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Evaluation Of Radiographic Skills Of Radiographers During Patient Load And Their Behavior Towards Patients

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ABSTRACT
A valid necessity for performing a radiographic examination in the radiological department is presented here. The study aims to educate radiographers on medical diagnostic imaging and technologies. These days, X-rays and many other advanced ionizing radiation-based diagnostic technologies are utilized daily and are believed to be the best ways to diagnose various diseases and ailments. Their understanding of radiation safety is, therefore, crucial. Since the general public is unaware of the negative effects of ionizing radiation exposure, medical professionals who work directly with patients must take the necessary precautions to safeguard both themselves and the public. This qualitative observational study was conducted in the Department of Radiodiagnosis, SGT Hospital, and Gurugram, where a minimum of 8 radiographers were taken in this study, in which both male and female radiographers were included from 2021 to 2023 and will demonstrate how radiographers behave in the workplace. Study data was received from the Department of Radiodiagnosis, SGT Hospital, Gurugram, where all the radiography was carried out. Both male and female radiographers were included during the study and observed on their communication skills, attitude, and behavior towards patients during heavy and low patient loads following the ALARA principle. Only 50% of radiographers were aware of the ALARA principle. As a result, individuals are more likely to experience an ionizing radiation-related problem. To keep up a high level of radiation protection, hospital management should be concerned with regular training programs that will help their personal development.

Keywords: *ALARA principle, Ionizing Radiation, Radiation Protection, Personal Protective Equipment.*

1. INTRODUCTION

X-rays were first discovered in November 1895, X-rays and the radiological procedures related to their usage have grown in importance as diagnostic and therapeutic tools in medicine. Other, non-radiation-based imaging techniques have been created as a result of the increase in the usefulness of imaging.[(1)] One of the most crucial diagnostic techniques in healthcare is radiography, and its efficient application requires adhering to a set of regulated processes. Despite the advantages of radiation in medicine, they should be used cautiously and in accordance with the ALARA code to minimize unnecessary radiation to

the patient and staff; while preserving the diagnostic value of the image, it can minimize the patients receiving radiation.[2] Owing to the expansion of modern medicine and the ongoing development of non-invasive public health measures. As a result, individuals are more likely to experience an ionizing radiation-related problem. Therefore, it is crucial that they are knowledgeable about radiation protection.[3]

Radiation protection.

The science and art of shielding humans and the environment from the damaging effects of ionizing radiation is known as radiation protection. It can also be defined as any activity aimed at reducing the amount of radiation that staff and patients are exposed to when exposed to x-rays. Every radiology field worker needs the right kind of supervision in addition to safety gear and instruments. Additionally, they need to get training and education relevant to their work.[4]Radiology has always been at the forefront of technical development, and its departments are among those that make use of the most advanced machinery..[5]The patient's viewpoint has also evolved recently. The patient should be much more involved in the visualization of anatomy, measurement of physiological functions, replacement of lost functions, handling of information, and other activities because new principles recognize the patient as an individual with personal life goals and plans, as well as values and attitudes that should be respected..Mediation, or linking and communicating, is a key concept in the practice of medicine's knowledge of technology.[6]

Knowledge and Awareness about the Hazards of Radiological Examination.

Ionizing radiation is now routinely utilized in hospitals and clinics for medical imaging techniques, allowing for more precise disease and injury diagnosis. Ionizing radiation exposure, such as the use of X-rays, is nevertheless linked to potential biological side effects.[7] Under the presumption that "one size fits all," the core radiation protection rules developed by the ICRP are generally applied to all activities involving the use of ionizing radiation. Equally, the same guidelines are applied to all categories of individuals who may be exposed, including employees, the general public, and patients. The obligation to safeguard all has recently been expanded to encompass the environment in its broadest sense. For all applications, it is always possible to keep personnel and the general public isolated from the radiation source.[8]

Radiography Education for Radiologic Technologists.

Radiographers are expected to follow more stringent radiation safety regulations in the modern era. It might be difficult for radiographers to stay current with these changes. To assist the management in making important choices that will advance the hospital and create the right policies and actions that could minimize the risk of radiation exposure, it is important to understand the level of compliance to radiation safety and standards and some challenges faced by the radiographers in complying with such standards.[9] Therefore, the purpose is to evaluate level of knowledge and awareness regarding the radiography profession as well as to identify ways to raise students' understanding of it. The radiographer is required to be aware of their own worth, interests, areas of strength and weakness, and social factors in order to approach their life choices from a broad perspective. The purpose of career awareness is to support people's success and the well-being of their communities and themselves.[10]

2. METHODS & METHODOLOGY

Source of data

In this qualitative observational study data was collected by observing the radiographer's skills during patient load using ALARA principle and their behavior towards patient on carrying a radiographic examination.

