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Analysis of Occupational Safety and Health (OSH) Risks in Hospitals: Literature Review

Widi Mahasih Pramusiwi^{1*}, Widodo Hariyono², Rochana Ruliyandari³¹Universitas Ahmad Dahlan | 2108053052@webmail.uad.ac.id²Universitas Ahmad Dahlan | Widodohariyono@gmail.com³Universitas Ahmad Dahlan | Rochana.ruliyandari@ikm.uad.ac.id*Corresponding Author: 2108053052@webmail.uad.ac.id

ABSTRACT

Introduction: As one of the workplaces that poses significant risks to occupational safety and health, hospitals have the potential for the emergence of infectious diseases among staff, patients, and even visitors. Essentially, all healthcare workers, including healthcare professionals, are at risk of being exposed to hazards in the workplace.

Objective: To determine the extent and types of health and safety risks present in Indonesian hospitals, researchers conducted further assessment through a systematic literature review.

Method: Data collection was carried out using specified categories on the Google Scholar search page, while the data filtering method was conducted by applying the PRISMA analysis method, resulting in six research articles being reviewed in this study.

Result: From the various studies reviewed, it is known that occupational health and safety hazards have the potential to result in numerous risks, including bacteria; cough and cold; dizziness; sneezing; Covid-19; animal disturbances; musculoskeletal disorders; hepatitis A; hepatitis B; HIV; nosocomial infections; fungi; falls; fatigue; heat; medical waste fluid contamination; medical waste; bruises; sore eyes; muscle pain; low back pain; joint pain; panic; exposure to hazardous and toxic materials; poor lighting; incorrect posture; attacks from patients; shortness of breath; work stress; scratches; falls from stairs; slips; being hit; stumbling; paper cuts; electric shocks; viral infections; being hit by objects; needle pricks; typhus; tuberculosis; and other viruses. These risks are categorized as physical, chemical, biological, ergonomic, and psychological hazards. Additionally, each risk has different levels of severity (high, medium, low) in each case.

Conclusion: Occupational health and safety hazards in hospitals encompass a wide range of risks, categorized into physical, chemical, biological, ergonomic, and psychological hazards. These include infectious diseases like Covid-19, hepatitis, and tuberculosis; physical injuries from falls, slips, and needle pricks; exposure to hazardous chemicals; ergonomic issues; and psychological stress.

Keywords: Occupational Health and Safety; OSH in Hospitals; Risk Analysis

INTRODUCTION

Hospitals were types of healthcare facilities that offered various individual health services, such as emergency rooms, outpatient and inpatient care, as well as examinations and research (1). Hospitals were workplaces where several factors could pose occupational safety and health risks (2). WHO reported that all healthcare workers, including health professionals, were at risk of workplace hazards. WHO reported that millions of healthcare workers suffered from work-related illnesses and accidents, and many died due to workplace hazards (3). Furthermore, the presence of flammable substances, medical gases, ionizing radiation, and chemicals required serious consideration for the safety of patients, staff, and the public (4). These hazards did not only affect hospital employees but also patients, visitors, and the general public around the hospital (5).

As a workplace with significant occupational safety and health risks, hospitals had the potential for infectious diseases to emerge among staff, patients, and even visitors, since various types of diseases could not be entirely avoided. Hospitals faced risks or hazards that could impact their environment and conditions, such as accidents (including explosions, fires, accidents caused by electrical installation issues, and factors that could cause injuries). Other examples included radiation, exposure to toxic and potentially hazardous chemicals, anesthetic gases, psychiatric illnesses, and ergonomic issues (6). According to the National Safety Council (NSC), hospital workers experienced accidents at a rate 41% higher than workers in other industries. Common incidents included infectious diseases, burns, sprains, back pain, cuts, and needle-stick injuries (4). All these potential concerns could disrupt and make hospital staff, patients, and visitors feel uncomfortable.

Additionally, according to World Health Organization (WHO) estimates that needlestick injuries (NSIs) annually cause 16,000 cases of HCV, 66,000 cases of HBV, and 1,000 cases of HIV among healthcare workers (HCWs). Percutaneous exposure accounts for approximately 37.0% of HBV cases, 39.0% of HCV cases, and 4.4% of HIV cases among HCWs (7). About 54% of healthcare workers in low- and middle-income countries have latent tuberculosis, a rate 25 times higher than that of the general population. In clinical settings across Africa, between 44% and 83% of nurses suffer from chronic lower back pain, compared to 18% among office workers. Globally, 63% of healthcare workers report experiencing some form of workplace violence. During the COVID-19 pandemic, 23% of frontline healthcare workers worldwide experienced depression and anxiety, while 39% suffered from insomnia. Medical professionals face a higher risk of suicide globally (3). In Indonesia, data related to occupational accidents and diseases among healthcare workers were not well recorded. According to BPJS Ketenagakerjaan, there were 1,326 occupational accidents in Indonesia in 2018, with 560 occurring in hospitals. This indicated that 42% of all occupational accidents in Indonesia occurred in hospitals (8).

