Radiation Safety Awareness and Practices among Public Health Workers in Medina General Hospital

Ian Kenneth R. Lumanog

Student
Medina College
Philippines

Abstract:
Radiation safety is essential in healthcare settings where ionizing radiation is used, placing public health workers at risk if safety measures are inadequate. At Medina General Hospital, assessing the awareness and practices regarding radiation safety among health workers is vital to improving institutional safety and protecting both staff and patients. This descriptive-correlational study involved 145 public health workers at Medina General Hospital. Data were gathered using a researcher-made questionnaire assessing radiation safety awareness and practices. Descriptive statistics (mean, standard deviation) and Pearson's product-moment correlation coefficient were used for data analysis. Overall radiation safety awareness was at an average level (mean = 3.356). Workers showed high recognition of perceived severity (3.920), perceived benefits (4.112), and cues to action (3.509), but only moderate perceived susceptibility (3.328) and self-efficacy (2.786). Perceived barriers were low (2.483). Radiation safety practices were rated high overall (mean = 3.704), with positive attitudes (3.815), subjective norms (3.610), and strong behavioral intentions (4.055). Perceived behavioral control was moderate (3.335). No significant correlation was found between awareness and practices (Spearman's rho = 0.013, p = 0.876). Although public health workers demonstrate high awareness of radiation risks and engage in safety practices, moderate self-efficacy and susceptibility highlight the need for targeted training to build confidence. The lack of correlation between awareness and practice suggests other factors influence safety behaviors. Enhancing perceived susceptibility and self-efficacy through continuous education and practical training is recommended to improve consistent radiation safety practice in the hospital setting.

Keywords: radiation safety, public health workers, awareness, safety practices, Medina General Hospital.

INTRODUCTION

Background of the Study

Radiation safety is a critical aspect of healthcare practice, especially in hospitals where diagnostic and therapeutic procedures often involve exposure to ionizing radiation. Public health workers, including nurses, radiologic technologists, and other medical personnel, are at risk of radiation exposure if proper safety measures are not consistently implemented. Despite existing protocols and guidelines, the level of awareness and adherence to radiation safety practices can vary widely among health workers, potentially compromising both their health and the safety of patients. In Medina General Hospital, understanding how well public health workers are informed about radiation risks and how they apply safety practices is essential for improving institutional safety standards. This study aims to assess the awareness and practices of these workers in relation to radiation safety, which could serve as a basis for enhancing training programs, updating hospital protocols, and ensuring a safer healthcare environment for both staff and patients.

Several studies have highlighted the importance of radiation safety awareness and the implementation of protective practices among health professionals. A study in Trinidad revealed that although many health

workers were aware of radiation risks, their safety practices remained inconsistent, indicating a need for continuous education and reinforcement of protocols (Partap et al., 2019). In the Philippines, the current implementation of safety measures in industrial radiography was found to require stricter enforcement and improved training to prevent radiation-related incidents (Borras, 2015). Research conducted at a university health center showed a positive relationship between safety management practices and employees' awareness of radiation risks, emphasizing the role of institutional support in fostering a safety culture (Ramli, 2018). In emergency medical settings, balancing the benefits of diagnostic imaging with the potential risks of radiation exposure was found to be a continuing challenge, highlighting the need for risk-awareness training among medical personnel (Azman, Shah, & Ng, 2019). Furthermore, a cross-country survey demonstrated that strong regulatory frameworks and a culture of safety significantly enhanced compliance with radiation safety protocols (Berris, Žontar, & Rehani, 2017). These findings collectively suggest that both individual knowledge and organizational systems play vital roles in promoting effective radiation safety in healthcare environments.

While numerous studies have explored radiation safety awareness and practices among healthcare workers in various international and institutional contexts, there is a noticeable lack of localized research focusing specifically on public health workers in provincial hospitals like Medina General Hospital. Most existing literature emphasizes urban or specialized medical settings, where access to training, resources, and regulatory oversight may differ significantly from those in rural or less-resourced areas. This creates a contextual gap in understanding how frontline health workers in smaller hospitals perceive and implement radiation safety measures. Without localized data, it becomes difficult to assess whether national safety protocols are effectively reaching and being practiced by health personnel in these settings. Therefore, this study seeks to fill that gap by examining the level of radiation safety awareness and the actual practices of public health workers in Medina General Hospital, providing a basis for targeted interventions and policy adjustments.

This study aims to assess the level of radiation safety awareness and the extent of radiation safety practices among public health workers in Medina General Hospital. It is grounded in the need to understand how well health workers recognize radiation risks and apply safety measures in their daily routines. Specifically, the study investigates various dimensions of awareness such as perceived susceptibility, severity, benefits, barriers, cues to action, and self-efficacy. It also examines the extent of actual safety practices based on attitudes, subjective norms, perceived behavioral control, and behavioral intention. By identifying the relationship between awareness and practice, the study seeks to provide evidence that can guide targeted interventions, improve training programs, and ultimately enhance the overall safety culture within the hospital setting.

METHODS

Research Design

The study employed a descriptive-correlational research design, which, according to Creswell (2018), is used to describe characteristics of a population and examine relationships among variables without manipulation. This design was appropriate for assessing radiation safety awareness and practices among public health workers and exploring their relationship. It enabled a clear depiction of how workers understood and applied radiation safety, while identifying associations between awareness factors (e.g., perceived susceptibility, severity, benefits, barriers, cues to action, self-efficacy) and safety practices (e.g., attitudes, norms, perceived control, intentions). The findings served as a basis for developing evidence-based interventions, such as a radiation safety monograph.

Research Setting

The study was conducted at Medina General Hospital in Ozamiz City, a private tertiary hospital with a 200-bed capacity. As a teaching and training facility affiliated with Medina College, it employs health professionals regularly exposed to radiation through diagnostic and therapeutic procedures. Its comprehensive services and high volume of radiologic activities make it a relevant setting for assessing radiation safety awareness and practices among public health workers.

Research Respondents

The study involved 145 public health workers from Medina General Hospital, including doctors, nurses, radiologic technologists, midwives, and other allied health personnel involved in areas with potential radiation exposure. Respondents were selected through purposive sampling to ensure participation of individuals most knowledgeable and relevant to radiation safety, allowing for a comprehensive assessment of awareness and practices across various professional roles.

