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(RESEARCH ARTICLE)

ASSESSMENT OF OCCUPATIONAL RISKS AT THE LOKOSSA REGIONAL HOSPITAL (BENIN)

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ABSTRACT

Hospitals present a wide range of occupational hazards, representing a high-risk working environment that combines the risks inherent in any work activity with the risks associated with its specific nature.

The exposure of hospital staff to occupational hazards, and the creation of a central occupational health department, come up against significant differences in the implementation of an occupational health department responsible for monitoring staff, and assessing and preventing the occupational hazards to which staff are exposed. Based on the patient care process, all the occupational hazards associated with this process were identified, and recommendations for preventive measures were formulated to help improve occupational health and safety in hospitals.

The methodological approach adopted an interpretivist epistemological framework based on an exploratory descriptive approach. The literature review divides the risks associated with hospital activities into two categories. Some are related to patient care, while others are specific to healthcare (chemical risks, blood-related incidents, contamination by infectious diseases, etc.). To identify occupational risks within the hospital, all doctors and surgeons are taken into account. The sample size is therefore 23.

The risks are very different and have different levels of importance depending on the healthcare sector. These have a negative impact on the health and safety of healthcare workers. 82.9% of those surveyed said they were constantly exposed to various risks of infection.

Keywords: Hospital, Occupational risks, Health, Safety at work, Lokossa.

1 INTRODUCTION

Risk is present in every aspect of social life, whether in industry, national defense, or everyday life. For a long time, people adopted a fatalistic attitude toward this reality, but today, society rejects this idea. Many arguments advocate for the concept of zero risk. However, a realistic approach prevails, and it seems wiser to manage risk by learning to understand it in order to control and reduce it. The healthcare sector, especially in hospitals, is no exception to this line of thinking. It appears that citizens are placing higher demands on this institution, which is supposed to be the last line of defense against life-threatening risks. (Bernfeld G., p. 31; Lhadj Mohand L. and Merzougui H., 2019, p. 14).

Changes in the nature of workplace hazards, advances in the understanding of risk factors, and greater awareness of risks to health, industry, and the environment have led to the recognition of occupational health and safety as a genuine public health issue. Today, ensuring the health and safety of employees is therefore a major social issue (Chetioui N. and Habib D. E., 2019, p. 12).

Like any employer, the hospital has a responsibility to ensure the health and safety of its employees. It must, in fact, meet specific objectives. To this end, it is required to take "all necessary measures to protect the physical and mental health of workers." The healthcare sector stands out from others due to its highly specific working conditions and occupational hazards (Benaffane K, 2016, p. 5).

The distress experienced by healthcare workers at Lokossa Hospital is primarily due to the complexity of the hospital's structure, variations in procedures and care, the multitude of specialties, the challenges posed by healthcare technologies, and the variety of cases treated at the hospital (Avit et al., 2018, p. 2).

To prevent any negative consequences related to exposure to potential hazards in the hospital environment, healthcare administrators must focus on the early identification of the various occupational risks affecting healthcare workers (Avit et al., 2018, p. 2).

1.1 Overview of the Study Area

The city of Lokossa, the capital of the Mono Department, is located in southwestern Benin. It is bordered to the north by the municipality of Dogbo, to the south by the municipality of Athiémé, to the east by the municipalities of Bopa and Houéyogbé, and to the west by the Republic of Togo. It lies between latitudes 6°36'14" and 6°47'00" North and longitudes 1°44'30" and 1°55'19" East. Its geographic location makes it an important administrative, economic, and health hub for the Mono Department.

The municipality has a subequatorial climate, characterized by two rainy seasons and two dry seasons. Average temperatures generally range between 25 and 32 °C, with relatively high humidity during the rainy periods. These climatic conditions can promote the proliferation of certain pathogens and affect the working conditions of healthcare personnel, particularly in facilities with inadequate ventilation or air conditioning.

The Lokossa Regional Hospital is the primary healthcare facility serving the Mono and Couffo departments. It provides preventive, curative, and health promotion care, as well as services in diagnostics, surgery, obstetrics, pediatrics, internal medicine, emergency care, laboratory testing, medical imaging, and pharmacy. It receives a large number of patients daily from Lokossa and the surrounding municipalities, resulting in a high volume of hospital activity.

