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OCCUPATIONAL SAFETY IN HOSPITALS: AN ANALYSIS OF WORKERS' PERCEPTIONS AND ORGANIZATIONAL PRACTICES

SEGURANÇA OCUPACIONAL EM HOSPITAIS: UMA ANÁLISE DAS PERCEPÇÕES DOS TRABALHADORES E DAS PRÁTICAS ORGANIZACIONAIS

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ABSTRACT: The hospital environment presents complex organizational and operational characteristics that can create risks to the health and safety of healthcare workers and patients. Risk management is no longer exclusively clinical and has become part of a strategic organizational process aimed at preventing adverse events and promoting safe environments. This study aimed to describe the formal risk-management procedure of a university hospital and to understand how workers recognized risks within their work context. It was a qualitative, applied, descriptive study conducted through semi-structured interviews with managers from different hospital departments. Data were analyzed using content analysis. The results showed significant variations in risk perception across departments and job functions, gaps in the identification and management of occupational risks, particularly ergonomic and psychosocial risks, and difficulties in aligning formal procedures with actual working conditions. Ergonomics emerged as a relevant framework for aligning management practices with workers' needs, supporting risk identification, intervention planning, and the promotion of safer and healthier work environments in the hospital context.

KEYWORDS: Safety management; Risk management; Risk perception; Ergonomics; Hospital.

RESUMO: O ambiente hospitalar apresenta características organizacionais e operacionais complexas que podem gerar riscos à saúde e à segurança dos trabalhadores e dos pacientes. A gestão de riscos deixou de ser exclusivamente clínica e passou a integrar um processo organizacional estratégico voltado à prevenção de eventos adversos e à promoção de ambientes seguros. Este estudo teve por objetivo descrever o procedimento formal de gerenciamento de riscos de um hospital universitário e compreender como os trabalhadores reconhecem os riscos em seu contexto de atuação. Trata-se de uma pesquisa qualitativa, aplicada e descritiva, realizada por meio de entrevistas semiestruturadas com gestores de diferentes setores hospitalares, cujos dados foram analisados por meio da técnica de análise de conteúdo. Os resultados mostraram variações significativas na percepção de riscos entre setores e funções, lacunas na identificação e no tratamento de riscos ocupacionais, especialmente ergonômicos e psicossociais, e dificuldades na

articulação entre procedimentos formais e condições reais de trabalho. A ergonomia emergiu como referencial relevante para aproximar práticas de gestão às necessidades dos trabalhadores, subsidiando a identificação de riscos, o planejamento de intervenções e a promoção de ambientes de trabalho mais seguros e saudáveis no contexto hospitalar.

PALAVRAS-CHAVE: Gestão da segurança; Gestão de riscos; Percepção de riscos; Ergonomia; Hospital.

1. INTRODUCTION

In complex sociotechnical systems, such as those in healthcare, scenarios change rapidly, resources are not always predictable, and professionals must remain continuously alert in order to adapt to prevailing conditions (Hollnagel, 2012; Khan *et al*., 2018). In this context, hospital management takes place in a dynamic environment that requires managers to make rapid decisions, often based on incomplete information and knowledge. Under these circumstances, a systemic and holistic perspective is necessary, supported by a culture of proactive information use and by an enhanced flow of data sharing capable of integrating and articulating information from different organizational processes so as to support decisions aligned with the value chain and the pursuit of operational excellence (Cirino *et al*., 2022; Fortea-Cabo; Gonzalez-Teruel, 2022).

In an environment characterized by high complexity and variability, safety management and risk management become central elements for the safe operation of healthcare organizations. Beyond ensuring continuity and quality of care, safety in the hospital context is directly related to the protection of patients and to the preservation of the health and well-being of professionals. To maintain the well-being and satisfaction of healthcare workers, the workforce must be physically and psychologically safe and healthy (Amoadu *et al*., 2025; Wong *et al*., 2021). For this to occur, it is essential that the working environment, available resources, workload, and work organization promote safe and healthy conditions, since occupational risks are hazards arising from the work environment, including physical, chemical, biological, mechanical, and social aspects (Badjate; Cariappa, 2007). These factors must therefore be integrated into a comprehensive hospital safety management system capable of simultaneously promoting patient safety and protecting professionals, thereby contributing to the quality of care and to the sustainability of health services.

In this context, safety management seeks to ensure the safe functioning of the system by reducing the occurrence of adverse events and strengthening a proactive safety culture (Benn; Healey; Hollnagel, 2008). Complementarily, effective risk management should act preventively through the appropriate allocation of human, financial, and material resources, thereby helping to minimize the physical, emotional, and financial costs associated with work (Cirino *et al*., 2022). For these practices to be effective, it is essential to recognize that risk is not only an objective datum but also a social construction. Thus, its assessment results from the interaction between scientific knowledge and judgment influenced by psychological, social, cultural, and political factors (Slovic, 2010).

Contemporary safety analyses indicate that a large portion of workplace vulnerabilities is associated with human and organizational factors (Balaji; Saravanan; Govindarasu, 2022; Gilbert, 2020). The dynamic and mutable nature of work, together with the increase in complex global social challenges, has driven the development of work systems that incorporate principles from human factors and ergonomics (Thatcher; Nayak; Waterson, 2019).

By investigating interactions between workers and the different elements that compose the work system — such as machines, equipment, tasks, and the organizational environment — ergonomics seeks to understand and improve these relationships, thereby contributing both to the enhancement of workers' well-being and to the overall performance of the system (Dul; Weerdmeester, 2012; IEA, 2000). In this context, ergonomics provides important contributions to the study and promotion of occupational safety (Falzon, 2012).

The analysis of human factors in the workplace draws on different fields of knowledge beyond ergonomics, including psychology, work sociology, and management sciences (Gilbert, 2020). This interdisciplinary approach aims to broaden the understanding of work activities and to optimize the performance of individuals, teams, organizations, and sociotechnical systems as a whole.