Therefore, the implementation of hospital occupational health and safety was crucial to prevent and reduce work-related accidents and disturbances. Hospitals needed to implement comprehensive occupational health and safety measures to reduce the risk of occupational diseases and accidents (9,10). Medical staff, non-medical staff, hospital patients, patient families, visitors, and the surrounding community were the focus of hospital occupational health and safety (3,10). Potential risks causing occupational diseases in hospitals typically included biological (bacteria, viruses, insects, parasites), chemical (disinfectants, solvents, cytotoxics, medical gases, preservatives), ergonomic (patient lifting procedures, sitting procedures), and psychological factors (work relationships between employees or supervisors and work procedures in operating rooms, patient admission units, emergency units, and work units) (11–13).

Professional strategic services were required to create job safety guarantees through standardized and fixed work procedures, not just relying on legally binding regulations and available funding. Implementing an organization was one of many factors that needed consideration. The success of the organization was evidenced by the achievement of organizational goals. The success of occupational health and safety programs was used to evaluate the implementation of hospital occupational health and safety. Employees were valuable resources for hospitals, thus needing protection, guidance, and maintenance in a healthy state, free from objects or influences that could endanger work. In their operations, hospitals created a safe, functional, and supportive environment for patients, families, employees, and visitors (14).

The implementation of hospital occupational health and safety was linked to hazards that could affect patients or the hospital itself in various ways, from hospital staff to patients and other supporting elements. With the implementation of hospital occupational health and safety, risks and hazards that could arise in the medical environment could be prepared for and managed. Hospitals could benefit from proper and appropriate occupational health and safety implementation as the current infrastructure and facilities met standards, were well-maintained, and could be monitored and evaluated according to applicable regulations (15–18).

To determine the extent of occupational health and safety implementation in Indonesian hospitals, further assessment was needed, involving various previous studies as a basis for analysis. This could be done by conducting systematic literature review research. Systematic reviews served many important roles. They could provide a synthesis of the state of knowledge in a field, identify future research priorities, answer questions that individual

studies could not, identify issues in primary research to be corrected in future studies, and generate or evaluate theories about how or why phenomena occurred. Systematic reviews generated various types of knowledge for different review users (such as patients, healthcare providers, researchers, and policymakers) (19). To ensure systematic reviews were beneficial for users, authors needed to prepare transparent, complete, and accurate reports on why the review was conducted, what they did (such as how studies were identified and selected), and what they found (such as study characteristics, study contributions, and meta-analysis results). Current reporting guidelines facilitated authors in achieving PRISMA designed to help systematic reviewers transparently report why the review was conducted, what the authors did, and what they found (20). The objective of this research was to identify and assess the extent of occupational health and safety risks present in Indonesian hospitals. The researcher conducted a systematic literature review to perform a further in-depth assessment.

METHOD

The type of research used in this study was a systematic literature review, which is a systematic and clear process to find, evaluate, and summarize research findings and conclusions from previous critical reviews conducted by academics and professionals. To identify gaps in the existing body of information on the subject, the systematic literature review aimed to analyze and synthesize this knowledge (21).

The stages undertaken in the systematic literature review process were highly organized and structured, distinguishing this method from general literature research strategies. The steps in this systematic review process included: 1) Formulating the Background and Purpose, 2) Developing research questions, 3) Conducting a literature search, 4) Selection based on criteria, 5) Sorting, 6) Quality Checklist and Procedures, 7) Data extraction, and 8) Implementing data synthesis strategies.

Related to this, the data filtering method in this research was conducted using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) analysis method. PRISMA was intended to be used in systematic reviews that included synthesis or did not include synthesis (20). This approach began with the identification of journals (screening), determining journal eligibility (eligibility), and collecting the results of journal searches used in the research (inclusion) as the final step in article screening used in this study.

The information used in this research was not collected directly but was secondary information obtained from previous studies. Leading international and national journal papers with predetermined themes served as secondary data sources. The Google Scholar national scientific research index, as the largest repository of scientific sources that also indexes scientific publications from several other databases, was used to gather this research data. Google Scholar was chosen as the source of data to avoid duplication of findings. The researchers used inclusion criteria to filter data, which included papers in scientific journals with the keywords "Hospital Occupational Health and Safety Risks" published between 2018 and 2022. The exclusion criteria were: (1) papers or journals with incomplete structures; (2) reviews or articles about other reviews; and (3) non-open access.

The researchers then analyzed the obtained articles by conducting the following steps namely (1) compare, which involved finding similarities among various literatures to review journal articles, and drawing conclusions about the commonalities of the reviewed journal articles. (2) Contrast, specifically by identifying differences among various literatures, and then drawing conclusions about these differences from the considered journal articles. (3) Critique, which offered a comprehensive analysis of the discussed journal articles. (4) Summarize, particularly by rewriting or summarizing the findings of several journal articles into simple and easily understandable sentences.

It was essential to note that when conducting research using a literature review, authors had to adhere to ethical standards, maintaining values of objectivity and honesty in science. Practices contrary to objectivity and honesty, such as modifying data to promote study results, manipulating incorrect or non-existent data, and plagiarism—stealing others' thoughts or ideas without proper attribution—were strictly avoided (22). Thus, for validity and reliability, all studies selected for inclusion were prospective and included data related to exposure and outcomes while controlling for confounding factors. We also sought studies with high internal reliability (consistency across items in a test) and high external reliability (consistency in agreement between use/levels) (23). In the final analysis of this study, the researchers also considered whether the studies were conducted appropriately (internal validity) and considered the generalization of results, i.e., whether the results related to other situations (external validity) (24).

