

Evaluating Nursing and Other Medical Staff Members' Knowledge of Occupational Safety and Health Risks in A Teaching Hospital

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Abstract

Healthcare workers, particularly nurses, are exposed to various occupational health and safety risks due to the nature of their work. These risks include physical, chemical, biological, and psychological hazards, which can affect both their well-being and the quality of patient care. Despite the importance of occupational health and safety (OHS) in healthcare settings, there remains a significant gap in the level of awareness among healthcare professionals, especially nurses, regarding these risks. This study aims to assess the level of awareness of OHS hazards among nursing professionals in a teaching hospital and identify areas requiring further education and intervention. This study was conducted over a three-month period and involved 200 nursing staff from various departments of a teaching hospital. A structured questionnaire consisting of demographic questions and 27 items assessing awareness of different occupational health and safety hazards was distributed. The questionnaire covered general awareness and specific knowledge of physical, chemical, electrical, mechanical, biological hazards, and safety practices. The awareness level was measured on a scale from 1 (Not Aware) to 5 (Fully Aware), with a maximum score of 135. Data were analyzed using descriptive statistics, and the relationship between demographic factors and awareness scores was evaluated. The majority of participants (93.3%) were female, with a mean age of 30.2 years and an average work experience of 7.6 years. The study revealed that 44% of participants had full awareness of general OHS risks, while specific awareness varied across different hazards. Full awareness of physical hazards was demonstrated by 24%–27% of respondents, with 59.4% fully aware of workplace infections and 52.7% recognizing respiratory risks from chemical exposures. A moderate level of awareness was observed in 28%–36% of participants for various hazards, while a small percentage (1%–5%) showed no awareness in these areas. Awareness of occupational safety practices such as PPE use, hand hygiene, and incident reporting was also evaluated, with 55.4% fully aware of PPE's role in injury prevention and 77.4% knowledgeable about proper hand hygiene practices. The study highlights significant variations in the level of awareness of occupational health and safety risks among nursing professionals in a teaching hospital. While general awareness is relatively high, there are notable gaps in knowledge regarding specific hazards, particularly in relation to chemical, electrical, and mechanical risks. The findings underscore the need for targeted educational programs and interventions to improve awareness and adherence to OHS practices, ultimately enhancing workplace safety and the quality of care delivered to patients.

Keywords: Medical Staff Members', Teaching Hospital, Healthcare Workers.

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Introduction

Healthcare workers represent approximately 12% of the global workforce, operating in environments that are widely recognized as some of the most hazardous occupational settings (1-3). Their exposure to various risks extends beyond the typical workplace hazards encountered in other professions. Due to the nature of their work, healthcare professionals are subjected to a multitude of challenges that can impact their well-being and efficiency in patient care (4,5). These occupational risks range from physical and chemical exposures to biological threats and psychological stressors, making it imperative to address their safety comprehensively (6,7).

Occupational health and safety (OHS) is a multidisciplinary field that encompasses numerous specialized domains, including physical, psychological, chemical, biological, and mechanical or electrical hazards (6,7). This broad discipline is designed to ensure the health and security of employees by identifying potential risks and implementing measures to mitigate them (8,9). In the healthcare sector, where workers are constantly exposed to a dynamic and high-risk environment, adherence to OHS principles is essential for safeguarding both employees and the patients they serve (4,5).

Among healthcare professionals, nurses and physicians are particularly susceptible to a range of occupational hazards due to their direct and frequent interactions with patients (8,9). Their work involves exposure to biological agents such as infectious pathogens, physical risks such as radiation or ergonomic strain, chemical hazards including drug exposure, and psychological stress related to high workloads and emotional demands (1-3). These factors necessitate targeted interventions to enhance awareness and preparedness in managing occupational hazards effectively (6,7).