Understanding workers' interactions with the different elements of the work system from multiple perspectives is fundamental to identifying how professionals experience and operate in the work environment, and to determining the Human Cost of Work (HCW). The HCW refers to the set of efforts expended by workers to carry out their activities and manifests in three main dimensions: (1) physical, related to bodily, physiological, and biomechanical demands of the activity; (2) cognitive, associated with mental demands, problem solving, and the learning required for task execution; and (3) affective, linked to emotional demands, feelings, and mood states involved in work (Pádua; Ferreira, 2020). These dimensions reflect the human capacity to think, act, and feel in the work context — aspects that become visible in the practices and values that make up the occupational safety culture.

A systemic ergonomic analysis of the work environment thus contributes to understanding the human cost of work, and gains particular salience in light of epidemiological data on work-related leaves in the healthcare sector, which demonstrate the direct impact of working conditions on professionals' health. According to data from the Observatory of Occupational Safety and Health, for the period 2012–2024 the hospital care activity sector stood out among those with the highest numbers of work-related leaves in Brazil. Among accident-related leaves, physical injuries such as fractures predominated, in addition to musculoskeletal diseases. For non-accident leaves, mental disorders were predominant, followed by musculoskeletal diseases (Brasil, 2024).

In this context, understanding workers' risk perceptions is fundamental to exploring how healthcare teams contribute to the construction of safer work environments and to identifying opportunities to strengthen organizational safety. Thus, broadening the understanding of workers' perceptions of the risks present in their work activities can provide important inputs for improving safety management practices and for developing more

effective preventive strategies to combat processes of occupational illness, both in their physical and psychological dimensions (Cruz *et al*., 2010).

Against this background, this study sought to (1) describe the formal risk-management procedure of a university hospital administered by Empresa Brasileira de Serviços Hospitalares (EBSERH) and (2) understand how workers recognize risks in their work context, with a view to identifying the organizational factors that contribute to the creation of safer work environments.

2. MATERIALS AND METHODS

This study is classified as applied research, as it sought to generate knowledge aimed at understanding workers' perceptions of occupational hazards present in the hospital environment and the ways in which risk-management practices were experienced (Silva; Menezes, 2005). With respect to the methodological approach, the study was qualitative in nature and employed Content Analysis as its analytical framework, enabling the systematic examination and interpretation of participants' accounts concerning how workers perceive occupational hazards in the hospital environment and the strategies employed for their management (Bardin, 2016; Marconi; Lakatos, 2017; Silva; Menezes, 2005).

Content Analysis, as proposed by Bardin (2016), was used as the technique for processing and interpreting the qualitative data obtained from the interviews. This methodological procedure was carried out in three main stages: (i) pre-analysis, (ii) material exploration, and (iii) treatment of results and interpretation.

The pre-analysis stage comprised the initial organization of the material, including the constitution of the analysis corpus, a floating reading of the interviews, and the definition of analysis units. At this stage, the research objectives were revisited and guidelines were established to direct the categorization and interpretation process (Bardin, 2016).

The material exploration corresponded to the phase of actual analysis, during which coding, classification, and categorization operations were performed (Bardin, 2016). In this stage, respondents' statements were systematically examined, enabling the identification of recording units and recurrent themes related to the perception of occupational hazards and to safety-management practices in the hospital setting.

Finally, the treatment of results and interpretation stage involved organizing, analyzing, and interpreting the categorized data in light of the study objectives and the theoretical framework (Bardin, 2016). This phase sought to transform raw data into meaningful information, allowing for the identification of patterns, convergences, and particularities in participants' perceptions. Through this methodological procedure, it was possible to systematize and interpret respondents' statements in a structured manner.

Regarding the objectives, the study is also characterized as descriptive, since it aimed to describe the perceptions of a group of healthcare workers concerning occupational hazards and organizational actions (hospital safety) present in their work environment (Silva; Menezes, 2005). Concerning technical procedures, the study employed a survey conducted through direct approach of participants, with the objective of collecting information about

their experiences and perceptions related to the management of occupational risks.

Additionally, a documentary analysis was conducted to characterize the formal risk management process adopted by the investigated institution, based on official documents made available on the institutional website of the Brazilian Hospital Services Company (EBSERH, 2024). The combination of semi-structured interviews and documentary analysis enabled the triangulation of data sources, allowing the comparison between formal institutionalized procedures and the participants' perceptions regarding the practices effectively experienced within the hospital environment.

Data were collected in September 2021 via semi-structured interviews with four healthcare professionals working at a Brazilian university hospital. Each interview lasted approximately 15–20 minutes. Interviews were conducted individually, audio-recorded with participants' consent, and subsequently transcribed in full to enable qualitative analysis of the data.

The interview guide was structured in two main sections: (i) sociodemographic factors, aimed at characterizing participants; and (ii) factors related to occupational risk management, encompassing questions on risk identification in the workplace, prevention strategies, and workers' perceptions of the safety-management practices adopted by the institution. The full interview guide is presented in Table 1.

Table 1 – Interview guide.

Sociodemographic factors	
1	How old are you?
2	What is your profession?
3	What is your current occupational role?
4	How long have you held this role?
5	Working hours (shift/regular daytime hours)?
6	Do you work at another institution?
7	Do you have previous experience in the profession/role you currently perform? (If you work at another institution, please answer for both positions.)
Factors related to occupational risk management	
1	What are the main occupational risks identified in the sector?
2	Are there measures, procedures, or protocols for identifying these risks?
3	Is there any form of record-keeping for the identified risks (database, indicators, platform/software) for monitoring, subsequent analysis, or simply for documentation? What information is recorded?
4	How are the identified risks managed (prevention, mitigation and/or elimination measures) to ensure the health and safety of workers and patients?
5	Which actions do you consider important for managing ergonomic/occupational risks?

Source: Authors, 2025.

For this study, professionals occupying different managerial positions within the hospital were selected in order to encompass distinct perspectives regarding risk management processes. The participants included the Head of the Regulation Department

(E1), the Head of the Financial Unit (E2), the Head of the Radiology Unit (E3), and the Head of the Building Maintenance Unit (E4). The selection of managers from different organizational sectors aimed to broaden the understanding of occupational risks, considering that each role involves distinct activities, work contexts, and levels of exposure.