Study duration:

This study was carried out over a period of 1.5 year. The data was collected from September 2021 to March 2023 on observing the radiographers' skills, attitude and their behavior towards patient in the Department of Radio-Diagnosis of SGT medical college, hospital& Research Institute, Gurugram.

Study type and design:

Qualitative observational study with minimum 8 radiographers was taken in this study in which both male and female radiographers will be included. Skills, attitude and their behavior towards patient using ALARA principle will be observed.

Study area:

Radiographer's skills technique attitude and awareness towards radiation safety was observed in the Department of Radio-Diagnosis of SGT medical college hospital& Research Institute.

Selection criteria:

Inclusion criteria:

Radiographers working in the Department of Radio-Diagnosis of SGT medical college hospital& Research Institute.

Exclusion criteria:

Radiographers who are not working in the Department of Radio-Diagnosis of SGT medical college hospital & Research Institute were excluded.

Sample size:

A convenient sample of multiple radiographers, minimum (8) will be taken in this study in which both male and female radiographers were observed.

Methods:

Data was collected by observing the radiographer's skills, attitude, and awareness towards harmful effects of radiations and their behavior towards patient while carrying a radiographic examination. This study will demonstrate how radiographers behave in the workplace their knowledge about ALARA principle will be also observed.

Setting and resources:

The project is set in SGT hospital located in a rural area of Gurugram district; Haryana. Department of Radio-Diagnosis of SGT medical college, hospital & Research Institute, Gurugram.

3. RESULT

In this study data received from Department of Radio-diagnosis, SGT Hospital, Gurugram, in this study we evaluated radiographic skills during heavy via low patient load and their behavior towards patient. Analysis done by observing the radiographers' skills and their behavior towards patient in the department following ALARA principle while carrying a radiographic examination. As a result, most of the radiographers were least experienced and not that much knowledgeable about the particular radiographic examinations as a result, individuals are more likely to experience an ionizing radiation-related problem. Therefore, it is crucial that they should be knowledgeable about radiological examinations and radiation protection. This paper examines the problems radiographers have adhering to radiation safety requirements as a basis for developing rules and regulations. Hospital management should pay attention to ongoing training programs that will aid in their personal growth in order to maintain a high degree of radiation protection. However, commitment to safety requirements is contingent on the availability of personnel protection measures as well as safety principles and procedures.

Table.5.1. Distribution of Radiographers on the basis of Communication Skills, their Behavior towards patients following ALARA Principle during a Radiographic Examination.

NAME	COMUNICATION SKILLS	BEHAVIOUR	ALARA PRINCIPLE
Radiographer-1	Yes	No	Yes
Radiographer-2	Yes	Yes	Yes
Radiographer-3	No	No	No
Radiographer-4	Yes	No	Yes
Radiographer-5	No	Yes	No
Radiographer-6	Yes	Yes	No
Radiographer-7	No	Yes	Yes
Radiographer-8	Yes	No	Yes

Table.5.1. Shows the distribution of radiographers on the basis of communication skills behavior towards the patient during a radiographic examination following ALARA principle. As observed the study was divided into three parts. (1) Communication Skills (2) Behavior (3) ALARA Principle. Communication skills were observed about 72% while as Behavior observed was about 50% and ALARA Principle followed by the radiographer's was 72%.

Fig.5.2. Shows positive (YES) distribution of Radiographers on the basis of Communication Skills, Behavior and ALARA Principle.