Nurses, being at the frontline of patient care, play a crucial role in healthcare delivery (8,9). They are often responsible for executing physician directives, monitoring patient conditions, administering medications, and ensuring overall patient safety (4,5). Given their integral role in healthcare settings, it is essential that nurses possess adequate knowledge and awareness of occupational hazards to protect themselves and maintain high standards of patient care (1-3). Failure to recognize or address these risks may lead to increased workplace injuries, compromised patient outcomes, and reduced job satisfaction among nursing staff (6,7).

Effective management of occupational health risks in nursing requires a comprehensive approach that includes structured training, adherence to safety protocols, and continuous education (1-3). Institutions must prioritize the development of robust OHS programs to equip nursing staff with the necessary skills and knowledge to handle workplace hazards (4,5). By fostering a safety-oriented culture within healthcare settings, institutions can reduce the incidence of work-related injuries and enhance overall healthcare service quality (8,9).

One of the key challenges in improving OHS awareness among nurses is the variability in training and institutional policies (6,7). Some healthcare facilities implement rigorous safety training programs, while others may lack standardized protocols, leaving their staff vulnerable to workplace hazards (1-3). Identifying gaps in knowledge and assessing the current level of awareness can help in designing targeted interventions to address these disparities and ensure uniformity in safety practices (8,9).

Assessing the level of awareness regarding occupational health and safety among nurses is crucial in identifying areas that require improvement (4,5). By evaluating their understanding of workplace hazards and the effectiveness of existing safety measures, healthcare institutions can implement evidence-based strategies to mitigate risks and enhance overall occupational well-being (6,7). Such assessments also contribute to policy development and the creation of safer work environments for healthcare professionals (1-3).

Given the critical role of nurses in healthcare delivery, this study aims to evaluate their awareness and understanding of occupational health and safety hazards within the hospital setting (8,9). The findings will provide valuable insights into existing knowledge gaps, enabling the development of targeted training programs that improve workplace safety and enhance the quality of patient care (4,5).

Materials and Methods

This research employed conducted over a three-month period . The study was undertaken as part of an academic requirement and did not involve any clinical interventions. The primary aim was to assess the level of awareness among nursing professionals regarding occupational health and safety risks encountered in hospital settings.

A total of 200 nursing staff working across various departments, including internal medicine, obstetrics and gynecology, pediatrics, orthopedics, nephrology, neurology, and urology, as well as different intensive care units, were invited to participate in the study. There were no strict inclusion or exclusion criteria, allowing for a broad assessment of occupational health awareness. Of the distributed questionnaires,

Data Collection Tool

The questionnaire was structured into two main sections. The first section gathered demographic information such as age, gender, work experience, and marital status. The second section consisted of six components comprising a total of 27 questions designed to assess various aspects of occupational health and safety awareness. These components included general awareness, physical hazards, chemical hazards, electrical/mechanical hazards, biological hazards, and practices related to hazard management.

Study Outcomes

The primary outcome of the study was to determine the level of awareness among nursing professionals regarding occupational health and safety hazards. The secondary outcomes included identifying knowledge gaps and potential areas for improvement, such as implementing enhanced training programs and re-orientation sessions to strengthen workplace safety measures.

Data Analysis

Descriptive statistics were employed to analyze demographic characteristics, including age, gender, years of work experience, and marital status. The mean age of the participants and their average years of experience were also calculated.

Each response was assigned a score ranging from 1 (Not Aware) to 5 (Fully Aware), with total scores computed to assess overall awareness. The maximum possible score was 135, derived from the following breakdown: general awareness (4 items \times 5), physical hazards (3 items \times 5), chemical hazards (3 items \times 5), electrical/mechanical hazards (3 items \times 5), biological hazards (4 items \times 5), and hazard management practices (10 items \times 5). Higher scores indicated a higher level of awareness, whereas lower scores signified a lack of knowledge in occupational health and safety.

Statistical Analysis

The correlation between participants' demographic factors, such as age and work experience, and their total awareness scores was calculated, yielding a coefficient of 0.4, indicating a moderate positive relationship. Additionally, the reliability and internal consistency of the questionnaire were evaluated using Cronbach's Alpha, which resulted in a value of 0.95, demonstrating strong reliability of the assessment tool.

