EVALUATION OF AWARENESS AND KNOWLEDGE OF IONIZING RADIATION-RELATED HAZARDS AND PROTECTIVE MEASURES AMONG PATIENT’S ACCOMPANYING PERSONS/CARETAKER IN BUNDELKHAND REGION OF CENTRAL INDIA IN A TERTIARY LEVEL TEACHING HOSPITAL IN BUNDELKHAND AND A MEDICAL COLLEGE, SAGAR (MADHYA PRADESH)

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ABSTRACT

Objective: Evaluation of awareness and knowledge of ionizing radiation related hazards and protective measures among patient’s accompanying persons or caretaker in Bundelkhand region of central India in a tertiary level teaching hospital in Bundelkhand Medical College, Sagar, (M.P).

Methods: This study was conducted as a questionnaire-based survey conducted in one tertiary-level teaching hospital in Bundelkhand Medical College, Sagar, M.P, from June 2021 to February 2022. A semi-structured questionnaire of 21 items was administered to 840 patient’s accompanying persons/caretaker selected as per inclusion/exclusion criteria. Information on demographic variables of the respondents intheir knowledge about ionizing radiation effects/hazard, radiation protection measures and source of their knowledge on ionizing radiation were taken and collected data used in the study by applying descriptive statistical analysis.

Results: Majority of the participants in our study were male 548 (63.3%). Most of the participants, 635 (75.6%), did not have knowledge of ionizing radiation. Only 320 (38%) knew that ionizing radiation is hazardous. The majority of the participants, 399 (76.7%), were informed about radiation exposure by the radiographers, while 121 (23.2%) read about it. A larger number of the participants, 620 (73.8%), had no idea about the meaning of radiation protection. The majority of the participants, 678 (80.2%), assisted their relatives during the examination. Most of the participants, 676 (80.1%), have seen the radiation warning sign before.

Conclusion: This study showed that there is a low level of knowledge and awareness of radiation hazards and protective measures among patients’ accompanying persons or caretakers. It is obvious that public education via news papers, TV, holdings, etc. will contribute immensely to the spreading of awareness of the harmful effects of ionizing radiation and the measurement of for radiation protection measures.

Keywords: Ionizing radiation exposure, Protection measures, Radiation protection.

INTRODUCTION

Medical imaging plays an important role in early diagnosis, early treatment, and postoperative monitoring. This will cause a significant positive impact on the prognosis and treatment of human diseases. Medical imaging modalities using ionizing radiation constitute about two-thirds of radiological procedures [1], thereby contributing as a major man-made source of secure radiation exposure to the public with potential biological effects [2]. Despite the various benefits of medical imaging in diagnosis, the associated radiation hazard is a public health concern. Exposure to low-level ionizing radiation at doses used in medical imaging can cause cancer [3].

During the recent decade of advancement of old and addition of new technology, an increase in radiological armamentaria with associated increases in imaging procedures and radiation exposure of patients undergoing radiological investigations as well as health personnel who work with this equipment was also noted. Previous studies revealed poor knowledge and awareness of radiation-related hazards among patients, as documented by Ugwuayi et al. [4]. They observed that the majority of participants (67.6%) knew that most of the medical imaging modalities used ionizing radiation, yet only a few (20.4%) knew that radiation could be harmful. Poor knowledge of radiation protection and the effects of radiation among doctors who conduct radiological investigations, as seen in study conducted by Ighodaro and Igbinedion [5]. Awosan et al. also showed satisfactory knowledge of radiation hazards and knowledge of personal protective devices among radiologists, radiotherapists, and dental surgeons [6].

A study almost entirely in the United States of America by Sacks BP reported a significant level of exposure not only to patients but also to patients’ relatives to ionizing radiation [7].

