

Evaluation of Nurses' Knowledge of Radiation Protection Practice: A Case Study of Two Hospitals in Calabar, Nigeria.

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Abstract: Nurses are caregivers often involved in assisting and accompanying patients to the Radiology Department for medical exposure to radiation for both diagnostic and therapeutic purposes. Exposure to ionizing radiation without adequate protection is implicated in causing harm to man. The study was designed to evaluate Nurses' knowledge of radiation protection practice as direct care givers in the University of Calabar Teaching Hospital (UCTH) and the General Hospital (GH) both in Calabar, Cross River State, Nigeria. A descriptive survey using self-administered questionnaire was used to collect data from 220 respondents, selected through simple random sampling technique. Findings revealed that most of the respondents were between age range 22 to 66 with average working experience between 1 year to >21 years. Although, majority of the Nurses (85.0%) like being posted to different wards, only 1.0% like to work in the Department of Radiology, 26.5% inferring that radiation is dangerous. About 50.0% assessment of the respondents had adequate knowledge on the value of radiation as being diagnostic and therapeutic in medical science, 35.5% identified the need to use lead apron for protection, 40.5% said time, distance and barrier were the essential basic protective measures and 90.0% of the respondents had no knowledge on the Protection of Persons Undergoing Medical Exposure or Treatment (POPUMET) regulations with poor attendance on radiation protection training. The study suggests that training of Nurses on this important aspect of care is either absent or appears to be insufficient. It is therefore recommended that conscious efforts be made to train Nurses on the POPUMET regulations in the studied health care institutions.

Keywords: Knowledge, Nurses, POPUMET, Radiology, Radiation, Radiation protection.

Introduction:

The increasing use of radiation in form of waves or particles emitted from a source travelling through space which can transmit all or part of its energy on contact with matter "[1]" in diagnostic and therapeutic imaging science, is unquestionably beneficial to man and his environment. Soon after the discovery of x-rays, with its subsequent introduction into medical practice, it became apparent that radiation was not only useful in the diagnosis and treatment of different human body ailments but also harmful to man "[2]". However, per-capital exposure to medical radiation has grown some six fold in the last two decades and still appears to be on the increase "[2]". The principles of radiation protection (effective measures and procedures or techniques used to protect personnel, patients and the general public from unnecessary exposure to ionizing radiation) "[3]" are achieving central importance for the health of both the patient and the radiation professional. Radiation damage can manifest in many ways including skin erythema, hair loss, vascular damage, internal bleeding, cataracts, cancers, weakening immune systems, sterility and mutation in offspring, premature ageing and death "[1]". While there is an increasing patient awareness that unnecessary radiation exposure from x-rays can cause health problems, most patients have no knowledge that the dangers of ionizing radiation, due to medical imaging, can reach atomic bomb levels "[4]". Nurses are highly trained and skilled professionals who care for the sick and infirm, and also help to educate patients on the issue of healthy living and wellness as wells as chronic disease processes and treatment "[5]". Nurses and other health professionals (non-radiation workers) who work as a team usually assist and accompany patients (especially the critically ill) to the Departments of Radiology or sometimes Radiotherapy for examination (medical exposure) and for further evaluation. This study sought to evaluate Nurses' knowledge of radiation protection practice as the primary direct care givers in the University of Calabar Teaching Hospital (UCTH) and the General Hospital (GH) both in Calabar, Cross River State of Nigeria.

Materials and method:

A simple random sampling technique (a heterogeneous population with every member having an equal chance of being selected) was used to select Nurses from UCTH and GH, Calabar. A self-administered questionnaire was used to obtain data from 250 Nurses (14 males and 236 females) interviewed. The questionnaire was subjected to validity and reliability test-retest on Nurses

in the Lawrence Henshaw hospital Calabar, with ethical approval obtained. Respondents were assured of confidentiality and anonymity of responses. Results were expressed using simple percentages and charts.

Results:

The distribution of the respondents in UCTH and GH was 205 and 45 respectively. Data collected was 220 (195 from UCTH and 25 from GH giving a total of 88.0% respondents returned rate) of the 250 questionnaires administered. Findings revealed that most of the respondents were between age 22 to 66 years with average working experience between 1 year to >21 years. The gender of respondents was not taken into consideration in the present study. The trends and observations from the two hospitals are illustrated in figures 1-9.