Results

As presented in Table 1, the total number of participants in the study was 200. The majority were female nurses, comprising 93.3% of the sample, while the remaining 6.7% were male. The mean age of the respondents was 30.2 ± 7.2 years, and their average professional experience was 7.6 ± 6.2 years. Additionally, 63% of participants reported being married.

Regarding general awareness of workplace safety, 44% of respondents exhibited complete knowledge of occupational health and safety risks, while 46% were fully informed about occupational hazards. Furthermore, 48.7% demonstrated full awareness of diseases linked to workplace exposure. Moderate knowledge of various occupational hazards was identified in 28% of respondents, whereas only 22.7% had a comprehensive understanding of hazard classifications. Notably, less than 1% of participants lacked awareness of occupational health and safety risks.

Exposure to ergonomic risks, such as musculoskeletal disorders, was common among nurses. In this study, full awareness of physical hazards varied between 24% and 27% , specifically regarding risks such as accidental falls, hearing impairments, and headaches. Additionally, 43.4% of nurses were aware of workplace falls, 42.7% recognized hearing-related issues, and 45.4% acknowledged headaches as potential work-related conditions.

Nurses frequently come into contact with aerosolized medications, anesthetic gases, and latex-based materials, which may lead to health complications. In this study, 42.7% of participants demonstrated full awareness of latex allergies, while 52.7% were fully informed about risks associated with dermatitis and respiratory problems. Moderate awareness was observed in 11.4% of participants regarding latex allergies and dermatitis, while 8.7% showed moderate knowledge of respiratory issues. A small proportion, approximately 2.7% to 3.4% , lacked awareness of chemical hazards.

Handling electrical equipment and devices at work exposes nurses to electrical and mechanical risks. In this study, full awareness of potential workplace hazards varied, with 42% recognizing the risks of accidental fires, 39.4% acknowledging burn risks, and 36.7% identifying electric shock hazards. Additionally, 14% to 16.7% demonstrated moderate awareness of these dangers. A small fraction, approximately 2.7% to 4.7% , had no knowledge of accidental fires, burns, or electric shocks.

Nurses frequently face biological risks due to exposure to bloodborne pathogens and infectious diseases. In this study, 59.4% of participants demonstrated complete awareness of workplace infections, while 54% fully recognized respiratory disorders as potential risks. Additionally, 48.7% had full knowledge of skin allergies, and 46.7% understood the health impact of workplace stress. Moderate awareness was identified in 32.7% to 36.7% of respondents, particularly regarding biological hazards. Approximately 14.7% showed moderate awareness of stress-related health effects, and 8.7% demonstrated moderate knowledge of respiratory conditions. A small proportion, ranging from 2% to 3.4%, lacked awareness in these areas.

Overall, the findings highlight variations in occupational health and safety awareness among nursing professionals, emphasizing the need for targeted educational programs to address identified knowledge gaps.

Table 1. Description of Participants Demographics

PARTICULARS (n=200)	%
GENDER	
Male	6.7
Female	93.3
AGE	

21-30	56.7
31-40	34.4
41-50	7.2
51-60	1.7
WORK EXPERIENCE	
≤1 yr	16.7
1-10 yr	50
11-20 yr	31.1
21-30 yr	2.2
MARITAL STATUS	
Married	62.7
Single	34.4
Others	2.8