RESULTS

The first step the researchers undertook in this study was identifying research articles to be used as data based on predetermined criteria. Using the keywords "Risiko" "K3RS" and "Risiko," "Keselamatan dan Kesehatan Kerja Rumah Sakit" on Google Scholar, a total of 505 Indonesian-language journal articles were initially retrieved. From this total, the researchers further filtered the articles by adding a publication date limitation between 2018 and 2022, reducing the total number of indexed articles to 430.

Next, considering accessibility, the researchers further screened the 430 indexed journal articles. This screening was done based on the previously established exclusion criteria and to eliminate duplicate articles. This process resulted in 21 articles. The titles and content of these journal articles were then read to complete the final screening. Since the researchers read each article individually to decide on comparisons between journals, this reading process was time-consuming. Six relevant articles were found after filtering for title relevance and removing duplicate literature and were selected as samples for this study. The number of articles filtered through this process is detailed in Figure 1.

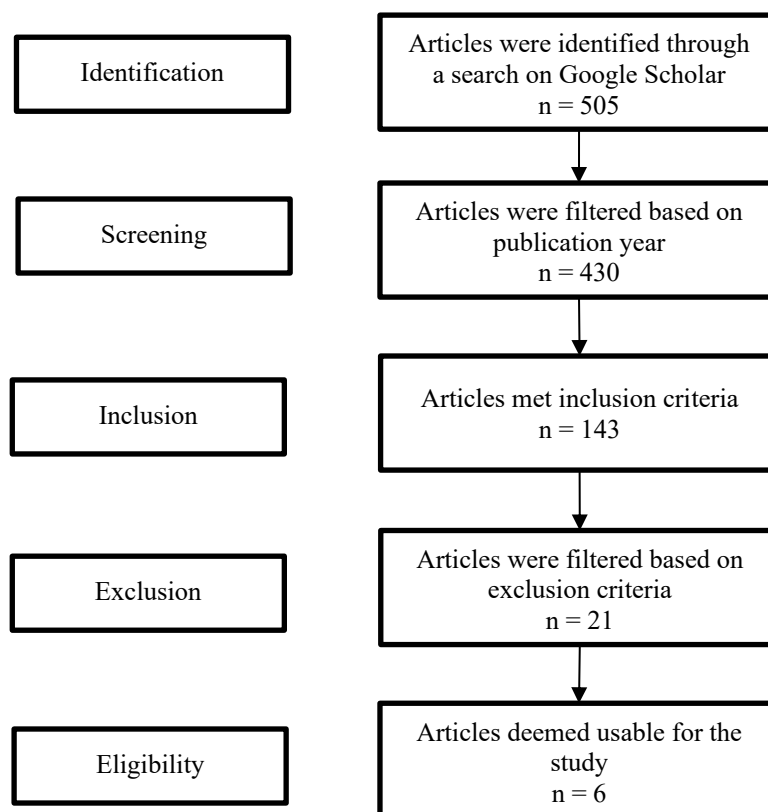


Figure 1. Data Screening Stages Using the PRISMA Method
Source: Processed by the researcher, 2022

Based on the studies conducted, it was found that there were several occupational health and safety risks awaiting hospital workers as detailed in Table 1. The initial findings from Indriarti & Setiawan (2021) indicated that medical personnel at the Emergency Installation of RS M. Djamil in Padang faced physical, chemical, biological, ergonomic, and psychological hazards. The physical risks included potential needle sticks and slip-and-fall hazards. Researchers claimed that chemical risks involved exposure to hazardous and toxic substances (B3), infection risks from contaminated needles, and nosocomial infections. Biological hazards included risks from HIV, SARS, hepatitis, Covid-19, and other viruses, bacteria, fungi, and parasites transmitted through direct contact with infected patients or bodily fluids. Ergonomic hazards such as back pain, joint pain, muscle pain, and bruises due to improper posture, repetitive movements, and patient attacks like hitting and scratching were noted. Lastly, psychological hazards faced by medical personnel included work fatigue and stress due to pressure or intimidation from patient families, as well as verbal violence encompassing insults, yelling, threats, and anger directed at healthcare workers (25).

Meanwhile, Rizaldi et al. (2020) found that among the cleaning staff at Haji Surabaya General Hospital, hazards in the management of medical waste included needle stick injuries and infections such as HIV, hepatitis, and typhoid from needle punctures, contamination from spilled medical waste around TPS, vector-borne animal disturbances, slips and falls, and viral attacks on medical waste. The causes of these issues were attributed to equipment exposure and job-related procedures, such as syringes, contact with infectious materials, heavy lifting, and repetitive movements. Environmental factors, such as uneven paths, slippery surfaces, and standing water, posed additional risks. In general, Rizaldi et al. (2020) categorized these issues into low-risk hazards like needle sticks and slips; moderate risks including chemical spills, virus exposure, and disruptive vector animals; while high risks included contamination from spilled medical waste around TPS (26).