Research Instrument

The research instrument used in this study is a The research instrument for this study was carefully designed to assess both the awareness and practices related to radiation safety among public health workers at Medina General Hospital. It consists of two main parts that address the cognitive perceptions and behavioral aspects influencing radiation safety. Part I focuses on measuring the levels of radiation safety awareness through key psychological constructs, while Part II evaluates the extent of actual safety practices and intentions. Both parts use a Likert-scale format to capture the degree of agreement with various statements, providing comprehensive data on factors that affect radiation protection behaviors in a healthcare setting. This instrument aims to identify gaps in knowledge, attitudes, and practices that can inform targeted interventions to enhance workplace safety.

Part I: Radiation Safety Awareness. This section measures the level of awareness among public health workers regarding radiation safety, based on key components of the Health Belief Model. It assesses how vulnerable workers feel to radiation exposure (perceived susceptibility), their understanding of the serious health consequences of such exposure (perceived severity), and the obstacles they face in practicing safety measures (perceived barriers). It also evaluates the external and internal triggers that motivate safe behavior (cues to action) and the workers' confidence in their ability to protect themselves effectively (self-efficacy). The results provide insight into the cognitive factors influencing radiation safety awareness and help identify areas for education and intervention.

Part II: Radiation Safety Practices. This part evaluates the actual safety behaviors and intentions of public health workers related to radiation exposure, guided by the Theory of Planned Behavior. It examines their attitudes toward radiation safety, reflecting the value and importance they place on these practices. It also assesses the influence of social expectations and workplace norms (subjective norms) on their behavior, as well as their perceived control over practicing safety despite possible challenges (perceived behavioral control). Lastly, it measures their intention to engage in safe practices, which is a strong predictor of future behavior. This section highlights the behavioral factors that can be targeted to improve adherence to radiation safety protocols.

Instruments Validation

The research instrument underwent expert review and pilot testing to ensure validity and reliability in measuring radiation safety awareness and practices. A panel of specialists in occupational health, radiation safety, and healthcare administration assessed the questionnaire for content validity, clarity, and relevance, leading to revisions for improved precision. A pilot test was then conducted with a similar group of public health workers, and internal consistency was evaluated using Cronbach's alpha. Based on the results, necessary adjustments were made to enhance the instrument before its final use.

Data Gathering Procedure

Data collection began with securing formal approval from Medina General Hospital and coordinating with hospital officials to inform public health workers about the study's purpose, importance, and voluntary participation. Informed consent was obtained to ensure confidentiality and anonymity. Using purposive sampling, the researcher identified and approached 145 eligible respondents. Questionnaires were personally distributed during scheduled department visits, allowing clarification of questions and encouraging honest responses. Respondents were given sufficient time to complete the forms in a supportive setting. Completed questionnaires were checked for completeness and consistency to ensure data accuracy and integrity.

Ethical Considerations

This study adhered to ethical principles outlined by Polit and Beck (2017), ensuring respect for persons, beneficence, and justice. Respondents were fully informed about the study's purpose, procedures, and potential risks and benefits, and gave informed consent prior to participation. Participation was voluntary, with the right to withdraw at any time without consequences. Confidentiality and privacy were maintained by anonymizing responses and securely storing data. The study minimized potential harm and posed no risk beyond the respondents' normal work environment. Fair and equitable selection of participants ensured ethical integrity throughout the research process.

Data Analysis

The study utilized the mean and standard deviation to analyze the levels of radiation safety awareness and practices among public health workers. The mean indicated the average response for each indicator, while the standard deviation revealed the variability of responses, providing insights into the consistency of awareness and practices. To examine the relationship between awareness and safety practices, the Pearson Product-Moment Correlation Coefficient was employed, measuring the strength and direction of the association between the two variables. This allowed the study to determine whether greater awareness was linked to better implementation of safety practices.

RESULTS AND DISCUSSION

Table 1.1 - Level of Radiation Safety Awareness Among Public Health Workers in Terms of Perceived Susceptibility

Indicators		**Mean**	**SD**
1.	I believe I am at risk of exposure to harmful radiation in my workplace.	3.021	1.079
2.	I think my role exposes me more to radiation than other health workers.	3.083	1.105
3.	I am aware that even low doses of radiation can be harmful over time.	3.421	1.048
4.	I feel that my daily tasks make me vulnerable to radiation-related illnesses.	3.145	1.254
5.	I consider radiation exposure as a serious occupational hazard.	3.972	0.742
Average Mean		**3.328 Average**	

Scale: 1.0 – 1.80 "Very Low", 1.81 – 2.60 "Low", 2.61 – 3.40 "Average", 3.41 – 4.20 "High", 4.21 – 5.00 "Very High"

The data in Table 1.1 revealed that the average mean score for radiation safety awareness among public health workers in terms of perceived susceptibility was 3.328, which falls under the "Average" category based on the scale used. This implies that, on the whole, public health workers at Medina General Hospital moderately perceived themselves to be susceptible to radiation exposure. While they were neither strongly aware nor completely unaware of the potential risks, the data suggests a need for enhanced educational interventions and training to elevate their awareness to a higher level, which is critical for their safety and for reinforcing a culture of precaution in the hospital environment. Further analysis of the individual indicators showed variations in the levels of perceived susceptibility. The highest-rated item was "I consider radiation exposure as a serious occupational hazard" with a mean of 3.972, indicating a high level of awareness regarding the seriousness of radiation risks. This suggests that health workers acknowledged the occupational danger posed by radiation, which is a positive sign for promoting safety practices. In contrast, the lowest mean was 3.021 for the statement "I believe I am at risk of exposure to harmful radiation in my workplace," which still falls under the average category but may reflect a gap in personal risk recognition. Similarly, moderate awareness was seen in statements regarding vulnerability due to role-specific exposure and the potential harm of low-dose radiation. These results indicate that while health workers recognize radiation as a general hazard, there may be a disconnect between this recognition and their perceived personal vulnerability, emphasizing the need for targeted risk communication strategies.