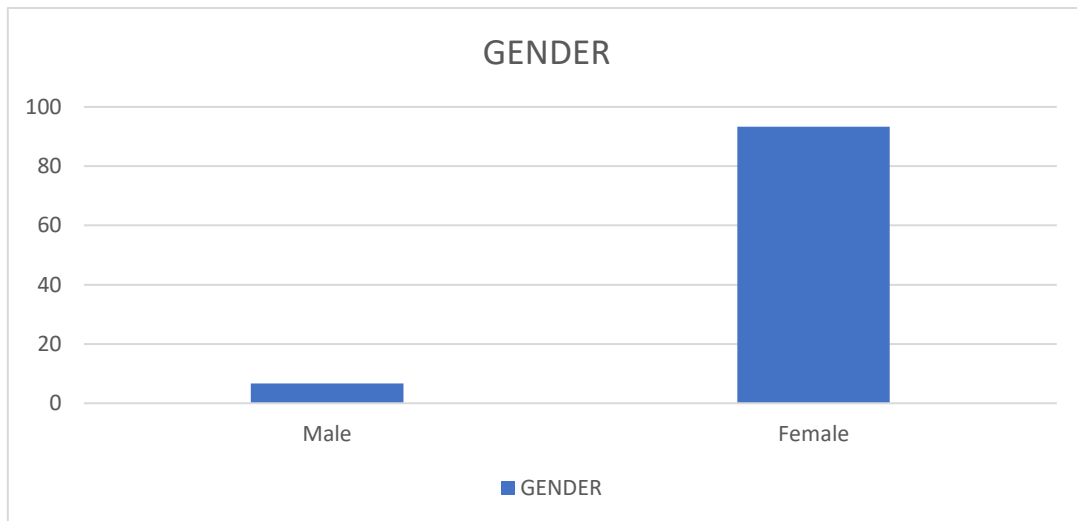


Fig 1. Gender

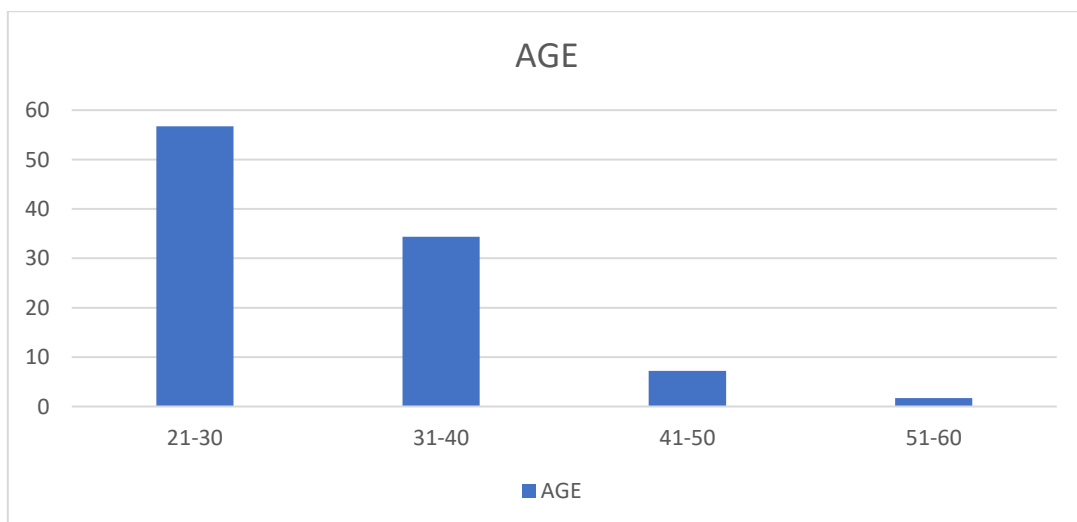


Fig 2. Age

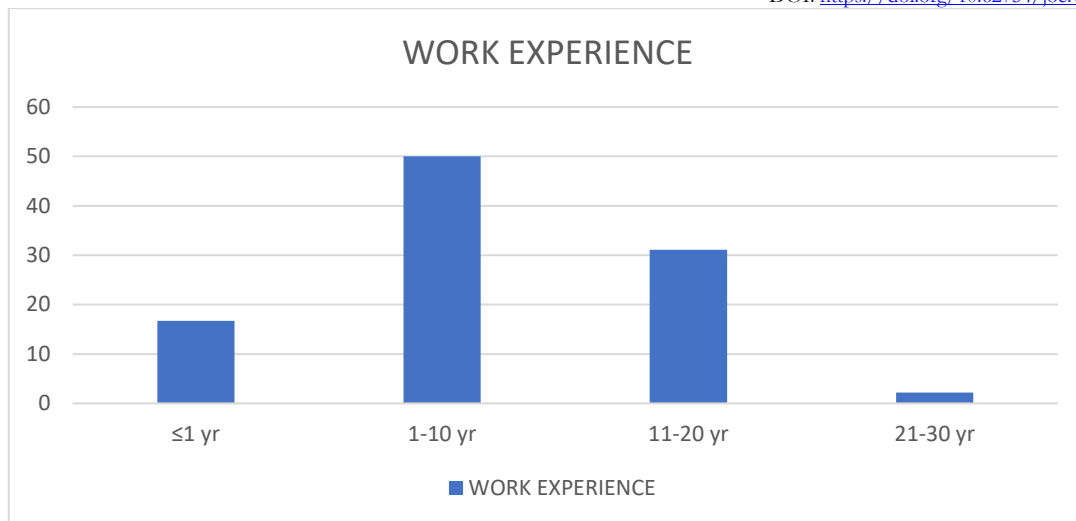


Fig 3. Work Experience

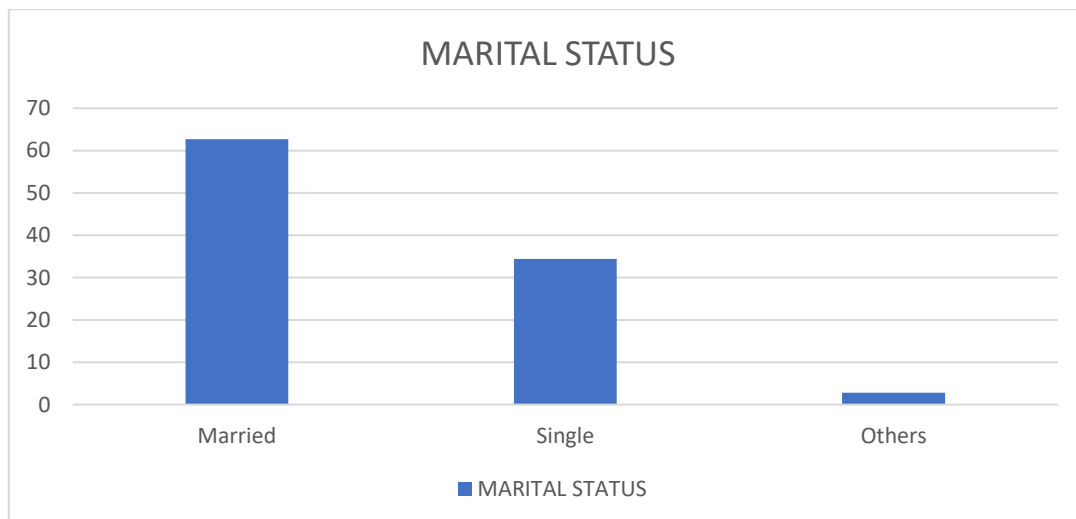


Fig 4. Marital Status

Nursing personnel must be well-informed about safety protocols to protect themselves from potential hazards by implementing preventive measures such as utilizing personal protective equipment (PPE), adhering to proper hand hygiene, reporting workplace incidents, and maintaining accurate documentation (16-18).

Among the 180 participants, 55.4% demonstrated full awareness regarding the use of PPE to prevent injuries such as cuts and skin abrasions. Additionally, 67.4% recognized the importance of PPE in mitigating respiratory risks, while 44% acknowledged its role in preventing accidental falls. Hand hygiene was well understood by 77.4%, and 78% recognized the importance of Hepatitis B vaccination. Furthermore, 71.4% were fully aware of the necessity of first aid kits for minor injuries, 62.7% understood the proper use of fire extinguishers, 60% recognized the need to report incidents to superiors, and 58% were knowledgeable about the documentation system for incident reporting.