The hospital's operations rely on a multidisciplinary staff consisting of physicians, pharmacists, laboratory technicians, nurses, midwives, laboratory technicians, medical imaging technicians, nursing assistants, janitors, administrative staff, and support staff. The practice of these various professions exposes workers to a variety of occupational hazards.

In fact, staff face biological hazards related to contact with blood, body fluids, and infectious diseases; chemical hazards associated with handling medications, disinfectants, and laboratory reagents; physical hazards such as ionizing radiation, noise, heat, and electrical accidents; ergonomic hazards resulting from patient handling, awkward postures, and repetitive movements; as well as psychosocial hazards related to workload, stress, night shifts, the pressure of emergency situations, and instances of violence or aggression from certain patients.

Furthermore, the management of biomedical waste, the implementation of measures to prevent healthcare-associated infections, the availability of personal protective equipment (PPE), compliance with safety protocols, and the hygiene conditions of the facilities are key factors in controlling occupational risks within the facility.

Thus, the Lokossa Regional Hospital provides a relevant setting for assessing occupational risks, given the diversity of activities carried out there, the wide range of socio-professional groups involved, and the numerous exposure situations

that staff face on a daily basis. Analyzing these risks will make it possible to identify the main exposure factors and propose preventive measures likely to improve the safety, health, and working conditions of healthcare workers.

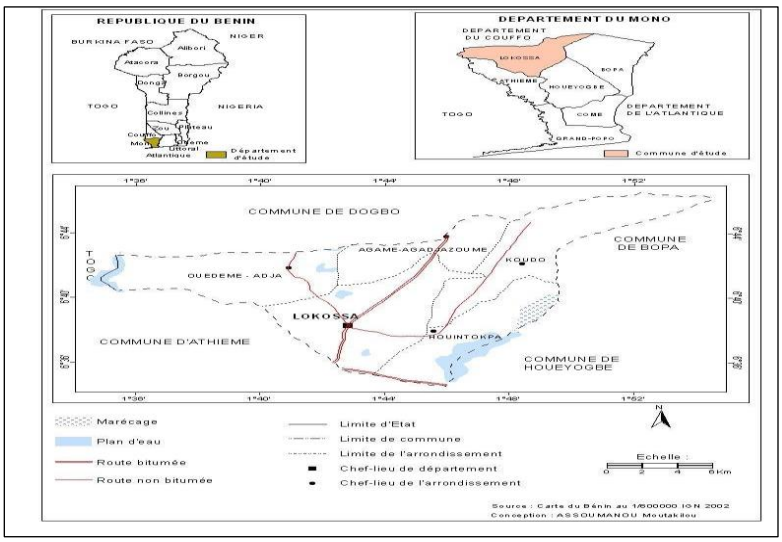


Figure 1: Geographic Location of the City of Lokossa

2 RESEARCH METHODOLOGY

Pour To address the research question and evaluate the validity of the hypothesis, we adopted an interpretive epistemological framework based on a descriptive and exploratory approach. Field visits were conducted to observe and discuss with healthcare staff.

To identify the various work-related risks, we conducted interviews with 42 healthcare workers employed in the medical, surgical, maternity, and laboratory departments.

2.1 Data Analysis Method

The VigiRisk software was used for this study. It was specifically developed for the healthcare sector to assist in managing risks associated with patient care. In addition, it allows for the reporting of adverse events and the investigation of their causes. This program enables the effective identification, assessment, and management of risks, thereby helping to enhance the safety of both patients and healthcare professionals.

It helps classify risks associated with healthcare work—an essential approach to ensuring employee protection and excellence in care.

2.2 Risk Identification

- Task Analysis: Evaluate each activity to identify potential hazards.
- Employee consultation: Engage staff to gather their feedback on the risks they encounter.

2.3 Risk assessment

- Probability of occurrence : Assess how often each risk might occur.
- Severity of consequences : Analyze the potential impact on workers' health and safety.

2.4 Risk Prioritization

- Risk Matrix : Use a matrix to classify risks based on their severity and probability.
- Prioritization : Focus efforts on the most critical risks first.

2.5 Implementation of Preventive Measures

- Elimination : Eliminate the risk if possible.
- Substitution : Replace one risk with a less hazardous one.
- Technical controls : Implement protective equipment or modifications to the work environment.
- Training and awareness : Train staff on best practices and safety measures.