The study conducted at Medina General Hospital showed that public health workers had an average level of radiation safety awareness in terms of perceived susceptibility, reflecting a moderate recognition of the risks associated with radiation exposure in their workplace. In contrast, Shubayr (2024) found that healthcare

workers in operating rooms demonstrated a higher level of awareness and perceived risk, likely influenced by their frequent and direct interaction with radiologic equipment. While both groups acknowledged radiation as an occupational hazard, the heightened awareness in Shubayr's study suggests that those in high-exposure settings are more attuned to the dangers and more proactive in adopting safety practices. This comparison highlights the need for stronger awareness programs in general hospital environments to bridge the gap in risk perception and promote consistent safety behaviors across healthcare settings.

Table 1.2 - Level of Radiation Safety Awareness Among Public Health Workers in Terms of Perceived Severity

Indicators	**Mean**	**SD**
1. Radiation exposure can cause severe health problems.	4.600	0.504
2. I understand that radiation can affect not just me but also my future offspring.	3.938	0.726
3. Long-term radiation exposure may lead to cancer and other diseases.	3.855	0.814
4. Radiation-induced conditions are difficult to treat and manage.	3.476	0.839
5. I recognize that radiation injuries can lead to long-term disability or death.	3.731	0.717
Average Mean	**3.920 High**	

Scale: 1.0 – 1.80 "Very Low", 1.81 – 2.60 "Low", 2.61 – 3.40 "Average", 3.41 – 4.20 "High", 4.21 – 5.00 "Very High"

Based on the data in Table 1.2, the average mean score for radiation safety awareness in terms of perceived severity was 3.920, which falls under the "High" category. This indicates that public health workers at Medina General Hospital generally had a strong awareness of the serious consequences associated with radiation exposure. Such a level of awareness suggests that the health workers acknowledged the potentially life-threatening and long-term effects of radiation, which is a critical factor in motivating safe practices and adherence to safety protocols within their work environment. In examining the individual indicators, the highest mean score was 4.600 for the statement "Radiation exposure can cause severe health problems," which is categorized as "Very High" and reflects a strong recognition of the immediate and serious risks posed by radiation. Additionally, high mean scores were observed in statements related to the heritable effects of radiation (3.938) and the potential development of chronic diseases such as cancer (3.855). These results imply that workers are not only aware of personal health risks but also the broader implications of radiation exposure. However, slightly lower scores were recorded for the statements on the difficulty of treating radiation-induced conditions (3.476) and the acknowledgment of long-term disability or death (3.731), though these still fall within the high awareness category. These findings indicate a need to reinforce specific information about the complexity of managing radiation-related conditions, which may further strengthen safety compliance and risk perception.

The study on radiation safety awareness among public health workers in Medina General Hospital reveals a strong recognition of the serious health risks posed by radiation exposure, including its potential effects on future generations and the long-term consequences such as cancer and disability. This aligns with the findings of Goula et al. (2021), who reported that health professionals generally hold positive attitudes toward radiation protection measures and are aware of the importance of minimizing exposure. While the Medina study emphasizes workers' understanding of the severity of radiation risks, Goula et al. highlight not only awareness but also the practical attitudes and behaviors toward consistently applying safety protocols. Together, these studies suggest that while awareness of radiation hazards is high, further focus on translating this knowledge into routine protective practices could enhance overall safety among health workers.

Table 1.3 - Level of Radiation Safety Awareness Among Public Health Workers in Terms of Perceived Benefits

Indicators	**Mean**	**SD**
1. Using protective equipment helps reduce my risk of radiation exposure.	4.041	0.642

2.	Undergoing radiation safety training improves my ability to protect myself.	3.834	0.685
3.	Following hospital safety protocols reduces radiation-related risks.	3.786	0.677
4.	I believe radiation safety measures benefit both staff and patients.	4.428	0.495
5.	Regular radiation monitoring is beneficial for early detection of exposure.	4.469	0.499
Average Mean		**4.112 High**	

Scale: 1.0 – 1.80 "Very Low", 1.81 – 2.60 "Low", 2.61 – 3.40 "Average", 3.41 – 4.20 "High", 4.21 – 5.00 "Very High"

As shown in Table 1.3, the average mean score for radiation safety awareness in terms of perceived benefits was 4.112, which is categorized as "High" on the given scale. This indicates that public health workers at Medina General Hospital strongly recognized the value and effectiveness of radiation safety practices. Their awareness of the benefits of protective measures reflects a positive attitude toward proactive safety behavior, which is essential for minimizing occupational health risks and fostering a culture of safety compliance in clinical settings. In terms of individual indicators, the highest mean was 4.469 for the statement "Regular radiation monitoring is beneficial for early detection of exposure," closely followed by "I believe radiation safety measures benefit both staff and patients" with a mean of 4.428. These results show a strong consensus on the importance of preventive strategies and the dual benefit of radiation safety—protecting both health workers and the patients they serve. The remaining items also received high mean scores, including "Using protective equipment" (4.041), "Radiation safety training" (3.834), and "Following hospital safety protocols" (3.786), all reflecting a positive perception of the tangible benefits these practices provide. These findings suggest that while some specific practices could still be promoted more intensively, the overall outlook on the usefulness of safety measures is solid and supportive of future intervention efforts.

The study on radiation safety awareness among public health workers at Medina General Hospital indicates a high level of recognition of the benefits of using protective equipment, undergoing safety training, following protocols, and regular monitoring to reduce radiation risks. This corresponds with the conclusions of Arruzza, Chau, and Kilgour (2023), who emphasize in their scoping review that problem-based learning in medical radiation science education enhances not only theoretical understanding but also practical skills and critical thinking related to radiation safety. While the study reflects positive attitudes and perceived benefits among workers, the review highlights how innovative educational approaches like problem-based learning can further improve safety practices by actively engaging learners in real-world scenarios. Both underscore the importance of continuous education and adherence to safety measures to protect both healthcare workers and patients.

