Occupational Hazards among Filipino Radiographers: An Exploratory Qualitative Study

Danica Anne Piansay*, Christian Miguel Alivio, Sittie Ainah Abdullah, Aipa Zaman

Iligan Diagnostic Center And Multipurpose Cooperative, Iligan City, Lanao del Norte, Philippines; christian.alivio@gmail.com (C.M.A.); sittie.abdullah@gmail.com (S.A.A.); aipa.zaman@gmail.com (A.Z.)

* Correspondence: danica.piansay@gmail.com

Abstract

This study explores the occupational hazards encountered by Filipino radiographers and identifies barriers to effective occupational health measures. Using a qualitative exploratory design, in-depth interviews were conducted with 15 radiographers employed in various Philippine hospitals. Data were collected between January and May 2023 through a combination of physical meetings and virtual Zoom sessions. The findings revealed that despite the implementation of safety measures, significant health risks persist, including radiation exposure, musculoskeletal problems, workplace stress, and chemical exposure. Inadequate ventilation, noise pollution, and poor lighting further exacerbate these challenges. Participants identified barriers including limited resources, insufficient training, organizational constraints, cultural stigmas, and systemic inefficiencies. The study underscores the importance of addressing these hazards to ensure the health and well-being of radiographers and highlights avenues for further research and institutional reforms.

Keywords: Filipino radiographers; musculoskeletal disorders; occupational hazards; radiation exposure; workplace stress

Type: Research Note

Received: 26 November 2023; Revised: 13 November 2024; Accepted for publication: 05 December 2024; Published online: 15 December 2024

1. Introduction

Radiographers are pivotal figures in modern healthcare, serving as the bridge between patients and diagnostic imaging technologies. Their expertise is indispensable in accurately capturing medical images – such as X-rays, computed tomography (CT) scans, and magnetic resonance imaging (MRI) – that guide crucial medical decisions. These professionals shoulder the responsibility of operating sophisticated equipment, ensuring patient safety and comfort, and contributing significantly to the diagnosis and treatment of various medical conditions.

However, the nature of radiographic work inherently exposes practitioners to occupational risks that, if left unaddressed, may significantly impact their physical and mental well-being. Common risks include exposure to ionizing radiation, prolonged periods of static postures, and repetitive tasks that lead to musculoskeletal disorders [1]. Beyond physical health, radiographers often face mental and emotional stress from high patient loads, irregular work hours, and the responsibility of handling life-critical imaging [2].

In the Philippines, where healthcare resources are often stretched thin, radiographers encounter additional challenges such as outdated equipment, inadequate protective gear, and insufficient organizational support. Previous research has extensively documented occupational hazards among nurses, pharmacists, medical technologies and medical doctors [3], yet there is no single study that focused specifically on radiographers. This gap in knowledge necessitates a deeper understanding of the experiences of Filipino radiographers, shedding light on the specific occupational hazards they encounter and the systemic and individual barriers they face in maintaining their health and well-being.

2. Methodology

This study adopted a qualitative exploratory design to probe deeply into the experiences of Filipino radiographers regarding occupational hazards. The purposive sampling method was employed to recruit 15 licensed radiographers currently working in Philippine hospitals. Convenience sampling technique ensured that participants were accessible and willing to share their insights.

Participants met the following inclusion criteria: they were licensed radiographers with at least two years of professional experience, currently employed in hospital settings, willing to engage in interviews, and provided informed consent for audio recording. Data collection occurred over five months, from January to May 2023, and involved a combination of virtual and in-person interviews to accommodate participants' schedules and preferences.

Semi-structured interviews served as the primary data collection tool, guided by a questionnaire validated by field experts to ensure its reliability and relevance. Each session lasted approximately one hour, during which participants shared their experiences in English or Filipino, depending on their preference. Interviews were audio-recorded with consent and transcribed verbatim. Key topics included occupational hazards and barriers to safety. Ethical

considerations were rigorously adhered to, with participants informed about the study's objectives, their rights to withdraw at any time, and assurances of confidentiality through data anonymization. Data analysis was conducted using thematic analysis guided by the framework of Clarke and Braun [4].