Although the number of participants was limited, the selection of managers enabled access to experience related to formal risk management processes and organizational safety strategies. These professionals were considered to possess a cross-functional perspective on institutional workflows and the management mechanisms adopted within the hospital. This choice is also justified by the fact that frontline and operational professionals, although essential for understanding real work activities, do not always have direct access to or in-depth knowledge of formal risk management processes, often receiving specific guidance restricted to their own duties and work routines.

This diversity of functions contributed to enriching the qualitative analysis, allowing the identification of different forms of risk perception, recognition, and management within the hospital environment. Within the scope of Content Analysis, this multiplicity of experiences enabled the identification of elements such as risk perception, vulnerabilities, organizational gaps, and reports of good practices related to occupational safety.

Thus, each position provided a specific perspective on the work environment, taking into account sector particularities and evidencing the presence of different types of occupational hazards, including physical, chemical, biological, ergonomic, psychosocial, and accident-related agents. The diversity of contexts analyzed contributed to a more comprehensive understanding of hospital safety and to a more consistent analysis of workers' perceptions of the risks present in their activities.

3. RESULTS

The presentation of the results is structured along two main axes. The first addresses the risk-management processes in the hospital setting, based on an analysis of the formal procedures adopted by the institution. The second axis discusses risk perception in the hospital environment, drawing on workers' accounts of the different types of risks present in their tasks and institutional routines, as well as on how those risks are recognized and experienced in day-to-day work.

3.1 RISK-MANAGEMENT PROCESSES IN THE HOSPITAL SETTING

According to the value chain of EBSERH, risk management is carried out in three main stages: (i) identification and assessment of risk events; (ii) establishment of control activities for prioritized risks; and (iii) monitoring of risks.

Figure 1 shows the process sheet used by the institution for the identification and assessment of risk events in the hospital setting. This process begins with an analysis of the internal environment and the institutional objectives, which guide the understanding of the organizational context and the activities performed. From that analysis, risk identification is carried out, a stage in which events that may compromise safety, workers' health, or task

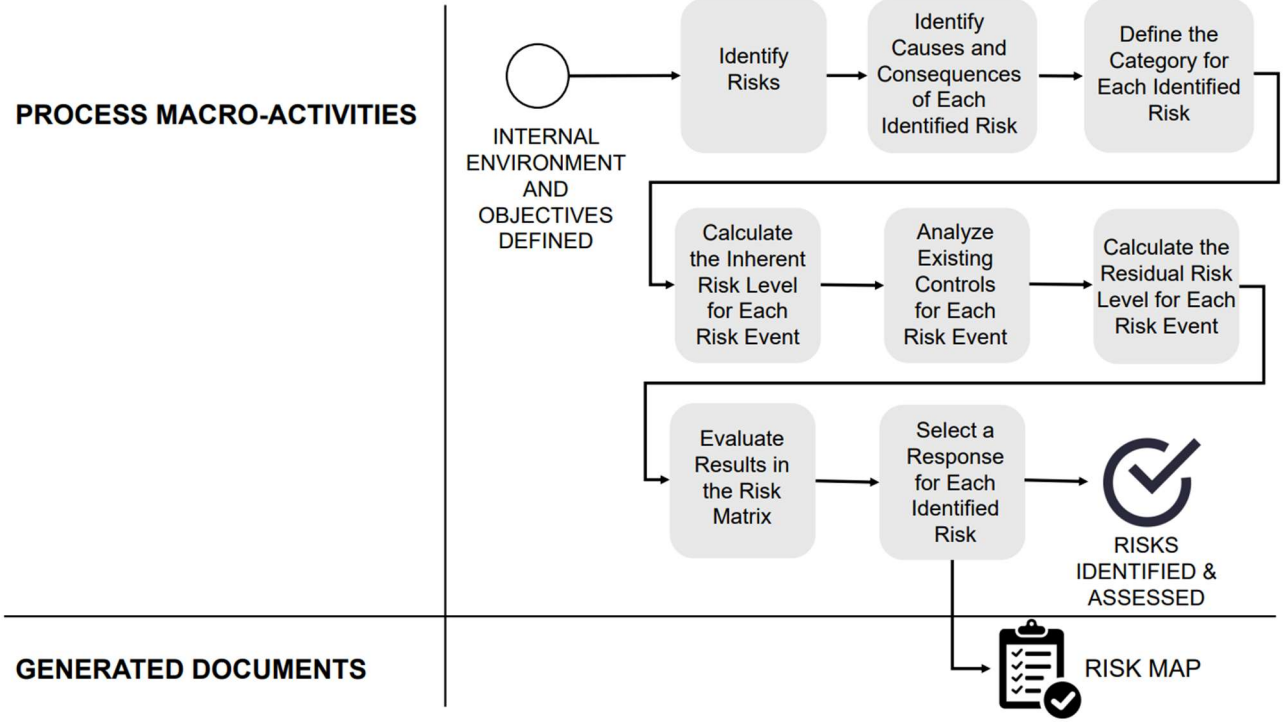
performance are recognized.

Next, the causes and consequences associated with each identified risk are mapped to understand the factors that may give rise to the risk event and the potential impacts resulting from its occurrence. Subsequently, each risk is assigned a category, classifying it according to its nature or area of impact.

Following this, the inherent risk level is calculated; this corresponds to the initial assessment of the risk considering its probability of occurrence and the severity of its consequences, prior to the application of control measures. Existing controls are then analyzed — that is, the mechanisms and procedures already implemented by the organization to reduce or mitigate these risks.

Based on this analysis, the residual risk level is computed; this represents the remaining risk after the adopted controls have been considered. The results are then consolidated in a risk matrix, a tool that enables evaluation and prioritization of risks according to their criticality.

Figure 1 – Process sheet for identification and assessment of risk events.