Table 1.4 - Level of Radiation Safety Awareness Among Public Health Workers in Terms of Perceived Barriers

Indicators	**Mean**	**SD**
1. I find it inconvenient to wear personal protective equipment (PPE) all the time.	2.000	0.830
2. There is not enough time during duty to consistently follow radiation safety measures.	2.131	0.984
3. I lack access to complete radiation safety training.	3.152	0.808
4. The hospital does not always provide adequate protective equipment.	2.345	1.072
5. I sometimes forget to follow radiation safety protocols due to workload.	2.786	1.097
Average Mean	**2.483**	**Low**

Scale: 1.0 – 1.80 "Very Low", 1.81 – 2.60 "Low", 2.61 – 3.40 "Average", 3.41 – 4.20 "High", 4.21 – 5.00 "Very High"

The data in Table 1.4 showed that the average mean score for perceived barriers to radiation safety practices among public health workers was 2.483, which falls under the "Low" category. This suggests that the respondents generally reported a low level of barriers or obstacles in practicing radiation safety measures at Medina General Hospital. The low perception of barriers could imply that while some challenges exist, they

may not significantly hinder compliance with safety protocols, or that health workers may be somewhat motivated to overcome these barriers to maintain safety. Looking at the individual indicators, the lowest mean was 2.000 for "I find it inconvenient to wear personal protective equipment (PPE) all the time," which indicates a low perception of inconvenience but still highlights some discomfort or resistance. Similarly, "There is not enough time during duty to consistently follow radiation safety measures" scored 2.131, suggesting time constraints are a minor concern but not overwhelming. The item "I lack access to complete radiation safety training" received a higher mean of 3.152, categorized as average, indicating that some workers perceive gaps in training availability, which could be an area for improvement. Other moderate concerns include inadequate provision of protective equipment (2.345) and occasionally forgetting to follow protocols due to workload (2.786), both reflecting relatively low to average barriers but still warranting attention. Overall, these findings highlight opportunities for hospital management to enhance resource availability and training while addressing minor practical inconveniences to further reduce barriers.

The findings of the current study reveal that public health workers at Medina General Hospital perceive barriers to radiation safety practices as generally low, though challenges such as lack of training, insufficient protective equipment, and workload-related forgetfulness are still present. This aligns with Christensen et al. (2024), who identified similar obstacles among radiographers, including inadequate training, limited time, and equipment shortages as significant barriers to following radiation safety principles. However, while Christensen et al. emphasized these barriers as major hindrances, the current study suggests that public health workers perceive these issues as less severe, possibly due to differences in job roles, hospital resources, or organizational culture. Both studies highlight how systemic and personal factors contribute to challenges in radiation safety adherence, but the degree of perceived impact varies depending on the professional context and setting.

Table 1.5 - Level of Radiation Safety Awareness Among Public Health Workers in Terms of Cues to Action

Indicators		**Mean**	**SD**
1.	Reminders from supervisors encourage me to follow radiation safety protocols.	3.800	0.748
2.	Posters and signage in the hospital help me remember to use protective gear.	2.890	0.918
3.	Safety drills or orientations prompt me to take radiation risks seriously.	3.469	0.771
4.	Peer encouragement helps me maintain good radiation safety habits.	3.552	0.813
5.	Hospital policies serve as a regular reminder to observe safety practices.	3.834	0.633
Average Mean		**3.509 High**	

Scale: 1.0 – 1.80 “Very Low”, 1.81 – 2.60 “Low”, 2.61 – 3.40 “Average”, 3.41 – 4.20 “High”, 4.21 – 5.00 “Very High”

The data in Table 1.5 indicated that the average mean score for cues to action related to radiation safety awareness was 3.509, which falls within the "High" category. This reflects that public health workers at Medina General Hospital are generally motivated by external cues that encourage adherence to radiation safety protocols. Such cues play an important role in reinforcing safe behavior, reminding workers of potential risks, and maintaining consistent safety practices in the workplace. Among the individual indicators, the highest mean scores were observed for "Hospital policies serve as a regular reminder to observe safety practices" (3.834) and "Reminders from supervisors encourage me to follow radiation safety protocols" (3.800), both reflecting strong institutional influence on workers’ safety behaviors. Peer encouragement (3.552) and safety drills or orientations (3.469) also contributed notably as motivating factors. However, "Posters and signage in the hospital help me remember to use protective gear" had a comparatively lower mean of 2.890, suggesting that visual cues like posters may be less effective or underutilized as reminders. This highlights an opportunity for the hospital to improve and optimize visual communication strategies to further reinforce radiation safety habits.

The findings of this study show that public health workers in Medina General Hospital have a generally high awareness of radiation safety, particularly influenced by reminders from supervisors and hospital policies, which serve as strong motivators for following safety protocols. This is consistent with the study by Hwang,

Park, and Jang (2022), which also highlights the significant role of cues to action, such as organizational support and social encouragement, in promoting protective behaviors among dental hygienists exposed to radiation. Both studies emphasize the importance of external prompts in reinforcing safety practices. However, while this study suggests that visual aids like posters may be less effective in prompting safety behaviors, Hwang et al. highlight that personal health beliefs interact with these cues, indicating that an individual's perception of risk and benefits can influence how environmental reminders impact their protective actions. Overall, the comparison suggests that combining institutional cues with individual health beliefs may be essential for enhancing radiation safety compliance.

Table 1.6 - Level of Radiation Safety Awareness Among Public Health Workers in Terms of Self-Efficacy

Indicators	**Mean**	**SD**
1. I am confident in my ability to protect myself from radiation exposure.	3.407	1.218
2. I know how to properly use radiation protective equipment.	2.669	0.780
3. I can follow safety procedures even under pressure or time constraints.	2.628	0.796
4. I feel well-informed about how to minimize radiation risks.	2.676	0.796
5. I am capable of teaching others about radiation safety.	2.552	0.787
Average Mean	**2.786 Average**	

Scale: 1.0 – 1.80 “Very Low”, 1.81 – 2.60 “Low”, 2.61 – 3.40 “Average”, 3.41 – 4.20 “High”, 4.21 – 5.00 “Very High”

The data presented in Table 1.6 showed that the average mean score for self-efficacy regarding radiation safety among public health workers was 2.786, which falls within the "Average" category. This indicates that while the workers have a moderate level of confidence in their ability to protect themselves from radiation exposure, there remains room for improvement in strengthening their self-efficacy. Enhancing self-efficacy is essential for ensuring that health workers consistently apply safety measures, even in challenging situations. Regarding the individual indicators, the highest mean score was 3.407 for "I am confident in my ability to protect myself from radiation exposure," which is at the upper end of the average range and close to high confidence. However, the scores for practical skills such as "I know how to properly use radiation protective equipment" (2.669) and "I can follow safety procedures even under pressure or time constraints" (2.628) were lower, suggesting some uncertainty in executing safety practices consistently. Similarly, "I feel well-informed about how to minimize radiation risks" (2.676) and "I am capable of teaching others about radiation safety" (2.552) were rated toward the lower end of the average range, indicating that knowledge dissemination and practical competence could be further developed. These findings highlight the need for targeted training and empowerment programs to boost confidence and competence among public health workers in radiation safety.