3. Results

3.1 Occupational Hazards

In-depth interviews on occupational hazards among Filipino radiographers revealed a range of risks that are inherent to their profession, despite the adherence to safety protocols. These hazards stem from both the physical and environmental demands of the job, as well as the psychological toll associated with handling critically ill patients. Radiographers faced multiple challenges, from exposure to ionizing radiation and ergonomic issues to workplace stress and the risk of infection.

Radiation Exposure. Radiation exposure is a major concern for Filipino radiographers, even though safety protocols are in place to mitigate the risks. All participants in the study acknowledged the constant worry of cumulative radiation exposure, despite using protective equipment such as lead aprons and shields. One radiographer articulated this fear, stating, "Even though I use the lead apron and shields, I can't help but think about the exposure over time. It feels like a constant risk that's hard to ignore."

Ergonomic Issues. Musculoskeletal problems were frequently mentioned as a result of the physical demands of the job, particularly the need to maintain static postures for long periods and manually handle heavy imaging equipment. A participant described the physical toll, saying, "We often have to bend or twist in awkward positions to get the right angles for imaging. After a long shift, the pain in my back and shoulders is unbearable."

Workplace Stress. Workplace stress was another prominent theme, with many participants describing high patient volumes and the constant pressure to deliver accurate imaging within strict timeframes. One radiographer shared, "Sometimes, the workload is so heavy that I feel overwhelmed. It's hard to focus when you're constantly rushing."

Chemical Exposure. Chemical exposure emerged as another critical issue for radiographers, particularly those working in older imaging facilities where traditional chemicals are still used for developing films and cleaning equipment. One participant expressed, "The smell of the chemicals we use in the darkroom lingers, and I've noticed irritation in my eyes and throat after prolonged exposure." The use of chemicals such as developers, fixers, and cleaning agents can lead to eye, throat, and skin irritation, and prolonged exposure may increase the risk of more serious health issues. Although digital imaging has reduced the need for chemical developers in some areas, many facilities still rely on these chemicals, which can pose health risks if not handled properly.

Inadequate Ventilation. Inadequate ventilation in imaging rooms was a recurring concern, with participants noting that poor air circulation contributed to discomfort, particularly during long shifts. One participant mentioned, "The rooms where we work are often stuffy, especially during long shifts." Poor air quality in imaging rooms can lead to a variety of health problems, including headaches, dizziness, and respiratory issues. The lack of proper ventilation not only affects physical comfort but can also exacerbate other health risks, such as the inhalation of harmful chemicals or the accumulation of radiation exposure.

Prolonged Standing. The physical strain of prolonged standing during imaging procedures was another significant concern. Many radiographers reported experiencing fatigue and leg pain as a result of standing for long periods while performing their tasks. One participant shared, "By the end of the day, my legs feel swollen and sore." This physical toll on the body, particularly the legs and feet, is common in radiography, where radiographers are often required to stand for extended periods without sufficient rest. The impact of prolonged standing can lead to chronic discomfort, varicose veins, and long-term musculoskeletal issues.

Noise Pollution. Noise pollution was identified as another mental and physical stressor for radiographers. The constant noise from imaging equipment, patient interactions, and other staff members created a noisy and distracting work environment. One participant commented, "It's hard to concentrate with the noise of machines and people talking." This noise can contribute to mental fatigue, reduce the ability to focus, and increase stress levels. In a profession where concentration is essential for accurate imaging, reducing noise pollution is crucial to improving the work environment.

Lighting Issues. Lighting issues, particularly poor lighting in imaging rooms, were also frequently mentioned as a significant problem. One participant explained, "Reading the screens in dim lighting gives me headaches." Poor lighting can cause eye strain, headaches, and difficulty focusing, which can hinder radiographers' ability to read images accurately and efficiently.

