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Adherence to radiation safety precaution among healthcare professionals at tertiary healthcare centre

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Abstract
The aim and objective of this study was to assess the compliances towards adherence to radiation safety measures among medical professionals who working under radiation zone. A cross-sectional study was performed at tertiary healthcare centre Gurgaon. The targeted peoples included in this study; physicians, nurses, technician and other OT staff working in the operating area under C-Arm.
Result: The total number of participants included in this study was 120 including physician (30), technician (25), nurse (15), and trainee students (50). Toward adherence to safety norms and guidelines, 98% were used personnel protective equipment such as lead apron, 97% wear the TLD Badge during radiation exposure, and 85% were maintain the distance between source to personnel's about 1-1.5 meter during radiation exposure.
Discussion: The adherence to safety precaution in the radiology department is an essential factor to ensure the good practice in radiology department. It is also a key factor to assess the continual quality improvement in the radiology department. For various accreditation and approval such NABH, JCI etc. adherence to safety precaution plays an important role.

Keywords: adherence, safety, radiation, radiology, NABH, JCI, risk

Introduction
Advances in the medical imaging techniques allowed various applications, such as image guided procedures including biopsy and FNAC, surgical procedures etc. using C-Arm equipment. Apart from radiology professional some other health care professionals are also exposed with ionizing radiation (x-ray) especially in the department of urology, orthopaedics, nephrology, and neuro-spine surgery etc. [1]. Use of radiation in the healthcare profession including for diagnostic purpose as well as therapeutic purpose increased in few decades [2]. Radiation risk among healthcare workers included mild to moderate or severe depending upon the awareness and safety measures used.
Health care professionals using radiation must ensure to apply ALARA principle to save the patient as well as themselves. All workers including radiology department and other departments using radiation must ensure the adherence to radiation safety guidelines, while them working in the radiation zone. All professional working in radiation zone including physician, nurse, and technicians must use thermo luminescence dosimeter (TLD) monitor the radiation dose received by an individual [3]. Amount of radiation absorbed by an individual's influence the radiation induced health hazards. Awareness and knowledge about radiation safety and protection influence the practice of medical professionals in terms of their behaviour, techniques, etc. low level of awareness may leads to health hazards [4-7].
Knowledge and awareness about adherence to safety is also a key point among quality indicator of radiology department. All tools of radiation safety and monitoring must be provided by employer to each and every individual worker in the radiology to meet the compliances [8-10].
The aim and objective of this study was to assess the compliances towards adherence to radiation safety measures among medical professionals who working under radiation zone.

Method and Materials
A cross-sectional study was performed at tertiary healthcare centre Gurgaon. The targeted peoples included in this study; physicians, nurses, technician and other OT staff working in the operating area under C-Arm. A self-administrated multiple choice questionnaire along with and written consent form send to the eligible healthcare workers and asked them to fill it within a limited time (30 min) and give it back within 2-3 days.
There was four three section was included in the questionnaire. First section was Demographic section including age, experience and job responsibility, section second was included the questions about Knowledge radiation protection principle and annual dose limits, etc., section third was included the individual adherence to radiation safety measures while they working under radiation zone. All data were manually insert into Microsoft excel 2011 software and analyses accordingly.

Result

The total number of participants included in this study was 120 including physician (30), technician (25), nurse (15), and trainee students (50).