2.6 Monitoring and reassessment

- Regular checks : Conduct audits and inspections to ensure the effectiveness of the measures implemented.
- Feedback : Adjust strategies based on incidents that have occurred and employee feedback.

3 RESULTS AND DISCUSSION

3.1 Socio-professional Characteristics of the Respondents

- At the Lokossa Regional Hospital, the following data were collected :
- At the Lokossa Regional Hospital, the following information was gathered :
- All staff members are aware of the hazards associated with their work at the hospital.
- 82.6% of employees work on-site on-call shifts.
- All staff lack adequate personal protective equipment.

3.2 Patient Care Process

Care is provided by a medical and technical team that utilizes all available resources, such as healthcare personnel (doctors, nurses, etc.), equipment (ultrasound machines, CT scanners, etc.), and treatment tools. This enables them to provide healthcare services to the residents of Lokossa. This system helps structure the patient's care pathway. This pathway consists of several phases. It begins with the patient's arrival at the local hospital, followed by a visit to the triage unit (reception and consultation) before the patient is directed to the appropriate care unit for their condition.

Figure 2 illustrates the patient care process.

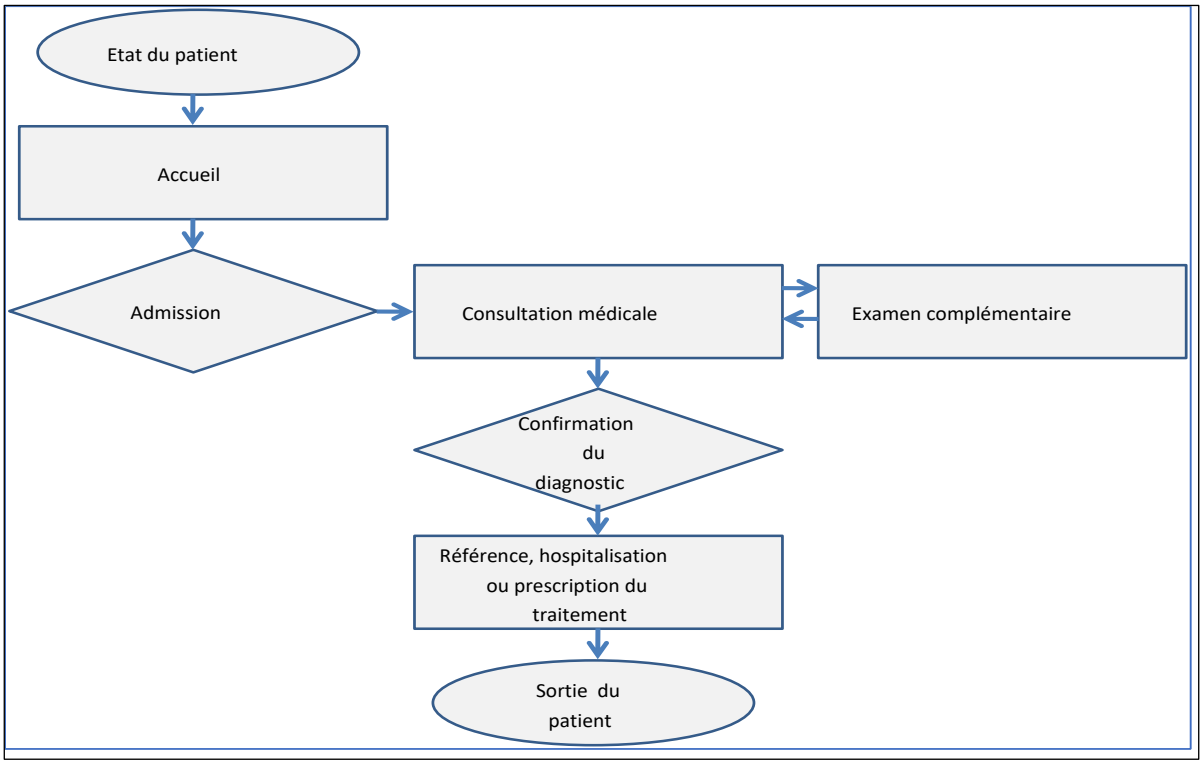


Figure 2: Patient Care Process

Source : Aissi (2025), «Field Survey, November 2025»

Establishing a diagnosis requires direct interaction with the patient, gathering a medical history, analyzing observed symptoms, conducting a physical examination, and evaluating additional test results.