Table 1. Summary of Screening Results Articles

No	Title of Article	Authors	Study Type	Location; Sample	Data Collection	Study Findings
1	Analisis Manajemen Risiko K3RS di Instalasi Gawat Darurat RSUP Dr. M. Djamil Padang	Indriarti, G., & Setiawan, P. (2021)	Qualitative	Medical staff; Emergency Installation, RSUP M. Djamil, Padang	Direct interviews	Identified 5 types of hazards: biological (risk of rabies transmission), chemical (exposure to toxic substances), ergonomic (back pain), and psychological (fatigue, work stress). High-level risks included rabies contamination and fatigue/stress, while medium-level risks included exposure to toxic substances.
2	Analisis Risiko Petugas Kebersihan Yang Menangani Limbah Medis Di Rumah Sakit Umum Haji Surabaya	Rizaldi, M. I., et al. (2020)	Qualitative	Cleaners; Haji Surabaya General Hospital	Observation, document review	Identified procedures for medical waste storage posing high contamination risks. Viruses, bacteria found in medical waste, and vectors present during the storage process for high-risk substances. Needle sticks, contact with infectious materials, lifting heavy loads, and repetitive work were some risks in solid medical waste management caused by work tools and processes, according to the study.
3	Gangguan Kesehatan Kerja Dan Kecelakaan pada Petugas Unit Rekam Medis di Bagian Filing Rumah Sakit Roemani Muhammadiyah Semarang Tahun 2019	Sari, D. A., & Wulandari, F. (2020)	Qualitative	Medical records filing unit officers; RS Roemani Muhammadiyah Hospital Semarang	Interviews, observations	Identified a number of health issues posing low risks, such as eye strain, lower back pain, shortness of breath, back pain, fatigue, dizziness, and stumbling/falling. Moderate risks included numbness or causing a high risk such as colds and sneezing or stumbling over incorrectly filed documents.
4	Potensi Bahaya Penyebab Kecelakaan Kerja di Instalasi	Hilmi, I. L., & Ratnasari, D. (2020)	Qualitative	Workers at Pharmacy Installation in the Hospital	Observation, questionnaires, accident data	Identified biological, physical, chemical, and psychosocial

No	Title of Article	Authors	Study Type	Location; Sample	Data Collection	Study Findings
	Farmasi Rumah Sakit					hazards with focus on hazardous substance control. The study found that biological hazards were the most common type of risk, followed by physical, psychosocial, and chemical hazards.
5	Manajemen Risiko K3 Menggunakan Hazard Identification Risk Assessment and Risk Control (HIRARC)	Indragiri, S., & Yuttya, T. (2018)	Qualitative	Prince Suryanegara Room (Psychiatry), RSD Gunung Jati, Cirebon	Field observation, document review, in-depth interviews	Identified 10 hazardous activities including poor lighting, exposure to infectious diseases, and high-risk patient interactions.
6	Analisis Risiko Keselamatan dan Kesehatan Kerja Pada Petugas Kebersihan di Rumah Sakit	Yuantari, C., & Nadia, H. (2018)	Qualitative	Cleaners at RSUD Tugurejo Semarang	Observation, interviews	Risks faced by cleaners include high risk (36.6%) exposure to germs, bacteria, and viruses, as well as chemotherapy drugs. Risks of electric shocks, falling from stairs, needle sticks, sharp object scratches, slipping or falling due to slippery floors, and musculoskeletal disorders had a moderate risk level (45.1%). Risks with a low risk level (18.3%) included allergies or irritability related to chemical use.

The issue of health and work-related accidents was also examined by Sari & Wulandari (2020), focusing on K3 risks among medical record officers in the filing section of RS Roemani Muhammadiyah Semarang. Based on the risk table obtained, the researchers concluded that at RS Roemani Muhammadiyah Semarang, filing officers faced various risks, ranging from low-risk conditions such as eye strain, lower back pain, shortness of breath, back pain, fatigue, dizziness, and slips, to moderate-risk conditions such as stiffness, numbness, and document. injuries, to high-risk conditions such as sneezing, coughing, and crushed objects or messy documents. In general, eye problems were a common risk, while moderate risks included stiffness, lower back pain, sneezing, shortness of breath, fatigue, heat, cough, and cold (27).

In a study by Hilmi & Ratnasari (2020) evaluating health and safety at work in the hospital pharmacy installation, findings showed that the hazards identified were biological, physical, chemical, and psychosocial. Biological hazard identification results showed that bacteria were the biggest biological hazard, followed by risks from fungi, nosocomial infections, and viruses potentially causing infections. Other risks that have occurred include the incidence of employees being stabbed with syringes from patients positive for hepatitis B. However, the biggest physical hazard potential is lighting, which creates the greatest risk due to the potential for employee visual impairments. In addition to other potential hazards such as inhaling other chemical substances and explosions caused by medical gases, researchers found potential chemical hazards such as inhaling dust, exposure to chemical spills,

and inhaling substances in syrup. According to information on hazardous and toxic substances owned by pharmacy facilities, there are twelve substances that need to be controlled for use and storage to prevent workplace accidents. Meanwhile, psychosocial risks are known to be caused by long working hours, late payment, working under pressure, and heavy responsibility burdens (28).

