view to improve quality and care in hospitals, it is expected the development of a strong organizational culture that values patient safety through the conception of inevitability of error, discussion and learning from errors, proactive identification of threats and incorporation of a non-punitive system for reporting and analyzing adverse events. For this change it is required, integrated teamwork and support from senior management[13].

Due to the fragile integration between nursing professionals, arising from their own organization into classes as a profession, and the existing cultural hierarchy between professionals who occupy care positions from those occupying management positions, distancing them, it was identified a certain disarticulation of the organizational culture. This results in confused workflows, unmet demands, dissatisfaction and compromised quality of care[13].

With regard to the environment dimension, nursing professionals who perceive the work environment as favorable have a good perception of the quality of care and the reduction of adverse events. Hospitals are among the types of environment where accidents happen the most, therefore, quality in this institutional aspect will ensure not only the improvement of the quality of care and patient safety, but also safety for the professionals who work there[14].

It was observed with risk management that the work processes reported by professionals at Hospital Alfa were not clearly defined. Adverse events elapse from many factors, from which poorly planned systems impair institutional processes, so when it comes to patient safety, work processes stands out. With increasing advances in the health area, simple processes have become complex, in these circumstances, it is necessary that work processes are adapted to emerging needs[2].

For patient identification, failures in the process can be observed from the patient's admission and throughout their journey within the health institution. Non-compliance with the patient identification protocol, or non-identification of the patient are chronic issues in many health institutions and must be improved by strengthening the safety culture of professionals[15].

For falls, failure to assess the risk of falling is the most common. The Morse scale is the instrument used in most Brazilian hospitals to identify the risk of falls, however, its adherence is still low, and there is a need for constant training so that the health team understands it is necessary to prevent this adverse event[16].

For the prescription, use and administration of medications, the process can have many failures because it is an extensive process that encompasses multiprofessional and multisectoral participation. Of those that can be cited, there are illegible prescriptions, errors in the selection of medication by the pharmacy, administration by wrong routes, among others[17].

Regarding the domain patients, it was noticed that they are not included as collaborators in the protocols of patient identification, falls and prescription, use and administration of medications. Customer collaboration for their safety should be encouraged, their inclusion adds knowledge and enables the sharing of points of view and perceptions that, when considered, result in an extra protection barrier and the strengthening of institutional safety programs[3].

As for the people domain, there were reports of professionals with low qualification in the protocols of patient identification, falls and prescription, use and administration of medications. Trained health professionals improve the quality of care and patient safety, on the other hand, the low qualification and scarcity of training of these compromises their performance in the health area, which increasingly requires high skills in technical-scientific matters to detect early risks and adverse events[18].

With these results, weaknesses were identified regarding risk management performed at Hospital Alfa. Performing risk management requires high skills from the organization's leaders, professionals, and employees, who need to be sensitized with the commitment to quality and safety in health care. These competencies in the institution under study may be impaired, given the common reality of low evaluations in municipal public services when compared with other spheres of public management (Federal and State) and with the private health service[19].

| Adverse events | Material | Organizational | Environment | Processes | Patients | People |
|---|---|---|---|---|---|---|
| **Patient identification** | [1]Shortage of materials. | [1]Deficit of supplies needed to identify patients. [2]Inadequate sizing. [3]Punitive culture. [4]Irregularity in the qualification of the team. | [1]Environment with insufficient lighting. | [1]Failure patient identification process. | [1]Patients not included as collaborator in the protocol. | [1]Professionals with low qualifications in the process. [2]Overwork. [3]Inattention. |
| **Falls** | [1]Shortage and/ or inadequacy of materials. | [1]Workflow not clearly established. [2]Irregularity in the qualification of the team. | [1]Environment poorly adapted to prevent falls. | [1]Failure fall prevention process. | [1]Patients not included as collaborators in the protocol. | [1]Professionals with low qualifications in the fall prevention protocol and Morse scale. |
| **Medication*** | [1]Shortage of supplies and materials. [2]Poor quality materials. | [1]Lack of training on medications. [2]Inadequate sizing. | [1]Environment poorly adapted for preparing and administering medications. | [1]Process of prescription, use and administration of medicines with failures. | [1]Patients not included as collaborators in the protocol of prescription, use and administration of medications. | [1]Professionals with low qualifications in the protocol of prescription, use and administration of medications. [2]Overworked professionals. |

**Chart 1** – Root causes of adverse events identified using the Ishikawa Diagram. Caxias, Maranhao, Brazil, 2021
Source: Research data, 2021.
*Prescription, use and administration of medications.