Psychological Strain. The emotional and psychological strain of working with critically ill patients and their families was another theme highlighted in the study. Radiographers expressed that seeing patients in pain and interacting with distressed families had a profound emotional impact. One radiographer noted, "Seeing patients in pain and their families distressed affects me deeply." The psychological toll of witnessing suffering on a daily basis can lead to compassion fatigue, emotional burnout, and a sense of helplessness. This emotional strain can affect radiographers' overall well-being and job satisfaction.

Infection Risk. The close proximity to patients during procedures also posed a risk of exposure to infectious diseases, especially in the case of airborne infections or during flu season. One participant shared, "We are always at risk, especially during flu season or with airborne infections." This concern underscores the vulnerability of radiographers to contagious diseases due to their direct contact with patients.

3.2 Barriers to Occupational Health

Alongside the occupational hazards, the study identified several barriers that prevent radiographers from addressing these health risks effectively.

Resource Limitations. One of the main barriers to improving occupational health and safety among radiographers was resource limitations, particularly outdated equipment and insufficient protective gear. A radiographer shared, "We're sometimes forced to improvise because there's no budget for better equipment."

Training Deficiencies. Participants also expressed concerns about the lack of regular safety training sessions, which often left them to learn on the job. One participant explained, "Most of us learn on the

job, and there are hardly any refresher courses." This lack of formal training on safety protocols and the risks associated with radiation exposure, ergonomic issues, and chemical handling increases the likelihood of accidents and health problems.

Organizational Constraints. A significant barrier to improving occupational health was the lack of institutional support and the slow implementation of safety policies. One respondent remarked, "Management talks about safety, but we rarely see actual changes being implemented." This lack of follow-through on safety initiatives creates frustration among radiographers and undermines efforts to improve the work environment.

Cultural Stigma. Cultural stigma surrounding the reporting of health concerns was another barrier identified by participants. Many radiographers feared job insecurity or being labeled as weak if they voiced concerns about their health. One participant shared, "If you complain, people think you're weak or not up to the job." This fear of stigma often prevented radiographers from seeking help for health issues, which could lead to more severe conditions over time.

Policy Gaps. The absence of clearly defined occupational health policies and enforcement mechanisms led to inconsistencies in safety practices. One participant noted, "Sometimes, there's a policy, but no one really follows it." This lack of effective policy enforcement contributes to unsafe working conditions and increases the risk of occupational hazards.

Workload Imbalance. Workload imbalance was another significant barrier that contributed to stress and burnout among radiographers. High patient loads, understaffing, and long working hours created an overwhelming environment for many radiographers. One participant described, "There are days when there are too many patients and not enough hands." This imbalance leads to excessive stress and can negatively impact the quality of patient care and the health of radiographers.

Communication Barriers. Communication barriers between management and staff hindered effective safety measures. One radiographer explained, "We often don't know about changes until it's too late." Poor communication can lead to confusion about safety protocols, equipment updates, or changes in health regulations.

Limited Access to Medical Support. Limited access to regular health check-ups was another concern expressed by participants. One radiographer suggested, "We need more regular health check-ups to monitor our exposure and health." Regular health screenings and exposure monitoring are essential to detect early signs of health issues related to radiation exposure, musculoskeletal problems, and other occupational hazards.

Irregular Scheduling. Inconsistent scheduling and unpredictable work hours were significant barriers to maintaining work-life balance. One radiographer shared, "The irregular hours leave me exhausted and unable to spend time with my family." Irregular work hours can lead to fatigue, disrupt sleep patterns, and make it difficult for radiographers to maintain personal and family commitments.

Financial Constraints. Financial constraints faced by hospitals were identified as a major barrier to improving occupational health and safety measures. One participant explained, "It always comes down to money. If the hospital can't afford it, we have to make do." Limited financial resources often result in outdated equipment, insufficient protective gear, and inadequate safety measures.

4. Discussion

This study sheds light on the multifaceted occupational hazards faced by Filipino radiographers, highlighting the significant risks inherent in their profession despite adherence to safety protocols. These hazards, ranging from physical and environmental challenges to psychological strain, underscore the need for improved safety measures and enhanced institutional support.