The diversity of cases treated in hospitals and the need for adaptability during the diagnostic process present ergonomic and organizational challenges, which can expose employees to occupational hazards.

It is worth noting that healthcare practices and methods vary from one level of care to another, with interventions becoming more complex, invasive, and risky for staff. At every stage of the patient's journey through these processes

(diagnosis and treatment), direct interaction between the healthcare provider and the patient creates occupational risks in the hospital environment.

3.3 Risks Associated with Consultations and Hospitalization in the Care of Patients in the Hospital

Based on the model of the care process, this section discusses all the occupational hazards that healthcare workers face (Figure 3).

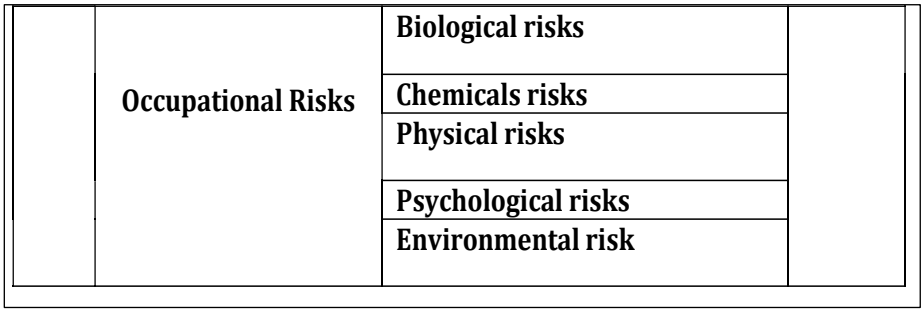


Figure 3: Overview of Occupational Health Risks

Source : Aissi (2025), "Field Survey, July–August 2026, INRS-adapted (2018)"

According to Figure 3, each patient care procedure is closely linked to the various occupational hazards that affect medical staff. This connection is due to: direct exposure to infectious agents, contact with hazardous substances, the weight of responsibility, and having to deal with difficult situations on a regular basis.

3.3.1 Risks Associated with Consultations and Hospitalization in the Care of Patients at the Hospital

Occupational risks at the Lokossa Regional Hospital are varied and fall into several categories.

3.3.2 Biological risks

The survey results show that 93% of respondents believe that the main danger in a healthcare setting is exposure to infections. This biological risk is primarily linked to contact with infected patients, blood, and other bodily fluids, as well as to the handling of medical equipment or healthcare waste that may be contaminated with pathogens such as bacteria, viruses, fungi, and parasites.

To illustrate these results, Table 1 presents a comparative table showing the main biological hazards identified, their frequency of mention by respondents, and their potential consequences for staff health. This presentation facilitates the interpretation of the data while complying with scientific requirements and confidentiality rules applicable to healthcare facilities (Table 1).

Table 1: Biological Risks

Identified Biological Hazards	Frequency (%)	Main Consequences
Exposure to infections	93	Occupational infections, cross-contamination
Contact with blood and biological fluids	91	Risk of HIV, HBV, and HCV transmission
Handling of biomedical waste	89	Injuries, contamination, infections
Blood exposure accidents (BEAs))	66	Contamination by pathogenic agents

Source : Field survey, July 2026.

Table 1 presents the respondents' perceptions of the main biological hazards to which staff at the Lokossa Regional Hospital are exposed. The results show that exposure to infections is the most frequently cited risk, cited by 93% of respondents. This high proportion reflects healthcare professionals' awareness of the risks of contamination associated with their constant contact with patients, body fluids, and infectious agents present in the hospital setting.

Contact with blood and body fluids is identified as a major hazard by 91% of respondents. This situation is particularly concerning due to the risk of transmitting pathogens responsible for diseases such as hepatitis B, hepatitis C, and HIV, particularly during medical procedures, blood draws, or the handling of contaminated materials.

The handling of biomedical waste is also perceived as a significant risk by 89% of participants (Photo 1). When not properly sorted, packaged, transported, or disposed of, this waste constitutes a potential source of contamination and workplace accidents. It exposes not only healthcare professionals but also cleaning staff, waste collectors, and, indirectly, patients and visitors.