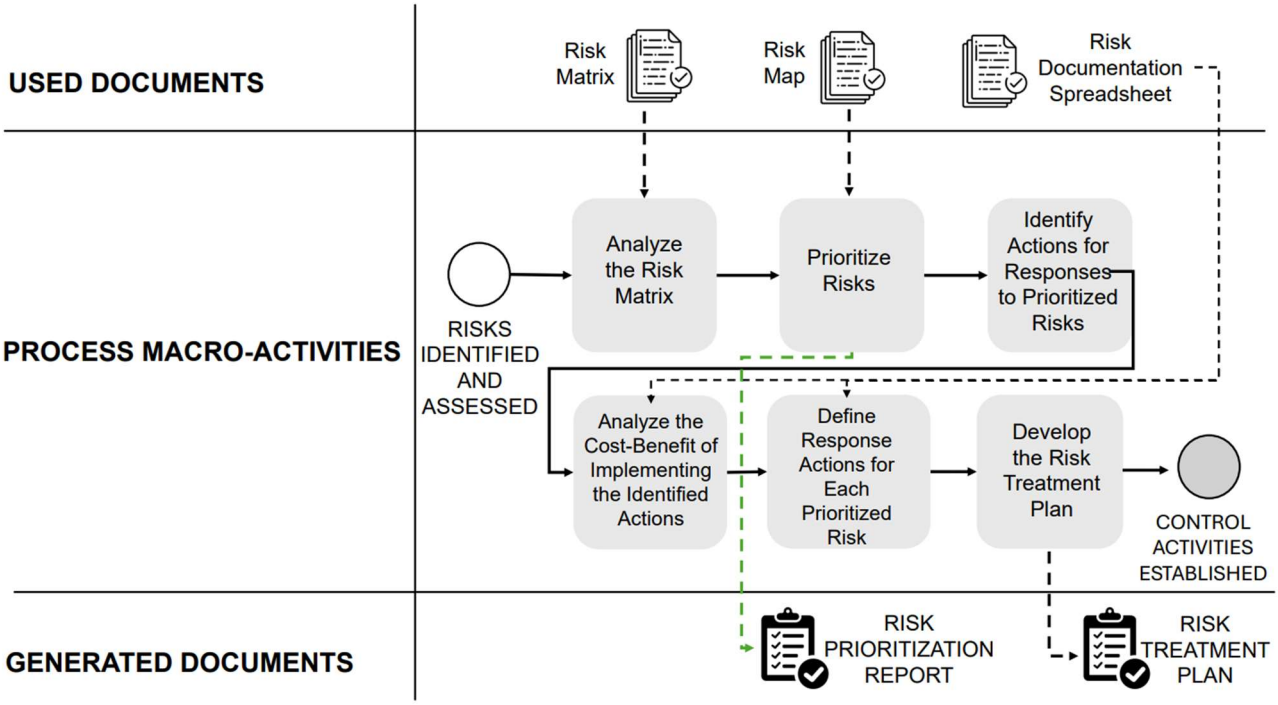


Source: Adapted from EBSERH, 2024.

Figure 2 presents the process for establishing control activities for prioritized risks. The process begins with an analysis of the risk matrix, from which the risks that require treatment actions are prioritized. Possible response actions to mitigate or control the identified risks are then identified.

A cost–benefit analysis of the proposed actions is subsequently performed to assess their feasibility and effectiveness. Based on that analysis, response actions are defined for each prioritized risk, culminating in the development of the risk-treatment plan, a document that consolidates the control measures to be implemented by the organization.

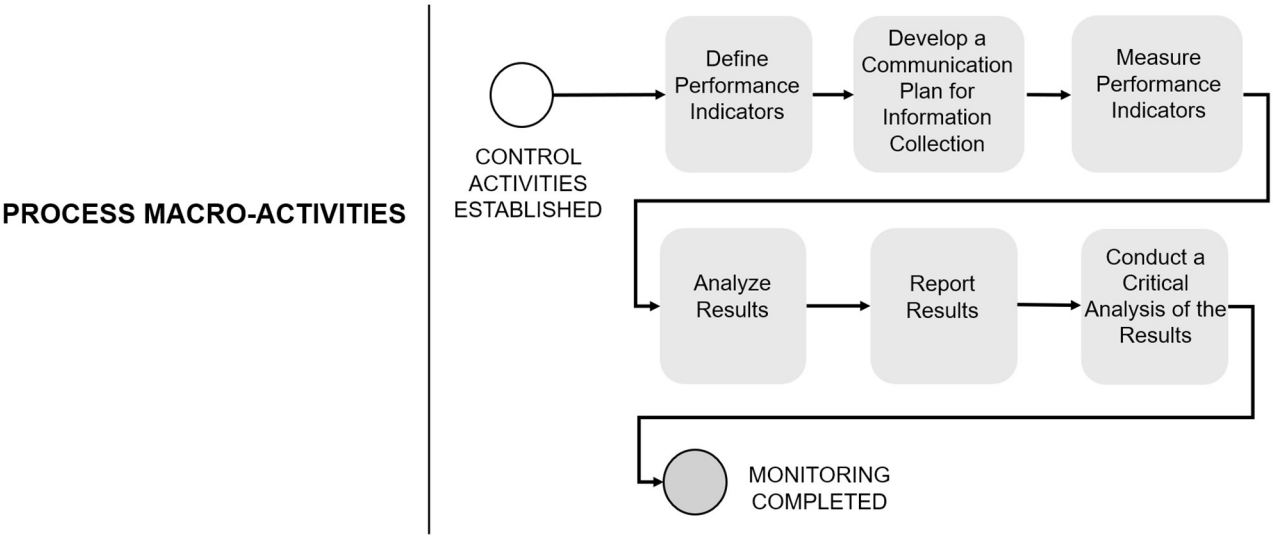
Figure 2 – Process sheet for establishing control activities for prioritized risks.



Source: Adapted from EBSERH, 2024.

The next stage of risk management is the monitoring of prioritized risks for which response actions have been defined. Figure 3 displays the risk-monitoring process, a phase devoted to following up on the effectiveness of the control activities implemented. The process starts with the definition of performance indicators, which are defined from the risk-identification process and subsequently incorporated. Once defined, these indicators enable the assessment of risk behaviour over time. A communication plan for information collection is then prepared, ensuring an adequate flow of data necessary for monitoring.

Figure 3 – Process sheet for risk monitoring.



Source: Adapted from EBSERH, 2024.