A moderate level of awareness was recorded among 9.4–12.7% of the participants regarding PPE use in preventing injuries, respiratory complications, and falls, as well as the significance of hand hygiene and reporting mechanisms. However, lower percentages were observed for moderate awareness of vaccination importance (2.7%), first aid use (4%), and the necessity of regular health checkups (3.4%).

A small portion of the participants exhibited a lack of awareness, with 5.4% unfamiliar with the use of PPE for fall prevention, and 1.4–2.7% unaware of the protective role of PPE, vaccination, health checkups, and documentation processes. Less than 1% were unaware of the importance of hand hygiene, proper use of fire extinguishers, and the need for incident reporting to higher authorities.

To assess their understanding of occupational safety and health risks, nursing staff responses were categorized based on specific hazard types. Individual scores were assigned and analyzed to determine the level of awareness in each category.

More than half of the participants demonstrated full awareness of fundamental occupational health and safety principles, with 40% exhibiting a general understanding and a negligible percentage showing a lack of knowledge (16-18). Regarding physical hazards in the workplace, 44.6% were aware, over 30% were highly knowledgeable, and only 4% were unfamiliar with such risks.

With respect to chemical hazards, 58.6% were fully aware, 32.6% had a general understanding, and only 2% had no knowledge of these risks. Awareness of electrical and mechanical hazards was high, with over 43% displaying complete understanding, 36% having moderate awareness, and 2.6% showing no familiarity.

Regarding biological hazards in the workplace, 61.3% exhibited full awareness, 3.3% had moderate knowledge, and 1.3% had no awareness. In terms of managing workplace hazards, 77.3% had a thorough understanding of PPE usage and reporting protocols, 20% were moderately aware, and less than 1% were completely unfamiliar with management practices.

When assessing overall awareness, 73.3% of the participants demonstrated comprehensive knowledge of all occupational health and safety aspects included in the assessment. Meanwhile, 22.6% displayed a general understanding, 3.3% had moderate awareness, and less than 1% exhibited minimal knowledge. Notably, none of the participants were completely unaware of occupational safety and health risks. A positive correlation of 0.4 was identified between overall awareness scores and factors such as age and work experience (16-18).

Discussion

In this study, 44% of the nursing staff demonstrated comprehensive awareness of occupational health and safety risks, while 46% were fully informed about occupational hazards. Moreover, 49% of participants had a clear understanding of diseases resulting from occupational exposures. A study conducted by Robert Kaba et al. (2018) on 296 hospital-based participants—nearly twice the sample size of this study—reported a significantly higher general awareness rate of 87% concerning workplace hazards (19). In terms of specific hazards, 24%–27% of participants in this study displayed complete awareness of accidental falls, while 44% exhibited full knowledge of hearing impairments and headaches as occupational risks. In contrast, Robert Kaba Alhassan et al. (2018) identified that 53% of nursing staff were aware of physical health hazards in their study (19). Additionally, Karki Sabita et al. (2018) noted that 92% of nurses in their research were knowledgeable about physical hazards, a discrepancy that may be attributed to the current study's detailed assessment methodology, which utilized a five-point scale (19).

With regard to chemical hazards, 42.7% of the nurses in this study were fully aware of latex allergies, while 52.7% exhibited complete awareness of dermatitis and respiratory complications. Research by Mahadeo Shinde et al. (2015) indicated that 22.9% of participants strongly acknowledged dermatitis as a workplace chemical hazard in a study of 105 nurses (20). Furthermore, Karki Sabita et al. (2018) reported a significantly higher rate, with 91% of nurses demonstrating awareness of chemical hazards (18). Since the present study employed a detailed assessment scale, the combined results of moderate-to-complete awareness would likely align more closely with previous research.