In contrast, 66% of respondents reported accidents involving exposure to blood (AES). Although this proportion is lower than those observed for other biological hazards, it remains high and reflects the persistence of risks associated with accidental needle sticks, cuts from sharp objects, or splashes of biological fluids. These incidents require immediate treatment to reduce the risk of infection.

Overall, the results show that biological hazards constitute the primary category of occupational risks at the Lokossa Regional Hospital. The prevalence of these risks highlights the need to strengthen preventive measures, particularly through the availability of personal protective equipment, strict adherence to standard precautions, improved management of biomedical waste, ongoing staff training, and the strengthening of the system for monitoring blood exposure incidents.



Figure 4: Patient's blood

Photo taken by: Bakari, July 2025

Figure 4 shows a patient's blood spilled on the floor. This blood may contain viruses and/or bacteria that can cause infections. The spilled blood can contaminate other samples or surfaces, increasing the risk of infection.

3.3.3 Chemical risks

Table 2 lists the main chemical hazards to which hospital staff are exposed

Table 2: Major Chemical risks

Identified Chemical Risks	Frequency (%)	Main Consequences
Use of disinfectants and decontamination products	81	Skin irritation, respiratory disorders, allergies
Dermatological irritation associated with latex gloves	23	Contact dermatitis, allergic reactions
Accidental contact with cytotoxic drugs	17	Toxic, mutagenic, or carcinogenic effects

Source : Field survey, July 2026.

Table 2 highlights the main chemical hazards to which the staff of Lokossa Zone Hospital are exposed. The results show that 81% of respondents identified the use of disinfectants, decontamination products, and hospital hygiene products as the main chemical risk. This high proportion can be explained by the daily use of these substances in various healthcare units, exposing staff to skin irritation, respiratory disorders, and allergic reactions in cases of improper handling or prolonged exposure.

Furthermore, 23% of respondents reported dermatological irritation caused by latex gloves. Although this risk affects a smaller proportion of staff, it may impair occupational comfort and lead to contact allergies that could limit the use of certain personal protective equipment.

Finally, 17% of respondents reported risks associated with accidental contact with cytotoxic drugs. Despite its relatively low frequency, this hazard remains a concern because of the high toxicity of these substances, which may cause mutagenic, teratogenic, or carcinogenic effects in cases of repeated exposure or improper handling that does not comply with safety protocols.

Overall, the findings indicate that chemicals used in healthcare activities constitute a significant source of occupational risks. They highlight the need to strengthen preventive measures, particularly through continuous staff training, compliance with safe handling procedures, systematic use of appropriate personal protective equipment, and implementation of rigorous protocols for the management of hazardous chemical substances.



Figure 5: Refrigerator Containing Chemical Products

Prise de vue : Bakari, juillet, 2024

Figure 5 shows a refrigerator containing chemical products. The risks associated with chemical substances are diverse and may have serious consequences for workers' health and safety.

3.3.4 Physical Risks

Patient lifting, transferring, and repositioning activities place considerable strain on healthcare workers' musculoskeletal systems and may contribute to the development of low back pain, muscle pain, musculoskeletal disorders (MSDs), and other conditions associated with awkward postures and repetitive physical exertion.

Similarly, 100% of respondents considered falls and slips to be a major hazard in the hospital environment. The presence of wet floors, spilled liquids, equipment left in corridors, or obstructed passageways increases the risk of accidents for staff, patients, and visitors alike. Such accidents may result in trauma, sprains, fractures, and temporary work incapacity, with potential repercussions for continuity of care and the quality of healthcare services.

The unanimity of the responses reflects a strong perception of these risks and highlights the importance of improving working conditions within the healthcare facility. Accordingly, it is necessary to promote the use of technical aids for patient handling, ensure rigorous maintenance of the premises, and keep passageways clean, dry, and unobstructed in order to prevent accidents and provide a safer working environment.

3.4 Psychosocial Risks

The results show that night work is the most frequently reported risk (42%). Night shifts and rotating schedules disrupt workers' circadian rhythms, contributing to chronic fatigue, sleep disorders, and reduced alertness, which may compromise both their well-being and the safety of healthcare delivery.

Occupational stress was reported by 32% of respondents. It is generally associated with the demands of hospital work, the management of emergency situations, professional responsibilities, and the need to make rapid decisions in

sometimes critical contexts. Prolonged exposure to stress may lead to burnout, reduced concentration, and a decline in the quality of healthcare services.