Radiation exposure remains one of the most significant concerns among radiographers. While safety protocols, including the use of lead aprons and shields, are in place, participants expressed persistent anxiety over the cumulative effects of ionizing radiation. This finding is consistent with prior research indicating that radiation exposure, even with protective equipment, poses long-term health risks, including the potential for cancers and other serious conditions [5]. The fear of chronic exposure remains palpable, suggesting that even with adherence to safety protocols, the psychological burden of radiation exposure may be difficult to alleviate. Future interventions should focus not only on physical protection but also on the psychological aspects of working in environments with inherent risks.

Ergonomic issues represent another critical concern, with musculoskeletal disorders reported as common among radiographers. The physical demands of the job, including long hours of standing and handling heavy imaging equipment, contribute significantly to discomfort and long-term health problems. Previous study has shown that prolonged static postures and awkward bending and twisting are risk factors for musculoskeletal injuries in healthcare professionals [1]. The absence of adequate rest periods, ergonomic training, and equipment designed to reduce physical strain exacerbates these issues. To mitigate these risks, institutions should invest in ergonomic equipment, provide regular training on proper body mechanics, and implement breaks that allow radiographers to relieve physical stress.

Workplace stress was also identified as a major factor impacting radiographers' well-being. High patient volumes, coupled with the pressure to deliver accurate images quickly, create a high-stress environment that can lead to burnout and compromised job performance. This aligns with literature that associates high workload and time pressure with emotional exhaustion and diminished job satisfaction among healthcare workers [2]. It is essential that hospital management addresses workload distribution and provides strategies to manage stress, such as relaxation techniques, mental health support, and reasonable patient-load caps.

Chemical exposure remains a concern, particularly for those working in facilities still using traditional film processing chemicals. The irritation caused by prolonged exposure to these substances poses significant health risks, especially for respiratory and skin conditions. Although digital imaging technologies have lessened the reliance on chemical-based processes, many institutions continue to use hazardous chemicals, which can lead to long-term health problems [6]. The study underscores the importance of transitioning to safer technologies, improving ventilation, and ensuring that

radiographers are provided with personal protective equipment to minimize exposure.

Inadequate ventilation was frequently reported as an issue in imaging rooms, which contributes to both physical discomfort and exacerbates other hazards such as chemical exposure. Poor air circulation is linked to a range of health problems, including respiratory illnesses and fatigue [7]. Addressing ventilation issues by improving air circulation and ensuring that imaging rooms are properly ventilated would not only improve the comfort of radiographers but also reduce the risks associated with other environmental hazards.

The physical toll of prolonged standing during imaging procedures emerged as another significant issue. This problem, while often overlooked, is common in professions requiring long periods of standing without adequate rest. The effects of prolonged standing are well-documented, including increased risk of venous disorders, fatigue, and musculoskeletal pain [1]. Addressing this issue would involve providing opportunities for seated breaks, the use of anti-fatigue mats, and other interventions to reduce the strain of standing for long periods.

Noise pollution and lighting issues were identified as contributing to both physical and mental fatigue. In a noisy environment, concentration is impaired, leading to reduced efficiency and accuracy, which is critical in radiography. Poor lighting, on the other hand, can cause eye strain and headaches, which further diminishes job performance. These environmental stressors can be mitigated by investing in quieter equipment and improving lighting conditions in imaging rooms, which will not only enhance radiographers' ability to perform their tasks but also improve overall job satisfaction.

Psychological strain from exposure to critically ill patients and distressed families can have significant emotional impacts on radiographers. The emotional toll of witnessing suffering and providing care under stress may lead to compassion fatigue, which has been associated with reduced empathy, burnout, and poor mental health outcomes [2]. Institutions must recognize the importance of psychological support for radiographers, offering counseling services, peer support programs, and strategies to help manage the emotional demands of the job.

Infection risk, especially in settings with high patient volumes and airborne diseases, underscores the vulnerability of radiographers to infectious diseases. The close proximity to patients during imaging procedures places radiographers at a heightened risk, particularly in hospitals where infection control protocols may not always be strictly followed. This finding points to the need for improved infection control measures, including personal protective equipment (PPE), proper sterilization protocols, and regular health screenings for radiographers.