Findings on electrical and mechanical hazards revealed that 42% of nursing staff were fully aware of workplace fire hazards, 39.4% had complete knowledge of burn risks, and 36.7% understood the potential for electrical shock injuries. In a study by Mahadeo Shinde et al. (2015), 46.7% of participants strongly

agreed that handling hot sterile equipment increased burn risks, findings that align with the current study's results (21).

The data analysis further showed that 59.4% of nursing staff were fully aware of workplace infections, while 54% recognized respiratory disorders as a significant risk. Additionally, 48.7% of participants had complete awareness of skin allergies, and 46.7% acknowledged the impact of workplace stress on health. In contrast, Robert Kaba Alhassan (2018) reported that only 20% of nursing staff demonstrated awareness of biological hazards in their study (19). Mahadeo Shinde et al. (2015) found that 44.8% of nurses strongly agreed, and 46.7% agreed, that medical professionals are at risk of acquiring diseases from their patients (21). Additionally, Robert Kaba Alhassan (2018) indicated that 20% of their study participants had direct experiences with biological hazards in the workplace (19).

The utilization of personal protective equipment (PPE) remains a key preventive measure for occupational hazards. In this study, 55.4% of nursing staff were completely aware that PPE usage prevents cuts and abrasions, 67.4% were fully aware of its role in preventing respiratory conditions, and 44% demonstrated complete awareness of PPE's importance in preventing accidental falls. Comparatively, research by Ilesanmi (2016) involving 249 participants found that 88.8% of respondents were knowledgeable about using face masks to prevent injury, while only 35.3% were consistently aware of the necessity of safety boots (22).

Hand hygiene and vaccination play a crucial role in mitigating occupational health risks. In this study, 77.4% of nurses exhibited full awareness of proper handwashing practices, and 78% recognized the importance of immunization. Research conducted by Karki Sabita et al. (2018) similarly reported that 86.4% of participants demonstrated complete awareness of hand hygiene protocols (20).

Additionally, underreporting of workplace injuries has been acknowledged as a significant challenge among healthcare professionals. A. B. de Castro (2009) highlighted this issue among nurses in the United States (23). However, in this study, 60% of nursing staff displayed full awareness of the importance of incident reporting to higher authorities, while 58% understood the role of documentation in workplace safety management.

Conclusion

This study underscores specific areas where nursing staff require additional knowledge enhancement regarding occupational health and safety risks. Addressing these gaps through targeted training programs and regular staff orientation initiatives can help foster a safer and more informed workplace environment within healthcare institutions.

References

- Goniewicz, M., Włoszczak Szubzda, A., Niemcewicz, M., Witt, M., Marciniak Niemcewicz, A., & Jarosz, M. J. (2012). Injuries caused by sharp instruments among healthcare workers: International and Polish perspectives. *Annals of Agricultural and Environmental Medicine*, 19, 523–527.
- Moore Jr., R. M., & Kaczmarek, R. G. (1990). Occupational hazards to healthcare workers: Diverse, ill defined, and not fully appreciated. *American Journal of Infection Control*, 18, 316–327.
- Triolo, P. K. (1989). Occupational health hazards of hospital staff nurses: Part II: Physical, chemical, and biological stressors. *AAOHN Journal*, 37, 274–279.
- Manyele, S. V., Ngonyani, H. A., & Eliakimu, E. (2008). The status of occupational safety among health service providers in hospitals in Tanzania. *Tanzania Journal of Health Research*, 10, 159–165.
- Nsubuga, F. M., & Jaakkola, M. S. (2005). Needle stick injuries among nurses in sub Saharan Africa. *Tropical Medicine & International Health*, 10, 773–781.
- Lipscomb, J., & Rosenstock, L. (1997). Healthcare workers: Protecting those who protect our health. *Infection Control & Hospital Epidemiology*, 18, 397–399.
- International Labour Organization (ILO). (2020). Your health and safety at work (Series). Retrieved from https://www.ilo.org/global/topics/safety-and-health-at-work/resources-library/training/WCMS_113080/lang-en/index.htm.
- Eldessouki, K. H. M., & Ayman, S. (2019). Attentiveness and attitude among junior cadre doctors about occupational health hazards and their practice of the appropriate preventive measures in Minia Governorate. *Minia Journal of Medical Research*, 30, 1–8.