The emotional demands associated with caring for critically ill or distressed patients were reported by 27% of respondents. Repeated exposure to suffering, pain, and death may generate emotional exhaustion, potentially affecting healthcare professionals' mental health and increasing the risk of burnout syndrome.

Furthermore, 19% of participants reported a feeling of insecurity while performing their duties, whereas 18% indicated that they were exposed to verbal violence from some patients or their accompanying persons. Such situations may negatively affect the working environment, increase stress levels, and reduce staff motivation.

Finally, 15% of respondents identified work overload as a psychosocial risk factor. Although reported less frequently, work overload may cause physical and mental fatigue, increase the risk of professional errors, and adversely affect the quality of healthcare.

Overall, the findings indicate that psychosocial risks are a reality at Lokossa Zone Hospital, although their perception varies according to the occupational constraints encountered. These findings highlight the need to implement preventive strategies aimed at improving work organization, strengthening psychological support for healthcare workers, preventing violence in healthcare settings, and promoting a working environment conducive to mental health and staff well-being.



Figure 6: Work Equipment

Prise de vue: Bakari, juillet 2026

Figure 6 shows the work equipment used by healthcare staff. The image indicates that the use of such equipment may increase the amount of time required to complete tasks beyond what would normally be necessary. These situations may contribute to increased workload and stress among healthcare workers.

3.5 Environmental Risks

The survey results show that working conditions and the hospital environment are factors that may influence the health and safety of staff. Respondents particularly emphasized that inadequate infrastructure, characterized by insufficient lighting, high noise levels, inadequate ventilation, and poorly ergonomic workspaces, may increase the risk of accidents, contribute to physical and mental fatigue, and reduce occupational performance.

Furthermore, hospital activities expose medical and paramedical staff on a daily basis to a wide range of occupational hazards, including biological, chemical, physical, ergonomic, and psychosocial risks. Repeated exposure to these various hazards may result in occupational accidents, work-related diseases, temporary or permanent disabilities, as well as recurrent absenteeism that may affect the continuity and quality of healthcare services. These findings highlight the need to strengthen occupational risk prevention measures, improve working conditions, and promote a safety culture within Lokossa Zone Hospital in order to protect workers' health and ensure higher-quality healthcare services.



Figure 7: Infrastructure Requiring Improvement

Prise de vue : Bakari, juillet, 2026

Figure 7 in the plate provides an overview of the working conditions of healthcare professionals, showing part of the laboratory where various types of products and materials are stored in an accumulated and poorly organized manner. Furthermore, Photo 2 shows a sanitary facility whose condition is unsatisfactory. Under such conditions, healthcare workers are exposed not only to environmental hazards but also to other occupational risks.

3.6 Risk Prioritization

Table 3 presents the prioritization of occupational risks and the implementation of preventive measures.

Table 3: Risk Prioritization and Implementation of Preventive Measures

Risk Category	Risk Type	Description	Probability	Impact	Risk Level	Preventive Measures
Biological Risks	Exposure to pathogenic agents	Contact with pathogenic agents	Very High	Very High	Critical	Vaccination, PPE, disinfection protocols
Chemical Risks	Exposure to hazardous substances	Handling of chemical products	High	Very High	High	Training, ventilation, PPE, safe storage
Physical Risks	Patient handling	Falls, slips, and various accidents	High	High	High	Safety training, regular maintenance of facilities
Psychosocial Risks	Work-related stress	Work overload, conflicts, harassment	Medium	High	High	Training, awareness-raising, psychological support, time management
Environmental Risks	Inadequate infrastructure	Insufficient lighting, noise, aging equipment	Low	Low	Low	Improvement of facilities and provision of new equipment

Source : Field Survey, July 2026.

The analysis of Table 1 shows that biological and chemical risks are the occupational hazards to which staff are most frequently exposed, whereas the probability of physical and psychosocial risks remains moderate. Furthermore, environmental risks are assessed as low.

3.7 Implementation of Preventive Measures

To mitigate these risks, several measures should be implemented :

- Continuous training : Raise staff awareness of occupational hazards, safety requirements, and good professional practices.