Another study by Indragiri & Yuttya (2018), applying Hazard Identification, Risk Assessment, and Risk Control (HIRARC) methods in the Prince Suryanegara Room (Psychiatry) at RSD Gunung Jati in Cirebon, found that in psychiatric inpatient wards, there were ten hazardous work activities. These risks included lighting, disinfectants, HIV/AIDS transmission, Hepatitis A, B, or Tuberculosis, improper posture, repetitive work, patient attacks, frequent patient contact, panic, and overwork. These ten activities comprised one with very high risk, seven with high risk, one with moderate risk, and one with low risk (29). Further findings on occupational health and safety risks among cleaning staff at RSUD Tugurejo Semarang were also conducted by Yuantari & Nadia (2018). Using Job Safety Analysis, the study revealed that cleaning staff faced high risks (36.6%) of exposure to germs, bacteria, viruses, and chemotherapy drugs. Moderate risks (45.1%) included electric shocks, falls from stairs, needle sticks, cuts from sharp objects, slips or falls due to slippery floors, and musculoskeletal disorders. Low risks (18.3%) included allergies or irritations related to chemical use. These various risks, according to the researchers, were influenced by the application of occupational health and safety practices by workers (30).

DISCUSSION

This study aims to provide a detailed discussion on the health and safety hazards affecting healthcare workers in hospitals and healthcare facilities, particularly in Indonesia. The research summarizes the risk factors and control strategies to manage, eliminate, or reduce these hazards. Based on various reviewed studies, it is evident that occupational health and safety hazards can lead to injuries, illnesses, and risks. From the compiled findings, it can be broadly outlined that occupational health and safety hazards in hospitals include bacteria; coughs and colds; dizziness; sneezing; COVID-19; vector-borne diseases; musculoskeletal disorders; hepatitis A; hepatitis B; HIV; nosocomial infections; fungi; falls; fatigue; heat stress; medical waste contamination; medical waste; bruises; eye irritation; muscle pain; lower back pain; joint pain; panic; exposure to hazardous and toxic substances; lighting; improper posture; SARS; patient assaults; shortness of breath; work stress; scratches; falls from stairs; slipping; being hit; stumbling; paper cuts; electric shocks; virus exposure; falling objects; needle sticks; typhoid fever; tuberculosis; and viruses (25–30). These risks are categorized into physical, chemical, biological, ergonomic, and psychological hazards. Moreover, each risk varies in severity (high, moderate, low) across different cases.

The review indicates that healthcare professionals face a significantly high risk of job-related hazards. Injuries and illnesses can impede healthcare providers from effectively performing their duties, thereby negatively impacting the overall healthcare system in Indonesia. Physical hazards, such as needlestick injuries, can expose medical personnel to diseases like hepatitis and HIV/AIDS, affecting emergency room staff, inpatient care workers, and sanitation workers. Other physical hazards, such as slips, were also found to be prevalent across all studied groups. Slipping and falling can have long-term physiological effects, such as bone fractures or sprains, requiring considerable recovery time (25). Therefore, various control strategies are necessary, such as warning signs and prompt risk (31,32)

Another identified risk is biological hazards. As part of their routine work, biological hazards can affect healthcare workers due to direct contact with patients and visitors. According to the study, biological hazards include viruses, bacteria, fungi, and parasites that can infect medical personnel, hospital support staff, patients, and non-patient visitors through direct contact or bodily fluids (33). Thus, every element in the hospital is at risk of exposure, whether through direct contact, contaminated items, or poorly managed medical waste. Hospital infection control units must manage pathogenic bacteria originating from patients, collaborating closely with occupational health and safety units (34). Healthcare workers tasked with managing biologically transmitted pathogens through blood and air must follow administrative guidelines and receive training on handling biological hazards promptly after or before incidents occur (31,35).

Regarding chemical hazards, healthcare professionals and support staff in hospitals are also at risk of exposure. This risk originates from medical equipment, increasing the possibility of syringe needles that will not be removed safely and patients will be infected when administered with syringe needles that are contaminated (36). Failure to screen procedures for tuberculosis patients, substandard PPE, and improper handwashing techniques are additional potential causes that increase nosocomial infection risks and exposure to hazardous and toxic substances (B3) (37). The World Health Organization's (2017) guidelines for public health management of chemical incidents define chemical incidents as "the release of unexpected, uncontrolled chemicals from containment". Chemicals pose various threats and can come into contact with the human body through the eyes, lungs, or digestive system. Additionally, chemical toxicity depends on the dose given and other factors such as age, sex, health condition, genetic factors, etc. Observed effects of exposure to toxic chemicals can be local or systemic. Local effects include skin burns, blister

formation, eye irritation, and respiratory tract irritation. Systemic effects can include toxicity due to lead mercury, etc. (38). In cases of unfavorable chemical hazards, strict protocols are applied, and one of the most important protocols is the Zoning to separate safe areas from areas at risk (39).

Ergonomic hazards in healthcare professionals tend to arise from patient lifting and hospital equipment; such as low beds that force nurses to bend while working due to malfunctioning height adjusters, leading to lower back pain (25). Generally, researchers found that these cases tend to only occur in nurses and medical professionals, while sanitation and filing workers are not at risk. On the other hand, medical record workers in the filing section can also experience ergonomic hazards while lifting documents improperly, and sanitation workers can experience similar issues while performing their duties. This requires careful prevention, assessment, and intervention, as the impact of ergonomic hazards on the musculoskeletal system of affected healthcare workers cannot be overlooked due to musculoskeletal risks that can affect daily life (40). Hospital administrators need to reduce frequent job pressure by providing safe and ergonomic equipment as needed, and employing adequate personnel (41). Professionals can work in shifts and well-planned teams to reduce fatigue, they should be trained in proper techniques for lifting patients and equipment, and policies should be enforced to ensure compliance (42).