The findings from the study on radiation safety awareness among public health workers at Medina General Hospital indicate an overall average level of self-efficacy, with respondents expressing moderate confidence in protecting themselves from radiation exposure but lower confidence in using protective equipment and teaching others about radiation safety. This contrasts with the study by Jang et al. (2023), which found that perioperative nurses demonstrated higher engagement in radiation protective behaviors, strongly influenced by their attitudes, subjective norms, and perceived behavioral control as framed by the Theory of Planned Behavior. While both studies highlight the importance of self-efficacy and knowledge in promoting safe radiation practices, the Medina General Hospital workers showed moderate awareness and practical confidence, suggesting potential gaps in training or resource availability compared to the perioperative nurses who exhibited more proactive protective behaviors. This difference may stem from varying workplace environments and specialized roles, emphasizing the need for tailored interventions to enhance radiation safety self-efficacy across different health worker groups.

Table 1.7 - Summary of the Level of Radiation Safety Awareness Among Public Health Workers

Components	**Mean**	**Interpretation**
Perceived Susceptibility	3.328	Average
Perceived Severity	3.920	High
Perceived Benefits	4.112	High
Perceived Barriers	2.483	Low
Cues To Action	3.509	High
Self-Efficacy	2.786	Average
Average Mean	**3.356 Average**	

Scale: 1.0 – 1.80 "Very Low", 1.81 – 2.60 "Low", 2.61 – 3.40 "Average", 3.41 – 4.20 "High", 4.21 – 5.00 "Very High"

Table 1.7 showed that the overall average mean score of radiation safety awareness among public health workers at Medina General Hospital was 3.356, which was interpreted as "Average" on the given scale. This suggests that while the workers generally had a moderate level of awareness regarding radiation safety, there remains significant potential for improvement. An average awareness level implies that the health workers recognize some aspects of radiation safety but may lack consistency or depth in knowledge and practices, which could affect the effectiveness of safety measures and increase vulnerability to occupational hazards. Examining the individual components revealed important insights. Public health workers perceived the severity of radiation exposure and the benefits of safety measures highly, with mean scores of 3.920 and 4.112, respectively, indicating strong recognition of the health risks and the value of protective actions. The cues to action also scored high (3.509), reflecting that external motivators such as policies, reminders, and peer influence effectively encourage safety compliance. Conversely, perceived susceptibility and self-efficacy were rated as average (3.328 and 2.786, respectively), highlighting a moderate awareness of personal risk and confidence in applying safety measures. The perceived barriers component was low (2.483), suggesting that workers reported fewer obstacles to practicing radiation safety but also indicating possible underreporting or normalization of challenges. These findings collectively point to strengths in recognizing risks and benefits but also underscore the need for enhanced training, empowerment, and support to elevate overall safety awareness and behavior.

The study on radiation safety awareness among public health workers in Medina General Hospital indicates a moderate level of confidence and knowledge in protecting themselves from radiation exposure, using protective equipment properly, and following safety procedures, though there is less confidence in their ability to teach others about radiation safety. In contrast, Alyami et al. (2022) found that nurses in nuclear medicine departments in Saudi Arabia exhibited a generally higher level of awareness and consistent practice of radiation protection measures. This difference may be attributed to the specialized environment of nuclear medicine nurses, who receive more focused training and regularly apply strict radiation protocols, whereas the broader group of public health workers in the Medina study may have less specialized training, highlighting the need for enhanced education and practical support to improve confidence and safety practices in general hospital settings.

Table 2.1 - Extent of Radiation Safety Practices Among Public Health Workers in Terms of Attitude Toward the Behavior

Indicators	**Mean**	**SD**
1. Practicing radiation safety is essential in my profession.	3.876	0.870
2. I believe following safety procedures is a professional responsibility.	4.124	0.769
3. Radiation safety is not just for radiologic technologists, but for all health workers.	3.793	0.769
4. I feel positive about consistently practicing radiation safety.	3.531	0.743
5. I value radiation protection as a key part of patient and worker safety.	3.752	0.738
Average Mean	**3.815 High**	

Scale: 1.0 – 1.80 “Very Low”, 1.81 – 2.60 “Low”, 2.61 – 3.40 “Average”, 3.41 – 4.20 “High”, 4.21 – 5.00 “Very High”

Table 2.1 showed that the average mean score for the attitude of public health workers toward radiation safety practices was 3.815, which was interpreted as "High" on the given scale. This indicates that the workers generally held a positive and strong attitude toward the importance of practicing radiation safety in their professional roles. A high attitude score suggests that they recognize radiation safety as an essential responsibility and are motivated to consistently adhere to safety procedures, which is crucial for maintaining a safe working environment and protecting both themselves and their patients. Looking at the individual indicators, the highest mean was for the statement "I believe following safety procedures is a professional responsibility" (4.124), reflecting a strong sense of duty and accountability among the health workers. The perception that radiation safety is important not only for radiologic technologists but for all health workers scored 3.793, showing inclusivity in recognizing radiation risks across professions. The workers also expressed positive feelings about consistently practicing radiation safety (3.531) and valued radiation protection as a key component of patient and worker safety (3.752). The statement "Practicing radiation safety is essential in my profession" received a mean of 3.876, reinforcing the general acknowledgment of its importance. These findings imply that the attitude toward radiation safety is a strong foundation that can support further enhancement of safety practices among the public health workers.