- Personal Protective Equipment (PPE) : Provide appropriate PPE and ensure its proper and consistent use.
- Safety protocols : Establish clear procedures for the handling of waste, chemical products, and patients.
- Improvement of procedures : Adapt and update protocols in order to minimize occupational risks.

3.8 Monitoring and Reassessment

For effective monitoring and reassessment, it is necessary to:

- Conduct audits and inspections to assess the effectiveness of the measures implemented through regular monitoring and control.
- Adjust prevention strategies based on incidents that have occurred and feedback from employees (lessons learned).
- Review risk assessments in response to changes in the work environment or the emergence of new occupational hazards (updating of risk assessments).

In addition, effective communication and staff awareness are essential to maintaining a safe working environment and ensuring the proper implementation of preventive measures.

3.9 Documentation

- Assessment reports : Maintain records of risk assessments conducted and the preventive measures implemented.
- Communication : Inform staff about the assessment findings and the actions to be taken.

A rigorous and continuous assessment of occupational risks is essential for improving safety within the hospital and promoting a healthy and safe working environment.

4 DISCUSSION

This study aims to analyze the occupational hazards faced by staff at Lokossa Hospital. We have observed that these workers are exposed to various types of risks due to their professional activities.

Staff members are exposed to biological, physical, and psychological hazards in all workplaces.

Among these hazards, biological hazards are the most serious and common. With regard to blood exposure incidents which represent the primary biological hazard a large proportion of the staff could be affected by such incidents.

Following the survey conducted at the hospital, we were able to answer our research question. Identifying risks is an essential but insufficient condition for suggesting appropriate improvements to the hospital environment. The root-cause analysis phase is essential to any strategy for preventing and correcting risks.

Based on the premise that the ongoing review of care practices can have a beneficial impact on the early detection of occupational hazards in hospitals, our study argues that managing patient flow and identifying the hazards associated with each activity in the care process play a key role in understanding sources of exposure, with the aim of reducing their frequency (for example: standardization of the patient's serological status; risk of tuberculosis transmission during patient admission and settlement).

These findings are consistent with the research conducted by Carricaburu et al. in 2008, titled: "When Caring Makes Caregivers Sick: Healthcare Workers Facing Infectious Risks (The Case of French Hospitals)." This research shows that caring for patients with infectious diseases poses a health risk to healthcare professionals, especially when they are not wearing personal protective equipment.

Our research indicates that to prevent burnout, it is essential to explore the root causes of these risks in order to suggest effective improvements. Working alternating day and night shifts can impair alertness and may be a cause of burnout.

A 2011 study by C. Hazif shows that burnout is a common risk for healthcare workers. However, for early detection of risks to have a positive impact on improving care, action must be taken to address professional behaviors and commitment to workplace safety.

During our study, we observed that recognizing workplace risks serves solely as a tool for assessing how committed employees are to reporting perceived risks (Rémili et al., 2019). This can be verified through regular audits of medical staff's commitment to identifying and reporting anomalies.

This observation was confirmed by Sumer's research (2014, updated in 2016) in the hospital sector. This research indicates that ongoing assessment and the commitment of healthcare staff play a key role in developing a workplace risk prevention plan.

The evaluation of diagnostic and care processes has a beneficial effect on employee engagement in the safety approach within the hospital sector ; this finding is consistent with that of Kassiba et al. (2020).

Thus, reviewing care procedures is essential for identifying sources of occupational risks in hospitals, which demonstrates the relevance of our research in relation to that of Tiberguent (2004). According to the INRS (2018), the evaluation of care processes is a key tool for managing occupational risks.

In this context, the HAS (2012), Francoise (2016), and Avit (2018) assert that a commitment to a culture of safety is essential for optimizing care processes.

Furthermore, while it is crucial to recognize hazards, it is equally important not to overlook the fundamental step of analyzing the root causes of occupational risks in hospitals before suggesting opportunities for improvement that are tailored to our situation.

5 CONCLUSION

Risk prioritization is an ongoing process that requires the participation of all levels of the organization. By implementing an active and organized approach, healthcare institutions can create a safer work environment for their employees. As a result, workplace risk management is essential to ensuring the safety of both staff and patients in a regional hospital. A proactive approach can help reduce these risks and optimize the work environment.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

Disclosure of conflict of interest

"The authors declare no conflicts of interest regarding this manuscript".

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