However, none of these previous studies recognize the similar radiation exposure of patients’ relatives, who take care of patients during the treatment and management of disease in our region. A good knowledge of radiation hazards and safety could reduce the overall radiation exposure of the public as radiation protection practices are judiciously implemented. Radiation protection and safety procedures, according to the International Atomic Energy Agency (IAEA), are established to ensure the protection and safety of staff, patients and patient relatives (caregivers) during their stay in the radiology department [8]. In radiology departments, especially in government hospital, patient relatives and caregivers are often seen inside and around the diagnostic area. This study was conducted to evaluate the awareness and knowledge of ionizing radiation-related hazards and protective measures among patient’s accompanying persons/caretaker in Bundelkhand region of central India in a tertiary level teaching hospital in Bundelkhand Medical College, Sagar, (M.P).
room with an unjustified extent of knowledge and awareness of potential radiation hazards and protection measures.

There is a scarcity or dearth of data on patient relatives’/care giver’s, extent of knowledge and awareness of radiation hazards and their protective measures. This study was done to assess the knowledge and awareness of radiation-related hazards and measures of radiation protection among patient relatives in Sagar (M.P.), India.

METHODS

This study was a questionnaire based prospective study and cross sectional tertiary level hospital based survey based which was conducted in a tertiary level teaching hospital in Bundelkhand Medical College, Sagar, (M.P.) from January 2021 to February 2022.

Twenty-one-item semi-structured questionnaires, written in the English language, with a convenience sample size of 840 participants were administered. The validity and reliability of the questionnaire were achieved by conducting a pilot study before this study. Thirty questionnaires were pretested with patients’ relatives before the commencement of the study and the Cronbach alpha reliability test was conducted. The questionnaire had an acceptable internal consistency (Cronbach's alpha=0.81).

Only patients’ relatives that came with their patients to the selected study centers during the period of this study, were able to read and write and consented to the study were included in this study. Non-patients’ relatives and those that did not consent to participate in this study were excluded from this study.

The questionnaires were administered to the participants using the one-on-one method of administering questionnaires at the waiting areas of the Radiology Departments of the hospitals. All completed questionnaires were retrieved immediately by the researchers. Information on demographic variables of the respondents, knowledge of ionizing radiation effect, radiation protection, and source of their knowledge of ionization were collected using data pro forma.

Statistical analysis radiation

The data collected from the study were processed by S.P.S.S. version 21 and analysis was done using descriptive statistics.

RESULTS

In our study, majority of the participants were male 548 (65.3%). A total of 840 participants, the maximum percentage of 371 (44.2%) was in the age group of 26–35 years. Most of them 345 (41.1%) had education school level (Table 1).

With regard to the participants’ knowledge about radiation hazards questions in (Table 2), 205 (24.4%) knew what ionizing radiation was. Of the total participants, 620 (73.8%) gave the answer that they have been previously exposed to ionizing radiation (Table 2). Majority of the participants 696 (80.6%) had stayed with their relative during the radiological examination that involves ionizing radiation (Table 2).

The participant’s knowledge of radiation protection in (Table 3), showed that the majority of the participants 220 (26.2%), had no idea about radiation protection (Table 1): Sociodemographic of the patients’ relative/caregivers.

Participants who knew about the meaning of radiation protection, 420 (19%) were informed by radiographers during radiological exposure (Table 3). Majority of the participants 565 (80.6%) assisted their relatives during radiological exemption coming to the ionizing radiation. Of those that assisted their relatives, 561 (80.6%) said they were given something to wear (Table 3). Out of 80.6% of the participants who were given something to wear while staying with their relative in the X-ray examination room, 426 (76%) knew why they were asked to wear the protective apron. The majority of the participants 553 (65%) stayed outside the examination room whenever they were asked to do so (Table 3).

With regard to the participant’s knowledge of radiation signs as captured in (Table 4), showed that a total out of 840 participants, 678 (80.2%) said that they have seen the radiation warning sign before. Most of the participants who had seen the radiation warning sign 402 (59.3) did not know what the meaning of the sign. Out of those that knew the meaning of the sign, 214 (77.5%) of the participants said they were informed about the meaning of the sign by radiographers (Table 4). A total of 507 (60.3%) participants had seen the radiation warning sign in the department, of which, 237 (39.7) they usually obeyed the sign (Table 4).