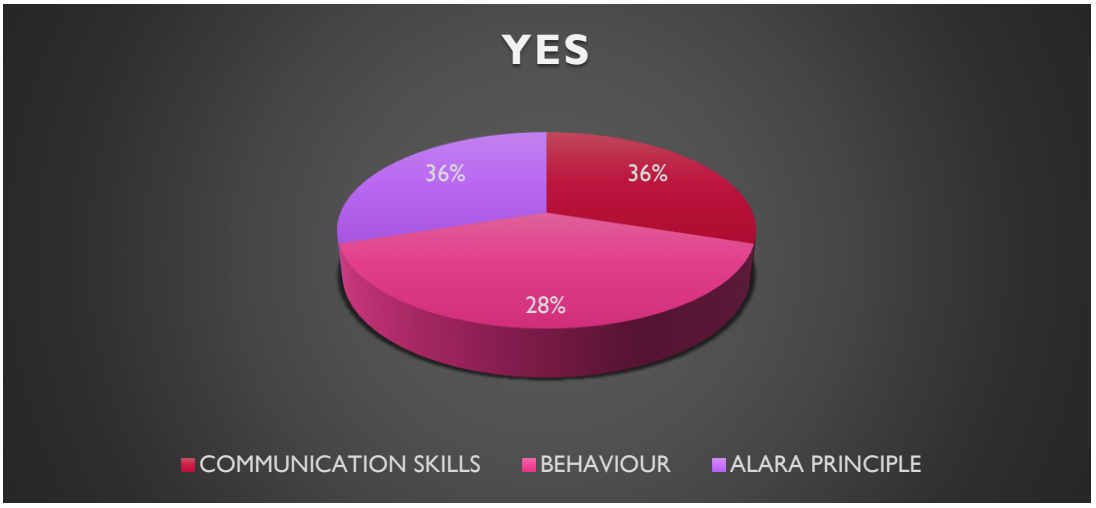

Fig.5.2. Shows the positive (Yes) distribution of radiographers on the basis of communication skills, behavior and ALARA principle, followed as. Communication Skills 36% Behavior 28% and ALARA Principle followed 36%. While carrying a radiographic examination.

Fig.5.3. Negative distribution of Radiographers on the basis of Communication Skills, Behavior and ALARA Principle.

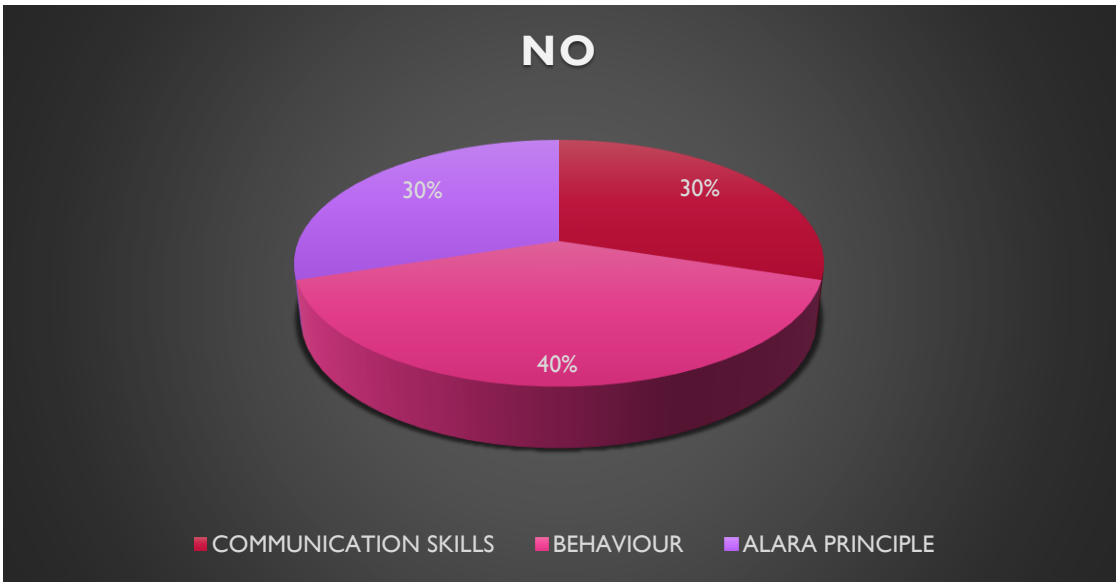

Fig.5.3. Shows the negative (No) Distribution of Radiographers on the basis of communication skills, behavior and ALARA principle, followed as. Communication Skills 30% Behavior 40% and ALARA Principle followed 30%. While carrying a radiographic examination.