Beyond these hazards, the study identified barriers to occupational health that prevent radiographers from addressing these risks effectively. Resource limitations were cited as a major barrier, with outdated equipment and insufficient protective gear contributing to the physical and environmental risks faced by radiographers. The lack of financial investment in safety improvements restricts the ability of healthcare facilities to create safer working environments. Additionally, training deficiencies hinder the development of effective safety practices, leaving radiographers to learn on the job without proper guidance.

Organizational constraints, such as insufficient institutional support and slow policy implementation, were also major barriers. As noted by several participants, the gap between management's verbal commitment to safety and the actual implementation of safety measures creates frustration and contributes to unsafe working conditions. Furthermore, the cultural stigma surrounding the reporting of health concerns prevents radiographers from seeking help for fear of being perceived as weak or incapable. This underscores the importance of fostering a supportive culture in healthcare institutions where health concerns can be addressed without fear of retribution.

5. Conclusions

This study provides a comprehensive exploration of the occupational hazards faced by Filipino radiographers, highlighting a range of physical, environmental, and psychological risks inherent to their profession. Despite adherence to safety protocols, such as the use of protective equipment and guidelines for radiation exposure, radiographers continue to face significant health risks, including radiation exposure, musculoskeletal problems, workplace stress, and chemical exposure. Additionally, environmental factors such as inadequate ventilation, noise pollution, and lighting issues further contribute to the physical and mental strain experienced by these professionals.

The findings also reveal several barriers that hinder the effective management of these hazards, including resource limitations, training deficiencies, organizational constraints, and cultural stigma surrounding the reporting of health concerns. These barriers not only prevent radiographers from addressing health risks adequately but also create a work environment that may contribute to burnout and decreased job satisfaction. The study underscores the importance of institutional support, resource allocation, and policy enforcement in mitigating occupational hazards and improving the overall health and well-being of radiographers.

As the radiology profession continues to evolve, it is critical for healthcare institutions to invest in improved equipment, regular training, and enhanced safety measures. Addressing both the physical and psychological demands of the profession through comprehensive policies and support systems is essential to creating a sustainable and safe working environment. Future research should focus on developing targeted interventions to reduce occupational hazards and barriers, ensuring that radiographers can perform their duties without compromising their health or well-being. By prioritizing the occupational health of radiographers, healthcare institutions can not only improve the quality of care provided to patients but also foster a healthier, more productive workforce.

Acknowledgement

The authors thank the anonymous reviewers whose valuable suggestions greatly enhanced this paper.

Conflict of Interest Statement

The authors declare no conflict of interest.

Author Contributions

All authors have contributed equally. They have read and agreed to the published version of the manuscript.

References

[1] Shanbhag, S.; Panakkal, N.C.; Nayak, U.U.; Mohapatra, S. A regression model on work-related musculoskeletal disorders and associated risk factors among radiographers. *Int J Occup Saf Ergon* **2024**, *1*.
[2] Robertson, S.; Olanloye, E.E.; Hon, Y.; England, A.; McNair, H.; Cruickshank, S. Are radiographers suffering from symptoms of compassion fatigue due to occupational stress: A systematic review. *Radiography* **2022**, *28*, 857-864.
[3] Faller, E.M.; bin Miskam, N.; Pereira, A. Exploratory study on occupational health hazards among health care workers in the Philippines. *Ann Glob Health* **2018**, *84*.
[4] Clarke, V.; Braun, V. Thematic analysis. *J Posit Psychol* **2017**, *12*, 297-298.
[5] Chida, K. What are useful methods to reduce occupational radiation exposure among radiological medical workers, especially for interventional radiology personnel? *Radiol Phys Technol* **2022**, *15*, 101-115.
[6] Motiang, K.P.; Chelule, P.K. Occupational health and safety in radiographic film processing in Limpopo province. *Occup Health South* Afr **2017**, *23*, 21-25.
[7] Laumbach, R.; Meng, Q.; Kipen, H. What can individuals do to reduce personal health risks from air pollution? *J Thorac Dis* **2015**, *7*.