Thereafter, the performance indicators are measured and the results analyzed, making it possible to verify whether control actions are effective. The results are reported to the responsible parties and, finally, a critical review of the information is performed; this step allows evaluation of the need for adjustments to risk-management strategies and ensures the continuous oversight of organizational safety.

3.2 RISK PERCEPTION IN THE HOSPITAL SETTING

Content Analysis of the interviews showed that the occupational risks identified varied according to participants' perceptions and the characteristics of their work routines. The risks mentioned by interviewees were grouped according to the categories of risks requiring management, as established by Regulatory Standard No. 1 (NR-1), which sets out occupational health and safety provisions and defines guidelines and requirements for the management of occupational and psychosocial risks and the adoption of preventive measures (Brasil, 2024). The main risks reported by participants are presented below:

- Physical: radiological exposure;
- Biological: exposure to infected patients and biological agents;
- Chemical: exposure to chemical substances;
- Ergonomic: postural problems and repetitive strain;
- Psychosocial: pressure, workload, stress during care provision, cognitive overload, and violence;
- Accidents: related to building maintenance processes.

Notably, participant E2 stated that they had no direct contact with illnesses and therefore did not identify occupational risks in their duties, even reporting that they did not receive an additional hazard pay allowance. This perspective contrasts with those of the other interviewees and may indicate either different working realities or a possible underestimation of the risks present in the workplace.

Ergonomic risks represented a significant concern for participants. Interviewee E1 emphasized problems related to prolonged computer work, citing "spinal problems, visual fatigue, cervical pain, and low back pain." Participant E4 pointed to issues associated with inadequate posture, attributable to unsuitable furniture and prolonged sitting. These observations are consistent with recent studies reporting a high prevalence of work-related musculoskeletal disorders among computer users, associated with prolonged use, repetitive movements, and poor posture (Demissie; Bayih; Demmelash, 2024; Lucka *et al.*, 2024; Tsou, 2022). Interviewee E3 stressed the physical effort involved in moving mobile X-ray units and heavy lead-lined doors used for radiological protection, reporting medical certificates for back and shoulder pain resulting from these activities. Complementary literature describes that handling heavy equipment and using radiological protective gear increase load on cervical and lumbar discs, are associated with higher prevalence of neck and low-back pain, and may lead to work leave due to musculoskeletal disorders (Cornelis *et al.*, 2021).

Biological risks were also mentioned, especially in sectors such as Intensive Care Units (ICUs) and emergency departments. Interviewee E1 highlighted exposure to infected patients and frequent contact with environments considered hazardous to health. E4 corroborated this perception by noting the presence of biological risks in certain tasks and possible interactions with chemical risks. A study conducted in ICUs found that workers are exposed to multiple and constant occupational risks, with biological and ergonomic risks being the most prevalent (Ferreira *et al*., 2020). Similarly, a cross-sectional study by Adal, Abebe e Feleke (2023) in ICUs and emergency services identified high rates of occupational exposure to blood and body fluids, reporting that 76% of nurses had been exposed to such materials during their professional careers.

Psychosocial risks also emerged prominently in the interviews. Interviewee E1 addressed the risk of violence, particularly in the role of regulatory physician, who deals directly with the public and communicates decisions related to regulatory rules that frequently generate dissatisfaction and can result in verbal aggression and threats. Supporting this finding, a meta-analysis investigating the prevalence of workplace violence against healthcare workers found that 61.9% of participants reported exposure to some form of occupational violence (Liu *et al.*, 2019). Interviewee E4 added that pressure and heavy workload in public administration arise from audits, the activity of oversight bodies — such as the Ombudsman's Office and the Public Prosecutor's Office — and demands from the population.

The existence of measures, procedures, or protocols for risk identification was also questioned by the participants, with variations observed across sectors and, in some cases, perceptions of the ineffectiveness of these processes. Participant E1 expressed a degree of skepticism regarding the risk identification process, noting that the company contracted to develop the occupational risk map within the scope of the Occupational Health Medical Control Program (PCMSO) did not recognize the risks perceived by workers — a finding that highlights the non-participation of workers in the analysis of the risks to which they are exposed. Interviewee E2 believed that the occupational health unit was responsible for risk assessment. E3, in turn, described the existence of a radiation protection unit composed of a medical physicist and an outsourced company responsible for measurements and radiation monitoring. E4 reported the existence of mandatory risk management programs requiring the preparation of inventories and risk assessments accompanied by corrective proposals. However, E4 emphasized that the implementation of these measures occurred "case by case," depending on the reality of the sector, the severity and likelihood of the risk, as well as the availability of financial resources.

This scenario points to the need for institutions such as EBSERH to adopt participatory approaches to risk analysis, especially through work activity analysis, which makes it possible to understand work as it is actually performed, rather than only as it was prescribed. It is recommended that the hospital, in line with the guidelines of the Ministry of Health and EBSERH itself, establish as a contractual criterion with companies providing services in the field of Occupational Health and Safety (OHS) the mandatory use of participatory risk analysis methodologies, ensuring that workers are consulted during the

performance of activities and that their perceptions are formally incorporated into risk management instruments, such as the Risk Management Program (PGR) and the Technical Report on Environmental Working Conditions (LTCAT). The complexity of the hospital environment, which requires continuous care, often hinders the implementation of the ideal safety scenario, but this should not justify the exclusion of workers from the processes of identifying and controlling the risks to which they are exposed.

With regard to the recording of risks in databases, indicators, or digital platforms, this is a legal requirement, although perceptions of its effectiveness and accessibility vary among participants. Interviewee E1 mentions that risk monitoring is recorded in the hospital's PCMSO plan. E2 believes that these records are maintained by the occupational health unit in a proprietary system, to which workers do not have direct access. E3 describes procedures adopted in the radiology sector, including weekly tables and daily tests designed to monitor radiation protection and equipment functioning. Finally, E4 explains that risk recording is carried out in institutional documents, such as the Environmental Risk Prevention Program (PPRA) — currently replaced by the PGR — which includes the identification of risks, the workplace, the exposed functions, and suggestions for control measures, whether individual, collective, or related to changes in work processes.