In addition to these aspects, various previous studies reviewed also indicate that various risks are accompanied by different levels of risk. For medical professionals, researchers found that the risk level is high, including needle stick risks, slips and falls, contamination due to improperly disposed syringes, nosocomial infections, exposure to hazardous and toxic substances (B3), and musculoskeletal disorders due to work positions. Meanwhile, risks such as cross-infection, disease transmission, and work-related fatigue and stress are categorized as moderate risks (25,28,29). For filing officers, there are moderate risks such as stiffness, numbness, coughs, colds, sneezing, and being crushed by objects or documents; and low risks include eye irritation, lower back or back pain, shortness of breath, fatigue, heat, and falls (27). On the other hand, for sanitation workers as hospital support staff, there is a high risk of exposure to germs and bacteria, moderate risk of slipping, scratching glassware, and musculoskeletal disorders, as well as a high risk of allergies and skin irritation (26,30).

As mentioned earlier, these various risks can have adverse effects on medical personnel, support staff, and employers. Poor workplace health and safety place a significant economic burden on individuals, employers, and the community (43). The high risk of various potential hazards in hospitals requires efforts to control, minimize, and even eliminate them. Therefore, the implementation of occupational health and safety in hospitals is urgent and needs to be prioritized. Furthermore, occupational health and safety indirectly plays a role in hospital services. Hospital services can be considered high quality if they pay attention to the safety and health of clients and employees (18,44).

CONCLUSION

Health and safety risks in hospitals are experienced not only by medical personnel but also by support staff such as janitors and administrative staff who work in hospitals. Each of these elements faces health and safety risks in hospitals according to their respective workloads and responsibilities. Based on the data processing and analysis conducted, it was found that the risks of occupational health and safety hazards in hospitals include physical hazards such as needle sticks, which could expose medical and support staff to diseases like hepatitis and HIV/AIDS. Slipping and falling could have long-term physiological effects, such as physical injuries like broken bones or sprains that required substantial recovery time. Biological hazards such as viral, bacterial, fungal, and parasitic infections could affect medical and support staff through direct contact, contaminated items, and improperly managed medical waste. Risks of cross-infection during patient injections due to contaminated syringes, inadequate isolation room standards, failure in TB patient cough screening, inadequate PPE, and improper hand hygiene could also pose risks to medical and support staff. Support staff were at risk for chemical hazards in hospitals, increasing the risk of exposure to toxic and hazardous substances, as well as nosocomial infections (B3). These various risks could have detrimental impacts on medical and support staff as well as employers. Poor workplace health and safety placed a significant economic burden on individuals, employers, and the community. The high risks associated with various potential hazards in hospitals required control efforts to minimize, if not eliminate, these risks. Therefore, the implementation of Occupational Health and Safety (OHS) in hospitals was urgent and needed to be prioritized. Additionally, OHS indirectly contributed to the quality-of-service delivery in hospitals. Hospital services could be deemed high-quality when they prioritized the safety and security of both clients and employees.

SUGGESTION

It is recommended that hospitals prioritize comprehensive Occupational Health and Safety (OHS) measures to mitigate the diverse risks faced by medical and support staff. Implementing stringent protocols for handling physical, biological, and chemical hazards is crucial to safeguard staff from potential injuries and infections. Improving training on proper safety procedures, enhancing the availability of Personal Protective Equipment (PPE), and ensuring rigorous compliance with hygiene standards can significantly reduce workplace accidents and illnesses.

Moreover, investing in ergonomic solutions and promoting a culture of safety awareness among all hospital personnel are essential steps toward creating a safer working environment. These efforts are vital not only to protect the well-being of healthcare workers but also to enhance overall service quality and operational efficiency in hospitals.