4. DISUSSION

The results of a few earlier research really showed that health care workers' awareness and knowledge of radiation safety were quite low. However, we find from this survey show an accurate awareness and knowledge of the target groups [11] although there are differences in generations, degrees, and primary careers, all professionals were concerned about radiation protection and safety, and they continuously followed that concern. This makes the professionals' awareness a particular concern because that group plays a crucial role in the radiation protection chaini.e. follow ALARA principle. Moreover, the study findings reveal that the positive influence between general awareness about the radiations. Findings have revealed that even though most of the protective equipment's such as Lead Aprons, Gonad shields, waist Apron, and Lead gloves are

readily availability which can provide protection to an extent they are still deficient in the availability. Only half of the radiographers questioned correctly understand and use exposure index EI, and a third of them do not pay attention to it, despite the fact that most radiographers say that they try to use the lowest exposure feasible to obtain the best images. Adhering to the ALARA principle in the age of digital radiography entails being mindful of exposure index EI. [12].The use of thyroid shields and protective leaded aprons during interventional procedures is required according to the fundamental principles of radiation safety, yet the majority of muco-polysaccharide doses MPs disregarded the importance of personal protective equipment in limiting occupational radiation exposure. Colleagues demonstrated that technicians didn't even use personal protective equipment's PPE. Since they thought it was cumbersome and uncomfortable particularly leaded aprons. Muco-polysaccharide doses demonstrated the lowest knowledge and weakest practice for the leaded eyewear among the personal protective equipment. It should be noted that the ICRP proposed a dosage cap for the eyes of 20 millisievert mSv for year. A dose limit for the eye's lens, averaged over defined periods of 5years, with no annual dose in a single year exceeding 50 millisievert mSv [13]. In radiology, a basic perspective on patient safety holds that the main danger is related to unwarranted radiation exposure. There are many more facets of radiology professionals' work related to patient safety, even if preventing this is a major part of their duties as radiographers and radiologists. We haven't tried to include a list of every safety concern in this document. Instead, we have concentrated on highlighting a few key areas to serve as a resource for radiologists and radiographers looking for pertinent references and advice. Radiographers have to know both how to position a patient and how to tune an X-ray tube to avoid clinically unnecessary radiation doses and repetitive acquisitions of X-ray images. The proposed system provides a safe environment where the procedure can be taught and rehearse. The new study's findings are generally consistent with those of earlier research in the literature and show that physicians are similarly ignorant about the potential hazards of radiological exams. Despite the fact that the ALARA principle is the cornerstone of radiation protection philosophy, it was clear that doctors had little understanding of radiological difficulties. Daily diagnostic ionizing procedures can potentially expose patients and medical personnel to significant quantities of radiation, which could have detrimental consequences on human health body.[14] Radiographers are highly advised to adjust exposure factors based on patient age and physical condition. For optimum patient dosing and image quality, appropriate protocols and exposure variables are essential. Exposure variables and the choice of appropriate protocols should be changed for different body habits in order to minimize patient dose and provide optimal image quality. The collective effective dosage and patient dose may both increase as a result of radiographers' lack of expertise in this area. Radiographers typically need to employ high kVp, high mA, and brief exposure times. The adoption of proper procedures and sufficient exposure factors is still extremely important, even though automatic exposure control stops radiation exposure once the image receptor has absorbed a certain quantity of x-ray exposure. Although a small number of technicians claimed that avoiding the radiologist's wrath was a drive to increase quality, more respondents responded. The reason they pay attention to image quality at low dose is because they have a strong personal commitment to the ALARA principle. Many people described how important it is for the radiologist to make the right diagnosis and to provide the finest possible medical care for the patients. Knowing what to expect from radiographs from the radiologist lessens the possibility of additional exposures lowering the radiation exposure to patients and enhancing technician efficiency [15]. Hospital management should pay attention to ongoing training programs that will aid in their personal growth in order to maintain a high degree of radiation protection. However, adherence to safety requirements is contingent on the availability of personnel protection measures as well as safety principles and procedures.

5. CONCLUSION

It was clear that radiographers had not enough awareness of radiological challenges, even though the ALARA principle is the foundation of the theory of radiation protection. Patients and medical personnel may be exposed to high radiation levels from routine diagnostic ionizing treatments. which may be harmful to human health. Radiographers are strongly urged to modify exposure parameters according to the age and physical condition of the patient. Adequate procedures and exposure variables are crucial for optimal patient dosage and image quality. The present study conducted among all the radiographers to observe attitude and their behavior towards patient following ALARA principle in the department of radio-diagnosis at SGT hospital. In order to maintain a high level of radiation protection, hospital staff should be aware of regular training programs that will support their personal development. But compliance with safety requirements depends on the availability of personnel protection measures as well as safety guidelines and practices.

To keep up a high level of radiation protection, hospital management should be concerned with regular training programs that will help their personal development. First, based on the most recent findings of a survey on radiation protection and safety issues related to the use of radiation for medical procedures, which aims to assess the knowledge and experience of healthcare professionals who unquestionably are radiation professionals, particularly in radiology department

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