The study on radiation safety awareness among public health workers at Medina General Hospital shows a strong positive attitude toward radiation safety, emphasizing its importance as a professional responsibility and a key aspect of both patient and worker protection. This is consistent with Lee and Choi’s (2021) research on radiation workers in dental institutions, where a similarly favorable attitude toward radiation safety management was observed. While Lee and Choi’s study focused on specialized radiation workers who may have more targeted training, the Medina study highlights that even non-radiologic health workers recognize the significance of radiation safety, suggesting a broader awareness across different healthcare roles. Both studies highlight the critical role of positive attitudes in promoting effective radiation safety behaviors, although the Medina findings imply a continued need to encourage consistent practice among all health personnel.

Table 2.2 - Extent of Radiation Safety Practices Among Public Health Workers in Terms of Subjective Norms

Indicators	**Mean**	**SD**
1. My colleagues expect me to follow radiation safety procedures.	4.310	3.453
2. I am influenced by my department’s practices regarding radiation safety.	3.552	0.694
3. I feel pressured by hospital standards to observe radiation safety.	2.297	0.696
4. My supervisors encourage adherence to radiation safety practices.	3.938	0.772
5. I follow safety protocols because I believe others around me also do.	3.952	0.603
Average Mean	**3.610 High**	

Scale: 1.0 – 1.80 “Very Low”, 1.81 – 2.60 “Low”, 2.61 – 3.40 “Average”, 3.41 – 4.20 “High”, 4.21 – 5.00 “Very High”

Table 2.2 showed that the average mean score for subjective norms influencing radiation safety practices among public health workers was 3.610, which was interpreted as "High" on the given scale. This suggests that social pressures and expectations from colleagues, supervisors, and the hospital environment played a significant role in motivating the workers to adhere to radiation safety protocols. The high level of influence from the social environment indicates that the behavior of others and organizational culture are important factors in shaping individual radiation safety practices. Regarding the individual indicators, the highest mean was for "My colleagues expect me to follow radiation safety procedures" with a mean of 4.310, highlighting the strong peer influence on safety behavior. Following closely were "I follow safety protocols because I believe others around me also do" (3.952) and "My supervisors encourage adherence to radiation safety

practices" (3.938), both demonstrating that encouragement and shared norms contribute positively to compliance. The influence of the department's practices was also rated high at 3.552, indicating that group habits and standards impact individual behavior. However, the lowest mean score was found in "I feel pressured by hospital standards to observe radiation safety" (2.297), suggesting that formal institutional pressure was less effective or less perceived compared to peer and supervisor influence. Overall, these results imply that fostering a supportive social and professional environment could further improve radiation safety adherence.

The study on radiation safety practices among public health workers in Medina General Hospital highlights that social expectations from colleagues and supervisors, as well as departmental influences, play a significant role in encouraging adherence to safety protocols. This is consistent with the findings of Lewis, Downing, and Hayre (2021), who used the Theory of Planned Behaviour to show that subjective norms, including peer influence and professional expectations, strongly predict radiation protection behaviors among South African diagnostic radiographers. However, the Medina study suggests that pressure from formal hospital standards may be less influential compared to interpersonal and departmental factors, whereas Lewis et al. emphasized that both organizational policies and social influences are important in shaping compliance. This contrast points to the potential benefit of strengthening institutional enforcement alongside fostering a supportive social environment to improve radiation safety adherence.

Table 2.3 - Extent of Radiation Safety Practices Among Public Health Workers in Terms of Perceived Behavioral Control

Indicators	**Mean**	**SD**
1. I have the resources I need to practice radiation safety.	3.097	0.808
2. I know where to get assistance if I have questions about radiation protection.	3.103	0.869
3. I have enough time to carry out safety measures before procedures.	3.793	0.787
4. I feel capable of handling emergency situations involving radiation.	3.103	0.682
5. I can comply with radiation safety practices even in a busy work environment.	3.579	0.721
Average Mean	**3.335 Average**	

Scale: 1.0 – 1.80 "Very Low", 1.81 – 2.60 "Low", 2.61 – 3.40 "Average", 3.41 – 4.20 "High", 4.21 – 5.00 "Very High"

Table 2.3 revealed that the average mean score for perceived behavioral control among public health workers in practicing radiation safety was 3.335, which was interpreted as "Average" on the provided scale. This suggests that while the workers generally felt somewhat capable and in control of their ability to perform radiation safety practices, there remained some limitations or uncertainties regarding their resources, time, and overall capacity to consistently follow safety measures. The average perception of control may indicate areas where additional support or improvements could help enhance compliance with safety protocols. Examining the individual indicators, the highest mean was for "I have enough time to carry out safety measures before procedures" at 3.793, suggesting that most workers felt reasonably able to allocate time for safety steps despite workload. The ability to comply even in a busy environment scored 3.579, reflecting moderate confidence in maintaining safety under pressure. However, indicators such as "I have the resources I need to practice radiation safety" and "I know where to get assistance if I have questions about radiation protection" both scored around 3.10, indicating some uncertainty or gaps in resource availability and support systems. Similarly, confidence in handling radiation emergencies was also at 3.103, showing room for improvement in emergency preparedness. Overall, these results imply that strengthening resource provision, guidance, and emergency readiness could improve workers' perceived control and promote better safety practices.

The study on radiation safety practices among public health workers at Medina General Hospital reveals a generally moderate sense of control over safety behaviors, with workers feeling more confident about having

enough time and the ability to comply with safety measures in busy environments. However, they report only average confidence in having sufficient resources, knowing where to seek assistance, and handling emergencies involving radiation. In comparison, Moore (2021) found that radiologic technologists tend to have a stronger overall perception of radiation safety, likely due to their specialized training and focused experience in radiation-related tasks. This contrast highlights that while radiologic technologists feel well-prepared and supported in radiation safety, public health workers may require additional resources, guidance, and training to enhance their confidence and effectiveness in practicing radiation safety.