REFERENCES

1. Kemenkes RI. Permenkes No 3 Tahun 2020 Tentang Klasifikasi dan Perizinan Rumah Sakit. Tentang Klasifikasi dan Perizinan Rumah Sakit [Internet]. 2020;(3):1–80. Available from: <http://bppsdmk.kemkes.go.id/web/filesa/peraturan/119.pdf>
2. Mustofa B, Paranita ES, Sukwika T. Risk Management with the FMEA Method in the Kuwait Hospital Emergency Room Manajemen Risiko dengan Metode FMEA di Instalasi Gawat Darurat Rumah Sakit Kuwait. Manag Stud Entrep J [Internet]. 2023;4(5):7064–77. Available from: <http://journal.yrpiiku.com/index.php/msej>
3. World Health Organization (WHO). Occupational health: health workers [Internet]. World Health Organization. 2022 [cited 2024 Jul 3]. Available from: <https://www.who.int/news-room/fact-sheets/detail/occupational-health--health-workers>
4. Sarastuti D, Subaris H, Wijayanti AC, KM S, Epid M. Analisis kecelakaan kerja di rumah sakit universitas gadjah mada yogyakarta. Universitas Muhammadiyah Surakarta; 2016.
5. Fitra M. Analisis Risiko Keselamatan Dan Kesehatan Kerja (ARK3). Jakarta: Azkiya Publishing; 2021. 106 p.
6. Menteri Kesehatan RI. KEPMENKES Nomor 432/MENKES/SK/IV/2007 Tentang Pedoman Manajemen Kesehatan Dan Keselamatan Kerja (K3) DI Rumah Sakit [Internet]. Jakarta: Kementerian Kesehatan Republik Indonesia; 2007. Available from: <https://regulasi.bkpk.kemkes.go.id/detail/a04ff22a-3049-447d-aa8f-abe6f70883fa/>
7. Mengistu DA, Tolera ST, Demmu YM. Worldwide Prevalence of Occupational Exposure to Needle Stick Injury among Healthcare Workers: A Systematic Review and Meta-Analysis. Can J Infect Dis Med Microbiol. 2021;2021:1–10.
8. Mahdi MI. Kasus Kecelakaan Kerja di Indonesia Alami Tren Meningkat. [Internet]. DataIndonesia.id. 2022 [cited 2024 Jul 3]. p. 1. Available from: <https://dataindonesia.id/tenaga-kerja/detail/kasus-kecelakaan-kerja-di-indonesia-alami-tren-meningkat>
9. Frantzana A. Hospital Hygiene and Safety. Am J Biomed Sci Res. 2019;2(5):172–6.
10. Mayangkara RH, Subiyanto AA, Tamtomo DG. Implementation of Hospital Occupational Health and Safety Regulations to Minimize Occupational Accidents at the Sultan Agung Islamic Hospital, Semarang. J Heal Policy Manag. 2021;6(3):160–7.
11. Azizoglu F, Köse A, Gül H. Self-reported environmental health risks of nurses working in hospital surgical units. Int Nurs Rev [Internet]. 2018;66:87–93. Available from: <https://api.semanticscholar.org/CorpusID:49339586>
12. Gestal JJ. Occupational hazards in hospitals: accidents, radiation, exposure to noxious chemicals, drug addiction and psychic problems, and assault. Br J Ind Med [Internet]. 1987 Aug 1;44(8):510 LP – 520. Available from: <http://oem.bmj.com/content/44/8/510.abstract>
13. Omoijiade EN. An assessment of laundry workers exposure to workplace hazards in secondary and tertiary health facilities in Benin-city, Nigeria. MOJ Public Heal. 2018;7(5):252–9.
14. Kusmawan D. Pengantar Konsep Dan Aplikasi K3 Rumah Sakit. Yogyakarta: Deepublish; 2021. 135 p.
15. Opoku SY, Yeboah C, Ampon-Wireko S, Hinnah RK. Occupational Health and Safety Hazards Experienced by Healthcare Workers at Two Hospitals in Suyani, Bono Region, Ghana. Occup Dis Environ Med. 2023;11(02):122–36.
16. Che Huei L, Ya-Wen L, Chiu Ming Y, Li Chen H, Jong Yi W, Ming Hung L. Occupational health and safety hazards faced by healthcare professionals in Taiwan: A systematic review of risk factors and control strategies. SAGE open Med. 2020;8:2050312120918999.
17. Damayanty S, Susanto A, Hipta WF. Implementation of Hospital Occupational Health and Safety Standards at General Hospitals in Kendari City. Kemas. 2022;18(1):10–9.
18. Marasini R, Shrestha P, Chaudhary Y. Occupational health and safety hazards faced by health care professionals in Kathmandu based hospital: a cross-sectional analytical study. Int J Community Med Public Heal. 2023;10(2):593–603.
19. Gough D, Thomas J, Oliver S. Clarifying differences between reviews within evidence ecosystems. Syst Rev. 2019;8(1):1–15.
20. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. Syst Rev. 2021;10(1):1–11.