DISCUSSION

This study was the first to evaluate the knowledge and the participant’s knowledge of radiation signs to the best of our knowledge. The findings revealed that about 70% of the participants lack knowledge of ionizing radiation despite their relatives (the patients) being referred for ionizing radiation examinations. This poor knowledge and awareness of ionizing radiation by the present study population is similar to the finding of the study conducted by Hobbs et al., who found poor knowledge about radiation exposure and risk among their patients [9]. According to Hobbs et al., the participants’ level of knowledge about radiation exposure and risk improved after the educational presentation [9]. Contrary to the index study finding, the study by Ugwuanyi et al., reported that the majority of the respondents (67.6%) were aware of the uses of radiation medical imaging [4]. The differences could be attributed to the different sample sizes and the educational experiences of the participants recruited.

Majority of the participants in the present study did not know that ionizing radiation is hazardous to health. This finding is not a surprise as over 55% of the participants said they were not exposed to ionizing radiation before. This finding is in agreement with the finding of the study conducted by Ugwuanyi et al., in which the majority of their participants 226 (79.58%) did not know that ionizing radiation is hazardous to health [4]. Over 75% of the participants were informed about the radiation hazards on health by the radiographers in this study. This implies that most radiographers give patients and their relatives more attention, which enables them to explain the effects of radiation to them. Majority of the participants in this present study, which accounted for 94.68% have not heard of anybody affected with ionizing radiation injury. This could be ascribed to the fact that majority of the participants were secondary school leavers who might have limited access to the Internet and other social media sources to obtain information on radiation injuries.

Most of the participants in this current study were not knowledgeable of the meaning of radiation protection and those that knows the
meaning of radiation protection, were informed by radiographers. Most of the participants usually stayed outside the examination room whenever they were asked to do so, but when needed to assist their relatives (the patients), a greater number responded to have stayed inside the X-ray room during the investigations. This implies that in some situations, depending on the patients’ health challenge,
the radiographers may either require the assistance of the patient's relatives in the X-ray rooms or be asked to stay outside the examination room while the investigation is ongoing. The present study finding was in agreement with the finding of the study conducted by Aldossari et al., who reported that of the total participants, 45.53% were aware that their relatives should be asked to stay outside the X-ray room during X-ray investigations to avoid unnecessary exposure to ionizing radiations [10].

This study also found that most participants had seen the radiation warning sign before, although, majority of them do not know the meaning of the sign. These findings indicate that the radiation warning signs in most X-ray units were normally placed at strategic places making them more visible to all those that visited the unit. There are little or no inscriptions of signs, which explained the meaning of the warning signs, while larger numbers of those that have seen the radiation warning sign said they obeyed the sign whenever they see it. This could be attributed to the fact that the frequent display of these signs on the X-ray door informed them of the associated dangers with ionizing radiation.

CONCLUSIONS

Our study showed a poor level of awareness and knowledge of imaging radiation-related hazards and protection measures among patient's according person of caretakers obvious that public education newspapers, TV, hoardings, Pumplete, etc. will contribute immensely to the promotion of awareness of the harmful effect of ionizing radiation and radiation protection measures. We therefore recommend that aside the radiation warning sign which is often placed conspicuously, there should be an inscription explaining the meaning of the sign. Government, health professionals, and regulatory bodies should intensify efforts in creating public awareness of radiation hazards.

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AUTHORS' CONTRIBUTIONS

Dr Punya Pratap Singh and Dr. Vreshbhan Ahirwar are mainly involved in data collection and arranging data to proper evaluation by statistical methods. Dr. Jagrati Kiran Nagar is out corresponding author and done main role in arranging this manuscript. Dr Manoj Sahu, Mr. Rajesh Kumar Maurya and Dr. Prabhath Varma are helped in arranging manuscript, arranging data in table form, preparing discussion & conclusion.

COMPETING INTERESTS

Nil.

REFERENCES