- Shi, Y., Xue, H., Ma, Y., Wang, L., Gao, T., Shi, L., et al. (2020). Prevalence of occupational exposure and its influence on job satisfaction among Chinese healthcare workers: A large sample, cross-sectional study. *BMJ Open*, 10, e031953.
- Zarrini, K. A., Sanagoo, A., Jouybari, L., Vakili, M. A., & Kavosi, A. (2018). Evaluation of occupational hazards for nurses in intensive care units of tertiary care centers. *Journal of Nursing & Midwifery Sciences*, 5, 153-158.
- National Institute for Occupational Safety and Health (NIOSH). (2017). Healthcare workers and chemical hazards. Retrieved from <https://www.cdc.gov/niosh/topics/healthcare/chemical.html>.
- Health and Safety Authority (HSA). (2020). Electricity and healthcare. Retrieved from https://www.hsa.ie/eng/Your_Industry/Healthcare_Sector/Electricity_and_Healthcare/.
- Becker's Clinical Leadership & Infection Control. (2020). 4 common nursing hazards demanding hospitals' attention. Retrieved from <https://www.beckershospitalreview.com/quality/4-common-nursing-hazards-demanding-hospitals-attention.html>.
- Reis, L. A., La Rotta, E. I. G., Diniz, P. B., Aoki, F. H., & Jorge, J. (2019). Occupational exposure to potentially infectious biological material among physicians, dentists, and nurses at a university. *Safety and Health at Work*, 10, 445-451.
- Ramaswami, E., & Nimma, V. (2020). Assessment of occupational hazards among dentists practicing in Mumbai. *Journal of Family Medicine & Primary Care*, 9, 2016-2021.
- Institute of Medicine (US) Committee on the Robert Wood Johnson Foundation Initiative on the Future of Nursing. (2011). *The Future of Nursing: Leading Change, Advancing Health*. Washington, DC: National Academies Press (US). Available from: <https://www.ncbi.nlm.nih.gov/books/NBK209880/>.
- World Health Organization (WHO) Regional Office for Europe. (2001). *The Role of the Occupational Health Nurse in Workplace Health Management*.
- Institute of Medicine (US) Committee on the Robert Wood Johnson Foundation Initiative on the Future of Nursing. (2011). *The Future of Nursing: Leading Change, Advancing Health*. Washington, DC: National Academies Press (US). Available from: <https://www.ncbi.nlm.nih.gov/books/NBK209880/>.
- Alhassan, R. K., & Poku, K. A. (2018). Experiences of frontline nursing staff on workplace safety and occupational health hazards in two psychiatric hospitals in Ghana. *BMC Public Health*, 18, 701.
- Sabita, K., Mandira, S., Bharati, S., & Sulata, K. (2018). Knowledge and preventive practice of occupational health hazards among nurses in different teaching hospitals. *Innovative Journal of Medical and Health Science*, 8, 225-234.
- Shinde, M., Sadare, S., & Potdar, V. (2016). Awareness of occupational health hazards among staff nurses. *International Journal of Scientific Research*, 5, 505-509.
- Ilesanmi, O. S., Omotoso, B., & Amenkhienan, I. F. (2015). Accidents, injuries, and the use of personal protective equipment among hospital cleaners in a tertiary hospital in Southwest Nigeria. *Research Journal of Health Sciences*, 3, 279-289.
- De Castro, B., Cabrera, S. L., Gee, G. C., Fujishiro, K., & Tagalog, E. A. (2009). Occupational health and safety issues among nurses in the Philippines. *AAOHN Journal*, 57, 149-157.