21. Rahayu T, Wekke IS, Erlinda R, Batusangkar I. Teknik Menulis Review Literatur Dalam Sebuah Artikel Ilmiah Kuesioner View project Southeast Asia View project. 2019;(September). Available from: <https://www.researchgate.net/publication/335826989>
22. Masturoh I, Nauri Anggita. Metodologi Penelitian Kesehatan. Jakarta: Pusat Pendidikan Sumber Daya Manusia Kesehatan; 2018. 307 p.
23. Hempel S, Xenakis L, Danz M. Front Matter. In: Systematic Reviews for Occupational Safety and Health Questions [Internet]. RAND Corporation; 2016. p. i–ii. (Resources for Evidence Synthesis). Available from: <http://www.jstor.org/stable/10.7249/j.ctt1d9nnzq.1>
24. Khorsan R, Crawford C. How to assess the external validity and model validity of therapeutic trials: A conceptual approach to systematic review methodology. Evidence-based Complement Altern Med. 2014;2014.
25. Indriati G, Setiawan P. Analisis Manajemen Resiko K3RS di Instalasi Gawat Darurat RSUP Dr. M. Djamil Padang. Ensiklopedia J. 2021;3(3):65–75.
26. Rizaldi MI, Nerawati AD, Rusmiati R. Analisis Resiko Petugas Kebersihan Yang Menangani Limbah Medis Di Rumah Sakit Umum Haji Surabaya. GEMA Lingkung Kesehat [Internet]. 2020; Available from: <https://api.semanticscholar.org/CorpusID:228403931>
27. Anggita D, Fitria S. Petugas Unit Rekam Medis di Bagian Filing Rumah Sakit Roemani Muhammadiyah Semarang Tahun 2019. VISIKES J Kesehat Masy. 2020;18(2):60–6.
28. Hilmi IL, Ratnasari DS. Identifikasi Potensi Bahaya Penyebab Kecelakaan Kerja di Instalasi Farmasi Rumah Sakit di Karawang. 2019; Available from: <https://api.semanticscholar.org/CorpusID:202144506>
29. Indragiri S, Yuttya T. Risiko Menggunakan Identification Risk Assessment and Risk (Hirarc). J Kesehat. 2020;9:1080–94.
30. Yuantari C, Nadia H. Analis Resiko Keselamatan dan Kesehatan Kerja Pada Petugas Kebersihan di Rumah Sakit. Faletahan Heal J. 2018;5(3):107–16.
31. Anua SM, Naim F, Hamzah NA, Jusoh J, Che Azid MKA, Kasim Z. Hazard Identification and Physical Parameters Measurement in Dental Laboratories. J Energy Saf Technol. 2023;5(2):15–20.
32. Kabiri N, Jannati A, Vahed N, Mahami-Oskouei M. 109: RISK MANAGEMENT AND PATIENT SAFETY IN OPERATING ROOM: A SYSTEMATIC REVIEW. BMJ Open [Internet]. 2017;7. Available from: <https://api.semanticscholar.org/CorpusID:46861405>
33. Ahmed MK, Afifi M, Uskoković V. Protecting healthcare workers during COVID-19 pandemic with nanotechnology: A protocol for a new device from Egypt. J Infect Public Health [Internet]. 2020;13(9):1243–6. Available from: <https://www.sciencedirect.com/science/article/pii/S1876034120305955>
34. Lemiech-Mirowska E, Kiersnowska ZM, Michałkiewicz M, Depta A, Marczak M. Nosocomial infections as one of the most important problems of healthcare system. Ann Agric Environ Med. 2021 Sep;28(3):361–6.
35. Alzahrani KS, Almutairi KM, Alsulami AW, Aseeri AM, Alqarni MA, Haffah AA, et al. Emerging bacterial and fungal pathogens in healthcare and the threat of drug resistance. Int J Community Med Public Heal. 2023;11(1):403–7.
36. Abdalkareem Jasim S, Thaeer Hammid A, Turgunpulatovich Daminov B, Kadhemi Abid M, Lateef Al-Awsi GR, Afra A, et al. Investigation ways of causes needle sticks injuries, risk factors affecting on health and ways to preventive. Rev Environ Health. 2023 Dec;38(4):629–36.
37. Suksatan W, Jasim SA, Widjaja G, Jalil AT, Chupradit S, Ansari MJ, et al. Assessment effects and risk of nosocomial infection and needle sticks injuries among patents and health care worker. Toxicol reports. 2022;9:284–92.
38. Rajendran S, Giridhar S, Chaudhari S, Gupta PK. Technological advancements in occupational health and safety. Meas Sensors [Internet]. 2021;15:100045. Available from: <https://www.sciencedirect.com/science/article/pii/S2665917421000076>
39. Moradi Majd P, Seyedin H, Bagheri H, Tavakoli N. Hospital Preparedness Plans for Chemical Incidents and Threats: A Systematic Review. Disaster Med Public Health Prep [Internet]. 2019/10/15. 2020;14(4):477–85. Available from: <https://www.cambridge.org/core/product/22E20BFD5618BB10EDD3B5884C5C4E2C>
40. Lim MC, Awang Lukman K, Giloi N, Lim JF, Salleh H, Radzran AS, et al. Landscaping Work: Work-related Musculoskeletal Problems and Ergonomic Risk Factors. Risk Manag Healthc Policy. 2021;14:3411–21.
41. Zare M, Black N, Sagot J-C, Hunault G, Roquelaure Y. Ergonomics interventions to reduce musculoskeletal risk factors in a truck manufacturing plant. Int J Ind Ergon [Internet]. 2020;75:102896. Available from: <https://www.sciencedirect.com/science/article/pii/S0169814119302069>
42. Gurubhagavatula I, Barger LK, Barnes CM, Basner M, Boivin DB, Dawson D, et al. Guiding principles for determining work shift duration and addressing the effects of work shift duration on performance, safety, and health: guidance from the American Academy of Sleep Medicine and the Sleep Research Society. Sleep

- [Internet]. 2021 Nov 1;44(11):zsab161. Available from: <https://doi.org/10.1093/sleep/zsab161>
43. Abdalla S, Apramian SS, Cantley LF, Cullen MR. Occupation and Risk for Injuries. In: Mock CN, Nugent R, Kobusingye O, Smith KR, editors. Washington (DC); 2017.
 44. Rahmadani M, Modjo R. Systematic Literature Review: Analysis of Assessment Elements of OHSMS in Indonesia Hospital. *J Phys Conf Ser.* 2021;1933(1).