The participants' responses reveal a structural weakness that goes beyond the technical dimension of recording: the absence or insufficiency of effective institutional channels for listening to, recording, and responding to workers' complaints and suggestions. When E2 states that the recording systems are managed by the occupational health unit without direct access by workers, a unidirectional logic of risk management becomes evident, in which the worker is treated as an object of monitoring rather than as an active subject and qualified informant regarding the real conditions of their work. This configuration is conducive to the phenomenon known as organizational silence, defined by Morrison and Milliken (2000) as the collective tendency of organizational members to withhold opinions, information, and concerns about problems identified in the workplace. The authors argue that this silence is not an individual choice, but rather a product of organizational structures and climates that, implicitly or explicitly, discourage workers from speaking up.

In the context of occupational health and safety, organizational silence represents a risk in itself: when workers do not find reliable channels to report risks, incidents, or suggestions for improvement, the organization operates with a partial and distorted view of actual working conditions (Milliken; Morrison; Hewlin, 2003). From an ergonomic perspective, overcoming organizational silence requires the institution to implement formal and permanent mechanisms for active listening to workers, integrated into risk management systems. This entails not only the existence of recording platforms, but also the guarantee of systematic feedback on the complaints and suggestions submitted, with defined deadlines and identified responsible parties, transforming the act of reporting a risk into a process with a visible beginning, middle, and end for the worker (Daniellou; Béguin, 2007).

Regarding the management of identified risks, especially in relation to prevention, minimization, or elimination actions, the participants pointed to several challenges. Interviewee E1 was emphatic in stating that effective risk management cannot exist when

the very existence of such risks is not acknowledged. E2 reiterated that their unit does not deal directly with occupational risks. E3 noted that, in their sector, dosimetry data are displayed at the reception area and that a radiation protection committee is responsible for quarterly meetings to discuss corrective measures and the development of Standard Operating Procedures (SOPs). E4, in turn, emphasized the complexity of risk management in hospitals, noting that the age of hospital infrastructure, combined with the recent evolution of legislation, makes it difficult to fully achieve ideal conditions of compliance and safety.

Subsequently, the interviewees suggest the need for a more in-depth and contextualized approach to risk data collection. Participant E1 argues that assessors should accompany workers' daily activities, directly observing the postures adopted and the use of equipment, rather than relying solely on interviews. E2 emphasizes the importance of analyzing the work environment and verifying the implementation and compliance of institutional protocols and guidelines. These accounts underscore the need to examine prescribed work and actual work within the workplace, since work as prescribed by managers does not always take into account real conditions or the individual characteristics of the worker (Iida, 2005). E3 emphasizes the need for greater interconnection among sectors and for the exchange of information regarding experiences and solutions adopted in different areas of the institution. This situation may be linked to the lack of alignment between prescribed and actual work, and there may be a lack of cooperation and integration between sectors, caused by competition under organizational pressures (Bedin; Fontes; Braatz, 2020).

In addition, with regard to the most common precautions, such as the use of Personal Protective Equipment (PPE) and the provision of training, the interviewee points to gaps in the identification of other risks — such as biological and ergonomic risks — in addition to radiation, which is the main focus of their sector. Thus, it can be inferred that when risk assessment is based solely on documents, regulations, and interviewees (who may be reluctant to report their experiences in the work environment), the risks present in the workplace may be underestimated. Therefore, a faithful analysis of how work is actually performed makes it possible to propose effective preventive measures aligned with the real conditions under which work is being carried out.

Finally, according to E4, the lack of mastery over work processes is a relevant obstacle, and the participant mentioned the difficulty of obtaining a complete survey of risks due to workers' low awareness of the problems present in their activities. In this regard, E4's response highlights the need to create Spaces for Debate on Work/Activity, understood as protected and participatory environments in which workers can share their perceptions, knowledge, and difficulties regarding real work situations. These spaces may incorporate the Return of Experience (REX) approach, which transforms experience into operational methods so that the problem does not recur or does not occur in a more harmful way for those involved (Diniz, Lima; Simões, 2024). This approach promotes collective solutions that value the experiences and lessons learned through daily work, contributing to the continuous improvement of preventive practices and occupational risk management.

The comparison across the different sectors highlighted that risk perception is directly

associated with the characteristics of the activities performed and the degree of proximity to healthcare delivery processes. While sectors directly involved in patient care and technical activities, such as radiology and regulation, emphasized biological, ergonomic, and psychosocial risks, administrative sectors demonstrated lower recognition of occupational risks, suggesting possible differences in exposure perception and in the understanding of occupational safety. In contrast, sectors related to building maintenance showed greater concern regarding accident risks and structural limitations within the hospital environment. These findings indicate that hospital safety management requires differentiated strategies across sectors, taking into account the organizational and operational specificities of each work context.

4. CONCLUSIONS

The management of risks in the hospital setting constitutes a continual challenge, particularly in institutions with aging infrastructure, limited resources, and the need for uninterrupted operation. In this context, the present study sought to describe the formal risk-management procedure of a university hospital administered by EBSERH and to analyse how workers recognise and perceive risks within their work context, thereby apprehending hospital safety as experienced in their daily tasks.

Although the formal management process is structured in accordance with institutional guidelines and regulatory standards, the results revealed a mismatch between the prescribed model and the reality experienced in everyday work. Participants' accounts evidenced substantial variation in risk perception across sectors and job roles, as well as gaps in the identification and treatment of certain occupational risks, particularly those of ergonomic and psychosocial nature. Difficulties were also reported in translating records, protocols, and formal documents into effective actions capable of producing concrete improvements in working conditions. In this regard, participants perceived risk management as fragmented and, in some cases, poorly aligned with the actual needs of the activities performed in the hospital setting.

Against this background, ergonomics emerges as an important framework to reconcile formal risk-management practices with the real demands of work. By taking into account the concrete conditions under which tasks are performed, work organisation, and the interaction among human, organisational, and technological factors, ergonomics contributes to a broader understanding of the risks present within the work system. Consequently, it facilitates not only the identification of vulnerabilities but also the planning of more effective, participatory interventions that are aligned with the needs of workers and organisations. The incorporation of ergonomic principles and methods into the risk-management process can thus support the development of safer, healthier, and more sustainable working environments in the hospital context.