Municipal hospitals, although strategic for the decentralization of the actions of the Unified Health System (*Sistema Único de Saúde* – SUS), still show, for the most part, little resolute. Decentralization, with the consequent transfer of decision-making power to the municipalities, has resulted in two dimensions: the responsibility and participation of local leaders and modern management processes. However, regional differences in the selection of local leaders work as determinants of these impacts[20].

In that regard, the superposition of roles and responsibilities in the division of functions between governments interferes with the decision-making autonomy of municipalities and their services, especially, in the allocation of resources aimed at local public policies, such as training professionals, managers, especially in areas of quality of care, patient safety and risk management[20].

The undeniable commitment of hospital management to quality and patient safety is admitted, however, when healthcare professionals are not fully committed to actions that seek to strengthen the patient safety culture, positive results will hardly be achieved. The nursing team is the category among health professionals with the best opportunities to identify and prevent adverse events, however, the lack of adequate structure, lack of financial, material and human resources are institutional difficulties that interfere with the provision of safe care, discouraging them and causing professional dissatisfaction[4]. Working on these points can improve these professionals' adherence to institutional commitments to patient safety.

For health services, risk management seeks to improve the quality of health care. From this perspective, it is useful to base risk management on philosophies that value the process centered on patient needs, such as the Lean philosophy, in the healthcare scenario known as Lean Healthcare[3]. More and more health institutions seek Lean Healthcare as an organizational strategy because its applicability is adaptable to any service and also for presenting consistent benefits when integrated with institutional planning, as the one outlined in this study for the next stages.

## FINAL CONSIDERATIONS

The root causes of adverse events were investigated at Hospital Alfa through risk management and designed using quality improvement tools. Different techniques were used to reach the objectives. Using Brainstorming and the Five Whys, it was identified that the root causes of the adverse events investigated were related to overwork and process failures.

With the use of the Ishikawa Diagram adapted to the hospital environment, the root causes were identified in different contexts, which has contributed to sustaining the high number of reports of adverse events related to patient identification, falls and prescription, use and administration of medications.

It was found that the barriers adopted by the institution to avoid adverse events were weakened, requiring more consistent investments in the fields of patient safety, such as training of professionals, sensitization of patient safety culture and continuity of risk management.

The use of action research allowed to exercise risk management in collaboration with the study participants and stood out as a relevant practice in the investigation, since the power of observation of working professionals expands the ability to look at the real problems faced to find more efficient ways to address them.

The limiting factors of the study were: the 2020/2021 pandemic period required a deep adaptation of the methodology, such as meetings with employees in the remote modality. Regarding the institution, there was some resistance in understanding its effective collaboration in risk management. With regard to researchers, risk management was carried out on a pilot basis at the institution and lacked materials for its execution, requiring them to adopt appropriate attitudes to the emerging demands and the implementation of the study.

It is noteworthy that the research is still in progress, in the stage of elaboration of actions to strengthen the protective barriers of Hospital Alfa and allow the prevention of the adverse events studied in a more effective way. To this end, the actions under construction will be based on the Lean Healthcare philosophy, which seeks to create lean processes, without waste and centered on the needs of patients.

In the current scenario in which health institutions increasingly seek to improve their processes and direct safe care to patients, the study becomes relevant because by presenting how risk management can help in the identification and prevention of adverse events, popularizing this methodology. It also contributes to the practice of nursing professionals who seek patient safety and quality of care, by demonstrating the use of quality improvement tools that are easy to apply and adaptable to any service.

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