Table 2.4 - Extent of Radiation Safety Practices Among Public Health Workers in Terms of Behavioral Intention

Indicators	**Mean**	**SD**
1. I intend to use protective equipment during all radiologic procedures.	4.000	0.654
2. I plan to attend radiation safety trainings when available.	4.234	0.633
3. I will remind others to follow safety protocols when necessary.	3.993	0.581
4. I intend to report unsafe radiation practices if I witness any.	4.110	0.577
5. I aim to be more consistent in applying radiation safety measures in my tasks.	3.938	0.590
Average Mean	**4.055 High**	

Scale: 1.0 – 1.80 “Very Low”, 1.81 – 2.60 “Low”, 2.61 – 3.40 “Average”, 3.41 – 4.20 “High”, 4.21 – 5.00 “Very High”

Table 2.4 showed that the average mean score for behavioral intention among public health workers toward radiation safety practices was 4.055, which was interpreted as "High". This indicates that the workers demonstrated a strong willingness and commitment to consistently engage in radiation safety behaviors. The high level of behavioral intention suggests a positive attitude and readiness to adopt protective measures, attend training, and promote safety within their work environment, which is crucial for effective radiation risk management. Looking at the individual indicators, the highest mean was for "I plan to attend radiation safety trainings when available" at 4.234, reflecting a strong eagerness to improve knowledge and skills through formal learning. The intention to report unsafe radiation practices scored 4.110, highlighting a responsible and proactive approach to maintaining safety standards. Using protective equipment during all radiologic procedures received a mean of 4.000, showing a high level of commitment to personal safety. Reminding others to follow protocols and aiming to be more consistent in safety measures also scored highly at 3.993 and 3.938, respectively, indicating a supportive and conscientious work culture. Overall, these findings imply a robust motivation among workers to uphold radiation safety, which can positively influence actual safety practices in the hospital.

The study on radiation safety practices among public health workers at Medina General Hospital shows a strong commitment to consistently using protective equipment, attending safety trainings, reporting unsafe practices, and encouraging others to follow protocols. This aligns with Shubayr’s (2024) findings, where Saudi Arabian nurses also exhibited a high willingness to respond effectively to nuclear and radiological disasters, demonstrating preparedness and proactive attitudes toward radiation hazards. While both studies highlight positive behavioral intentions toward radiation safety, the current study emphasizes everyday safety practices within a hospital setting, whereas Shubayr’s research focuses on readiness during large-scale emergency situations. Together, these studies provide complementary perspectives on healthcare workers’ dedication to radiation safety in both routine and crisis contexts.

Table 2.5 - Summary of the Extent of Radiation Safety Practices Among Public Health Workers

Components	**Mean**	**Interpretation**
Attitude Toward the Behavior	3.815	High
Subjective Norms	3.610	High
Perceived Behavioral Control	3.335	Average
Behavioral Intention	4.055	High
Average Mean	**3.704 High**	

Scale: 1.0 – 1.80 "Very Low", 1.81 – 2.60 "Low", 2.61 – 3.40 "Average", 3.41 – 4.20 "High", 4.21 – 5.00 "Very High"

Table 2.5 revealed that the overall average mean score for the extent of radiation safety practices among public health workers was 3.704, which was interpreted as "High." This suggests that, in general, public health workers consistently engaged in radiation safety practices to a considerable degree. The high overall score indicates a positive and proactive approach to maintaining safety standards in their work, which is essential for minimizing radiation-related risks and promoting a safe healthcare environment. Examining the components individually, the highest mean was found in Behavioral Intention with a score of 4.055 (High), indicating strong commitment and readiness among workers to perform safety-related behaviors. Attitude Toward the Behavior also scored high at 3.815, reflecting positive perceptions about the importance of radiation safety in their professional roles. Subjective Norms received a mean of 3.610 (High), suggesting that social influences from colleagues, supervisors, and institutional culture supported adherence to safety protocols. However, Perceived Behavioral Control had a lower score of 3.335 (Average), implying some challenges or limitations in resources, time, or confidence that may affect consistent practice of radiation safety. These findings highlight strengths in motivation and social support but also point to areas where improving perceived control could enhance overall safety practices.

The study on radiation safety practices among public health workers at Medina General Hospital reveals a generally positive attitude, strong subjective norms, and high behavioral intention toward radiation protection, alongside a more moderate sense of control over practicing safety measures. These findings are consistent with Behzadmehr et al. (2021), who reported that healthcare workers typically demonstrate good knowledge and favorable attitudes toward radiation protection. However, both studies indicate that despite positive intentions and awareness, actual adherence to safety practices can be limited by factors such as workplace challenges and resource constraints. This highlights the gap between intention and behavior, emphasizing the need for improved institutional support and practical measures to enhance radiation safety compliance among healthcare workers.

Table 3 - Test of Significant Relationship Between Radiation Safety Awareness and Radiation Safety Practices

Variables	Spearman's rho	df	p-value	Decision
Radiation Safety Awareness and Radiation Safety Practices	0.013	143	0.876	retain the H_o

Note: If $p \leq 0.05$, with a significant difference

Table 3 showed that the p-value for the relationship between radiation safety awareness and radiation safety practices was 0.876, which was greater than the significance level of 0.05. This indicated that the relationship was not statistically significant. Therefore, the null hypothesis (Ho) was retained, suggesting that there was no significant association between the level of radiation safety awareness and the extent of radiation safety practices among public health workers. The findings imply that despite varying levels of awareness about radiation safety, this awareness did not directly translate into improved or consistent safety practices in the workplace. This may suggest the presence of other influencing factors such as institutional support, availability of resources, or personal motivation that affect safety behaviors independently of awareness. It highlights the need for more comprehensive interventions that go beyond raising awareness to effectively enhance radiation safety practices.

The study on radiation safety awareness and practices among public health workers at Medina General Hospital found no significant relationship between awareness and actual safety practices, suggesting that being aware of radiation safety does not necessarily translate into consistent safe behavior. In contrast, the study by Allam et al. (2024) reported that healthcare workers exposed to ionizing radiation showed a clear link between their awareness of radiation safety and their compliance with safety protocols, indicating that higher awareness tends to promote better safety practices. This difference may be due to variations in factors such as the effectiveness of training programs, institutional support, enforcement of safety measures, or

availability of resources. While Allam et al. highlight awareness as a key factor in improving safety compliance, the Medina study suggests that awareness alone may not be enough, pointing to the need for additional strategies to ensure proper radiation safety practices.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

In conclusion, the findings indicate that while public health workers at Medina General Hospital exhibit an overall average level of radiation safety awareness, they demonstrate a high understanding of the severity and benefits of radiation safety, as well as responsiveness to cues promoting safe practices. However, their perceived susceptibility and self-efficacy remain moderate, suggesting the need for further training and empowerment to enhance confidence in applying safety measures. The low perception of barriers is encouraging, as it implies minimal hindrances to practice. Strengthening awareness components, particularly in perceived risk and self-efficacy, may contribute to more consistent and effective radiation safety behavior in the workplace.