From a practical perspective, the findings reinforce the need for hospitals to expand risk identification processes beyond the formal compliance with protocols and legal requirements, incorporating more participatory approaches that are integrated with real work

activities. The importance of strengthening communication mechanisms across sectors, increasing workers' participation in risk identification, and incorporating ergonomic and psychosocial analyses into safety management practices is highlighted. Furthermore, the findings suggest the need for investments in preventive actions focused on work organization, ergonomic conditions, and the continuous training of teams, particularly in hospital environments characterized by high complexity and operational variability.

Finally, this study presents some limitations. The first refers to the small sample size, composed exclusively of managers from different sectors, which limited the ability to capture the diversity of experiences and perceptions among the broader group of healthcare professionals, particularly those directly involved in clinical and operational activities. Nevertheless, considering that the objective of the study was to describe the formal risk management procedures and understand how workers recognize risks within their work context, the participation of managers enabled access to relevant information regarding formal management processes, institutional workflows, and organizational safety strategies.

The second limitation refers to the fact that the research was conducted in a single institution managed by EBSERH, which restricts the direct applicability of the findings to other organizational contexts, since each institution may present its own formal risk management processes, distinct organizational structures, and different levels of safety maturity. However, perceptions related to the challenges of identifying, communicating, and managing occupational risks may present similarities across other hospital institutions, particularly in contexts characterized by high operational complexity and continuous healthcare demands.

In addition, the interviews were relatively short due to operational constraints and the limited availability of professionals in a high-demand hospital environment, which may have restricted the in-depth exploration of certain topics and the more detailed examination of participants' individual experiences. Despite this, the reports obtained were sufficient to identify relevant elements related to formal management processes, risk perception, and weaknesses in safety management within the investigated context. It is also acknowledged that the data were based on self-reported accounts and, therefore, may be subject to social desirability bias and the possible omission of informal practices.

As a recommendation for future research, it is suggested to expand the sample by including frontline and operational professionals from different hospital sectors, as well as to broaden the methodological triangulation strategies by incorporating direct work observations, analysis of internal institutional documents, safety indicators, and incident reporting records. Furthermore, future studies should deepen comparisons across sectors and further investigate psychosocial factors within the hospital environment, considering that these aspects emerged prominently in the participants' reports. In addition, the importance of exploring the impacts of the recent updates to Brazilian Regulatory Standard No. 1 (NR-1), particularly regarding the inclusion of psychosocial risk assessment within Occupational Risk Management (GRO), is highlighted, as this topic is expected to gain increasing relevance in occupational safety and health management practices.

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REFERENCES

ADAL, O.; ABEBE, A.; FELEKE, Y. Occupational exposure to blood and body fluids among nurses in the emergency department and intensive care units of public hospitals in Addis Ababa City: cross-sectional study. **Environmental Health Insights,** v. 17, 2023. DOI: https://doi.org/10.1177/11786302231157223.

AMOADU, M. *et al.* Examining the impact of psychosocial safety climate on working conditions, well-being and safety of healthcare providers: a scoping review. **BMC Health Services Research,** v. 25, p. 90, 2025. DOI: https://doi.org/10.1186/s12913-025-12254-2.

BADJATE, Samprati J.; CARIAPPA, K. M. Scapholunate dislocation: a rare occupational hazard. The British Journal of Oral & Maxillofacial Surgery, v. 45, n. 3, p. 236–237, 2007.

BALAJI, R.; SARAVANAN, R.; GOVINDARASU, R. Study on the impact of human factors on health and safety performance. **International Journal of Health Sciences,** v. 6, n. S5, p. 8081–8093, 2022. DOI: https://doi.org/10.53730/ijhs.v6nS5.10597.

BARDIN, L. **Análise de conteúdo.** Tradução: Luís Antero Reto e Augusto Pinheiro. São Paulo: Edições 70, 2016.

BEDIN, É.; FONTES, A.; BRAATZ, D. Discrepancy between prescribed and real work: the case of outsourced service contract supervisors at federal universities in the state of São Paulo. **Revista Brasileira de Gestão de Negócios,** v. 22, n. 2, p. 232–249, 2020. DOI: https://doi.org/10.7819/rbgn.v22i2.4055.

BENN, J.; HEALEY, A. N.; HOLLNAGEL, E. Improving performance reliability in surgical systems. **Cognition, Technology & Work,** v. 10, p. 323–333, 2008. DOI: https://doi.org/10.1007/s10111-007-0092-x.

BRASIL. Ministério do Trabalho e Emprego. **Norma Regulamentadora No. 1 (NR-1):** Disposições Gerais e Gerenciamento de Riscos Ocupacionais. Brasília: MTE, 2024. Available at: https://www.gov.br/trabalho-e-emprego/pt-br/acesso-a-informacao/participacao-social/conselhos-e-orgaos-colegiados/comissao-tripartite-partitaria-permanente/normas-regulamentadora/normas-regulamentadoras-vigentes/nr-1. Accessed on: 15 mar. 2026.

BRASIL. **SmartLab – Observatório de Segurança e Saúde no Trabalho. Perfil dos casos de afastamentos.** 2024. Available at: https://smartlabbr.org/sst/localidade/0?dimensao=perfilCasosAfastamentos. Accessed on: 15 mar. 2026.

CIRINO, J. A. F. *et al.* (org.). **Manual do gestor hospitalar.** v. 4. Brasília: Federação Brasileira de Hospitais, 2022.

CORNELIS, F. H. *et al.* Ergonomics in interventional radiology: awareness is mandatory. **Medicina,** v. 57, n. 5, p. 500, 2021. DOI: https://doi.org/10.3390/medicina57050500.

CRUZ, R. M. *et al.* Saúde docente, condições e carga de trabalho. **Revista Eletrónica de Investigación y Docencia, Jaén,** n. 4, p. 147-160, 2010. Available at: https://revistaselectronicas.ujaen.es/index.php/reid/article/view/1024. Accessed on: 27 maio 2026.

DANIELLOU, F.; BÉGUIN, P. Metodologia da ação ergonômica: abordagens do trabalho real. *In:* FALZON, P. (Ed.). **Ergonomia.** São Paulo: Edgard Blucher, 2007.