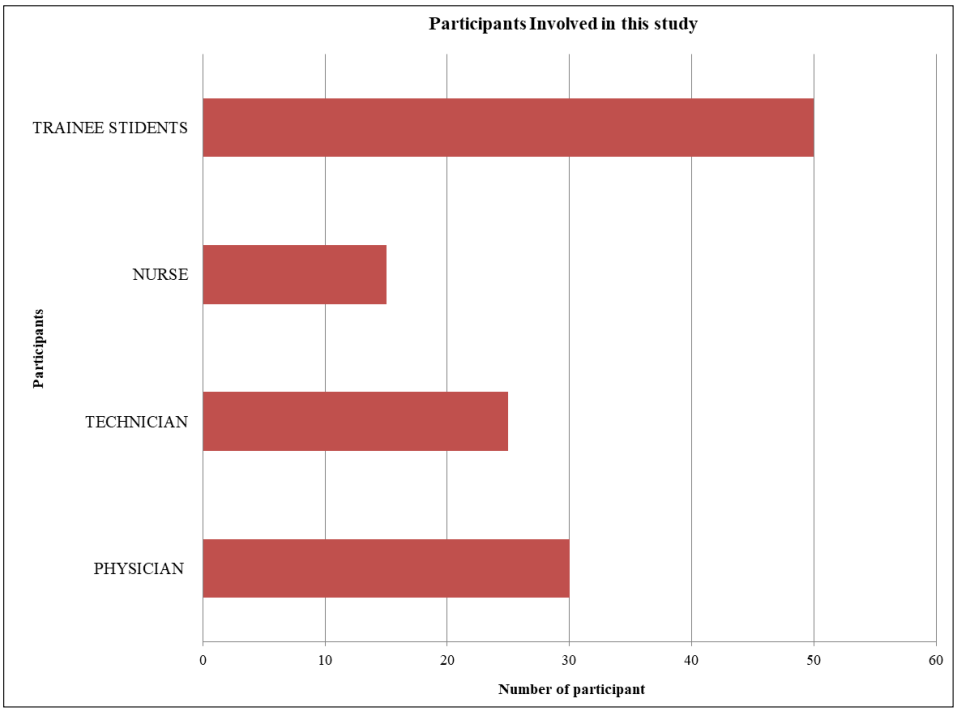

Fig 1

The majority of participants were from radiology background including radiology professionals and radiology trainee. The sex ratio of participants was 75% male and 25% female of age group between 22 – 62 years. Overall 97% of professionals adhere the safety precautions while them working in the radiation zone. Toward adherence to safety norms and guidelines, 98% were used personnel protective equipment such as lead apron, 97% wear the TLD Badge during radiation exposure, and 85% were maintain the distance between source to personnel's about 1-1.5 meter during radiation exposure.

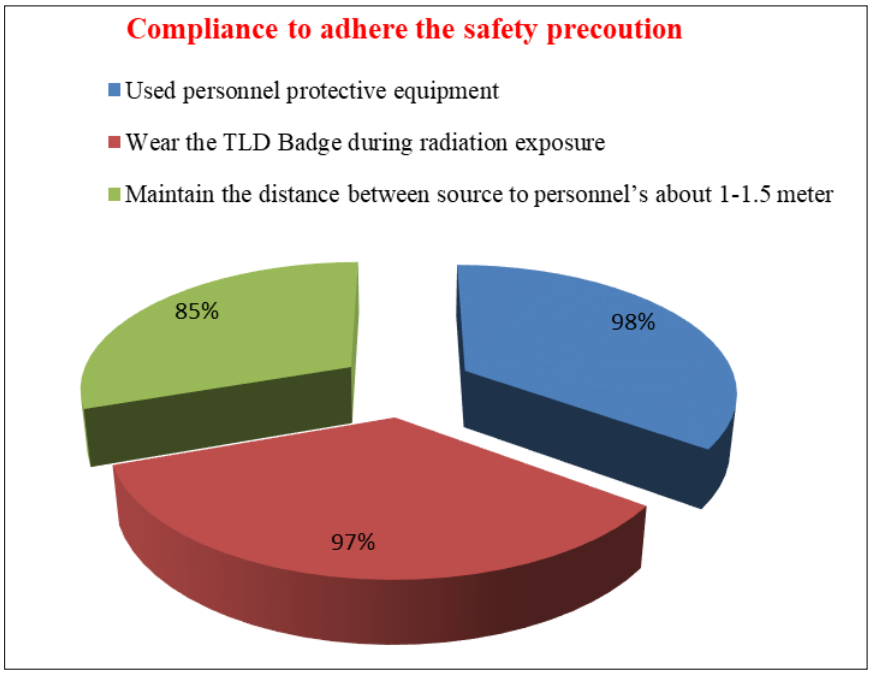

Fig 2

Majority of participants were known about radiation protection principle and tools to reduce the radiation dose. 93% professionals were got training about radiation protection while 85% were trained to use PPEs and radiation monitoring device (TLD).

Conclusion

The adherence to safety precaution in the radiology department is an essential factor to ensure the good practice in radiology department. It is also a key factor to assess the continual quality improvement in the radiology department. As we know that, radiation Couse harmful effect to the animals, but in few decades, the use of radiation in the medicine increased very fast. Therefor adequate knowledge and training is required for health care professional to work under radiation directly or indirectly.

This study shown that, most of the professionals adhere the safety guidelines laid down by competent authority to avoid any health hazards. Some breach of adherence also shown in this study only in the emergency situation, due to department work load, poly-trauma patients etc.

Adequate knowledge and awareness also leads to good practice. Training must be provided to all health care professional to introduce the key guidelines and safety precautions. Each professional in the health care profession need to be acquire adequate knowledge and training prior to work in respective section or department. And also update the knowledge about latest technology or advancement in the respective section.

Personnel protective equipment and radiation monitoring equipment is crucial component of radiology practice. It must be provide by the employer to every employee, who works in the radiation zone. Failure to adhere the safety guidelines affects the practice of professionals, and it can also alter the psychological or behavioural status of professional. Monitoring of radiation is very important to know about how much radiation received in a certain time frame. A very high dose of radiation can cause mild to moderate effects and sometime also cause severe effects if thy received suddenly a higher radiation dose. Maximum threshold value for radiation professional must be maintained below 20 mSv per annum while for trainee 6 mSv.

For various accreditation and approval such NABH, JCI etc. adherence to safety precaution plays an important role. A good practice in the department always adhere maximum level of safety guidelines. It also increases patient feedback and satisfaction. It can help to increase the quality of service also.

This study basically describes the knowledge and adherence to radiation safety precaution among health care professional who work in radiation zone directly or indirectly. Overall adherence was very good in this study. The knowledge and awareness was excellent toward radiology practice among all professionals including in this study. Proper training and good practice must be employed adequately to meet the maximum level of compliance.

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