Recommendations

Public health workers may benefit from regular training and practical workshops to enhance awareness and confidence in radiation safety. Medina General Hospital could institutionalize comprehensive safety programs with ongoing education, clear protocols, and accessible resources. Communicating these efforts may also reassure patients of their protection. Policymakers might use the findings to inform behavior-focused safety policies and consider regional safety programs. Researchers are encouraged to study additional factors and settings to strengthen safety strategies. Educational institutions may integrate behavioral models into curricula to better equip students for healthcare practice.

REFERENCES:

1. Allam, S. M. E., Algany, M. M. A., & Khider, Y. I. A. (2024). Radiation safety compliance awareness among healthcare workers exposed to ionizing radiation. BMC Nursing, 23, 208. https://doi.org/10.1186/s12912-024-01858-4
2. Alyami, A., Majrashi, N., Shubayr, N., Alomairy, N., & Abuhadi, N. (2022). Assessment of radiation protection awareness and safety practices among nurses in nuclear medicine departments in Saudi Arabia. Radioprotection, 57(1), 49–54. https://doi.org/10.1051/radiopro/2021041
3. Arruzza, E., Chau, M., & Kilgour, A. (2023). Problem-based learning in medical radiation science education: A scoping review. Radiography, 29(3), 564–572. https://doi.org/10.1016/j.radi.2023.03.008
4. Azman, R. R., Shah, M. N., & Ng, K. H. (2019). Radiation safety in emergency medicine: Balancing the benefits and risks. Korean Journal of Radiology, 20(3), 399–404. https://doi.org/10.3348/kjr.2018.0416
5. Behzadmehr, R., Doostkami, M., Sarchahi, Z., Dinparast Saleh, L., & Behzadmehr, R. (2021). Radiation protection among health care workers: Knowledge, attitude, practice, and clinical recommendations: A systematic review. Reviews on Environmental Health, 36(2), 223–234. https://doi.org/10.1515/reveh-2020-0063
6. Berris, T., Žontar, D., & Rehani, M. M. (2017). Survey on impact of regulations on radiation safety and development of radiation safety culture in 25 countries. Journal of Medical Imaging, 4(3), 031204. https://doi.org/10.1117/1.JMI.4.3.031204
7. Borras, A. M. (2015). Current practices and implementation of safety and security of radioactive sources in industrial radiography in the Philippines. In Safety and security of radioactive sources: Maintaining continuous global control of sources throughout their life cycle (p. 369). IAEA. https://tinyurl.com/4u6u5vdc
8. Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). SAGE Publications.
9. Christensen, B. M., Bjällmark, A., Ndipen, I. M., Afram, S. S., & Bazzi, M. (2024). Barriers to radiographers' use of radiation safety principles: A qualitative perspective. Journal of Medical Radiation Sciences, 71(2), 214–221. https://doi.org/10.1002/jmrs.750

10. Goula, A., Chatzis, A., Stamouli, M., Kelesi, M., Kaba, E., & Brilakis, E. (2021). Assessment of health professionals' attitudes on radiation protection measures. International Journal of Environmental Research and Public Health, 18(24), 13380. https://doi.org/10.3390/ijerph182413380
11. Hwang, S., Park, J., & Jang, J. (2022). Factors influencing protective behaviors for dental radiation exposure among female Korean dental hygienists using health belief model. International Journal of Environmental Research and Public Health, 19(1), 518. https://doi.org/10.3390/ijerph19010518
12. Jang, S. Y., Kim, H. S., Jeong, S. H., & Kim, Y. M. (2023). Factors affecting radiation protective behaviors in perioperative nurses applying the theory of planned behavior: Path analysis. Journal of Korean Academy of Nursing, 53(2), 222. https://doi.org/10.4040/jkan.22099
13. Lee, C., & Choi, S. H. (2021). A study on the status of radiation safety management knowledge, attitude, and behavior of radiation workers in dental institutions. International Journal of Clinical Preventive Dentistry, 17(4), 214–222. https://doi.org/10.15236/ijcpd.2021.17.4.214
14. Lewis, S., Downing, C., & Hayre, C. M. (2021). Using the theory of planned behaviour to determine radiation protection among South African diagnostic radiographers: A cross-sectional survey. Journal of Medical Radiation Sciences, 69(1), 47–55. https://doi.org/10.1002/jmrs.537
15. Moore, Q. T. (2021). Determinants of overall perception of radiation safety among radiologic technologists. Radiologic Technology, 93(1), 29–37.
16. Partap, A., Raghunanan, R., White, K., & Seepaul, T. (2019). Knowledge and practice of radiation safety among health professionals in Trinidad. SAGE Open Medicine, 7, 1–8. https://doi.org/10.1177/2050312119848240
17. Polit, D. F., & Beck, C. T. (2017). Nursing research: Generating and assessing evidence for nursing practice (10th ed.). Wolters Kluwer.
18. Ramli, R. B. (2018). The relationship between safety management practice and radiation safety awareness among employees in UUM University Health Centre [Master's thesis, Universiti Utara Malaysia]. UUM Electronic Theses and Dissertation Repository. https://etd.uum.edu.my/6961/1/s818217_01.pdf
19. Shubayr, N. (2024). Evaluating Saudi Arabian nurses' willingness to respond to nuclear and radiological disasters. International Nursing Review. https://doi.org/10.1111/inr.13040
20. Shubayr, N. (2024). Operating room radiation safety measures: Awareness, compliance, and perceived risks among nurses and other healthcare workers. International Nursing Review. https://doi.org/10.1111/inr.13071