DEMISSIE, B.; BAYIH, E. T.; DEMMELASH, A. A. A systematic review of work-related musculoskeletal disorders and risk factors among computer users. **Heliyon,** v. 10, n. 3, e25075, 2024. DOI: https://doi.org/10.1016/j.heliyon.2024.e25075.

DINIZ, E. P. H.; LIMA, F. P. A.; SIMÕES, R. R. A contribuição da Ergonomia para a segurança no trabalho. **Revista Brasileira de Saúde Ocupacional,** v. 49, 2024. DOI: https://doi.org/10.1590/2317-6369/01923pt2024v49edcinq15.

DUL, J.; WEERDMEESTER, B. **Ergonomia prática.** Tradução de Itiro Iida. 3. ed. São Paulo: Brucher, 2012.

EBSERH - Empresa Brasileira de Serviços Hospitalares. **Cadeia de valor.** 2024. Available at: https://www.gov.br/ebserh/pt-br/acesso-a-informacao/institucional/cadeia-de-valor. Accessed on: 15 mar. 2026.

FALZON, P. Natureza, objetivos e conhecimentos da ergonomia: elementos de uma análise cognitiva da prática. *In:* Falzon P, (ed.). **Ergonomia.** São Paulo: Edgard Blucher, 2012. p. 3–19.

FERREIRA, A. *et al.* Evaluation and control of professional risks in intensive care units. *In:* AREZES, P. et al. **Occupational and environmental safety and health II.** Cham: Springer, 2020. (Studies in Systems, Decision and Control, v. 277). DOI: https://doi.org/10.1007/978-3-030-41486-3_3.

FORTEA-CABO, G.; GONZALEZ-TERUEL, A. Culture of information and information exchange in a public hospital: a study based on the information orientation model and social network analysis. **Profesional de la Información,** v. 31, n. 6, e310615, 2022. DOI: https://doi.org/10.3145/epi.2022.nov.15.

GILBERT, C. What Is the Place of Human and Organisational Factors in Safety? *In:* JOURNÉ, B.; LAROCHE, H.; BIERDER, C. GILBERT, C (eds.). **Human and Organisational Factors:** practices and strategies for a changing world. Cham: Springer, 2020, p. 1–4. DOI: https://doi.org/10.1007/978-3-030-25639-5_1.

HOLLNAGEL, E. **Proactive approaches to safety management.** London: The Health Foundation, 2012. (Thought paper). Available at: https://www.health.org.uk/reports-and-analysis/reports/proactive-approaches-to-safety-management. Accessed on: 15 mar. 2026.

IEA – International Ergonomics Association. **What is ergonomics?** Conceituação aprovada na reunião do Conselho Científico da International Ergonomics Association em 1º de agosto de 2000, San Diego, USA. Available at: https://iea.cc/about/what-is-ergonomics/. Accessed on: 15 mar. 2026.

IIDA, I. **Ergonomia:** Projeto e Produção. 2. ed. São Paulo: Edgard Blucher, 2005.

KHAN, S. *et al.* Embracing uncertainty, managing complexity: applying complexity thinking principles to transformation efforts in healthcare systems. **BMC Health Services Research,** v. 18, p. 192, 2018. DOI: https://doi.org/10.1186/s12913-018-2994-0.

LIU, J. *et al.* Prevalence of workplace violence against healthcare workers: a systematic review and meta-analysis. **Occupational and Environmental Medicine,** v. 76, p. 927–937, 2019. DOI: https://doi.org/10.1136/oemed-2019-105849.

LUCKA, E. *et al.* The impact of increased computer screen time during the COVID-19 pandemic on the occurrence of upper part of musculoskeletal diseases among health personnel. **Scientific Reports,** v. 14, p. 20257, 2024. DOI: https://doi.org/10.1038/s41598-024-70942-1.

MARCONI, M. A.; LAKATOS, E. M. **Fundamentos de metodologia científica.** 8. ed. São Paulo: Atlas, 2017.

MILLIKEN, F. J.; MORRISON, E. W.; HEWLIN, P. F. An exploratory study of employee silence: issues that employees don't communicate upward and why. Journal of Management Studies, v. 40, n. 6, p. 1453–1476, 2003. DOI: https://doi.org/10.1111/1467-6486.00387.

MORRISON, E. W.; MILLIKEN, F. J. Organizational silence: a barrier to change and development in a pluralistic world. **The Academy of Management Review,** v. 25, n. 4, p. 706–725, 2000. DOI: https://doi.org/10.2307/259200.

PÁDUA, L. S. FERREIRA, M. C. Avaliação do custo humano do trabalho e das estratégias de mediação dos médicos de uma unidade de pronto atendimento. **Trabalho (En) Cena,** v. 5, n. 1, P. 28–52, 2020. DOI: https://doi.org/10.20873/2526-1487V5N1P28.

SILVA, E. L.; MENEZES, E. M. **Metodologia de pesquisa e elaboração de dissertação.** Laboratório de ensino à distância da UFSC: Florianópolis, 2005.

SLOVIC, P. The Psychology of Risk. **Saúde e Sociedade,** v. 19, n. 4, p. 731747, 2010. DOI: https://doi.org/10.1590/S0104-12902010000400002.

THATCHER, A.; NAYAK, R.; WATERSON, P. Human factors and ergonomics systems-based tools for understanding and addressing global problems of the twenty-first

century. **Ergonomics,** v. 63, n. 3, p. 367-387, 2019. DOI: http://dx.doi.org/10.1080/00140139.2019.1646925.

TSOU, M.-T. Influence of prolonged visual display terminal use on physical and mental conditions among health care workers at tertiary hospitals, Taiwan. International **Journal of Environmental Research and Public Health,** v. 19, p. 3770, 2022. DOI: https://doi.org/10.3390/ijerph19073770.

WONG, A. H. *et al.* Supporting the Quadruple Aim Using Simulation and Human Factors During COVID-19 Care. **American Journal of Medical Quality,** v. 36, n. 2, p. 73-83, mar. 2021. DOI: https://doi.org/10.1097/01.jmq.0000735432.16289.d2.

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