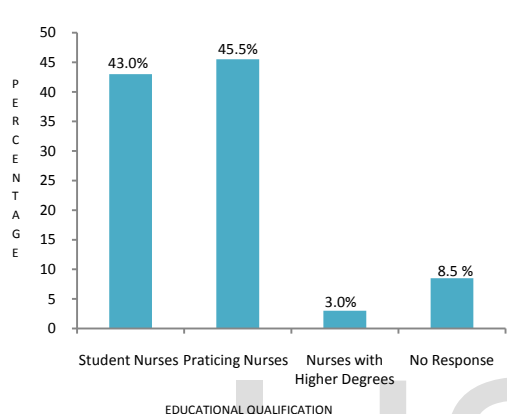


Fig. 1. Level of educational qualification

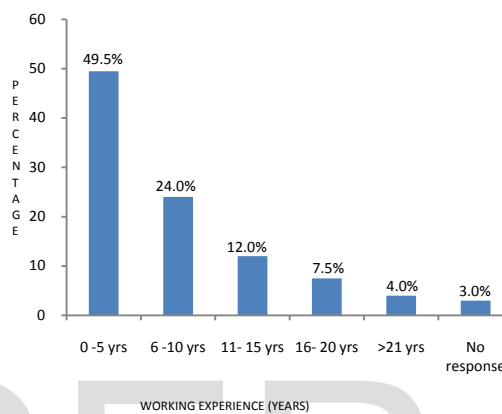


Fig. 2. Years of working experience

Figure 1 shows level of education (qualification). Student Nurses (under training) 43.0% were of the population, practicing Nurses holding certificates such as B.Sc., HND, RN, OND, etc. were 45.5% and Nurses with post graduate qualifications such as M.Sc., etc. 3.0%. About 8.5% made no responses. In Figure 2, 49.5% Nurses with work experience 0-5 years, those with 6-10 years experience were 24.0% while 11-15 years, 16-20 years and >21years formed 12.0%, 7.5% and 4.0% respectively of the study population. About 3.0% of the respondents made no responses. Figure 3 shows their areas of posting. Nurses posted to the different wards 45.0%, theatre Nurses 40.0%, Nurses posted to the Department of Radiology 1.0% while 14.0% gave no responses. On the use of radiation in medicine (figure 4), 26.5% of the respondents put it that radiation is dangerous and should only be used if beneficial, 24.0% inferred that radiation can be used for diagnosis and treatment, 17.5% answered that patients involved should be adequately protected, 16.5% revealed that radiation can cause skin erythema, hair loss, genetic mutation, sterility and cancer while 15.5% inferred that radiation is not as dangerous as being propagated.

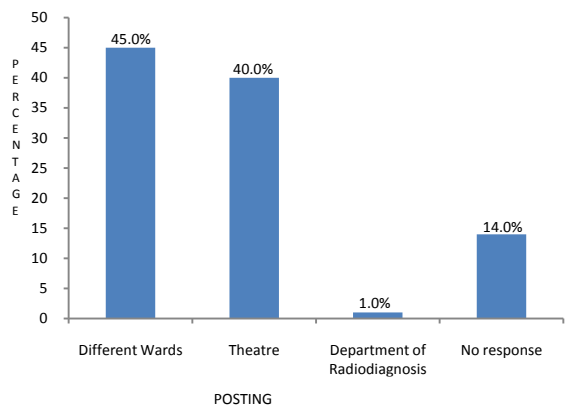


Fig. 3. Areas of posting

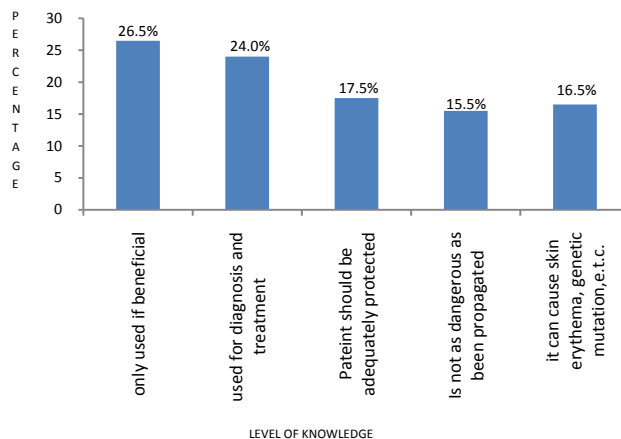


Fig. 4. Knowledge on the use of radiation in medicine

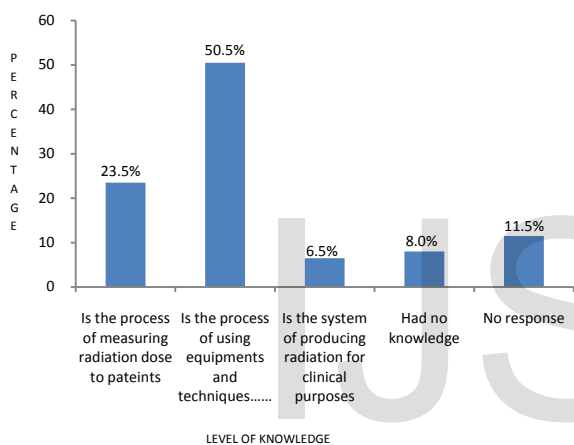


Fig. 5. Knowledge on radiation protection

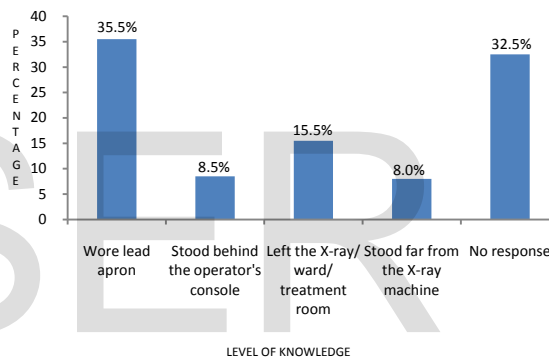


Fig.6. Knowledge on the use of radiation protective measures

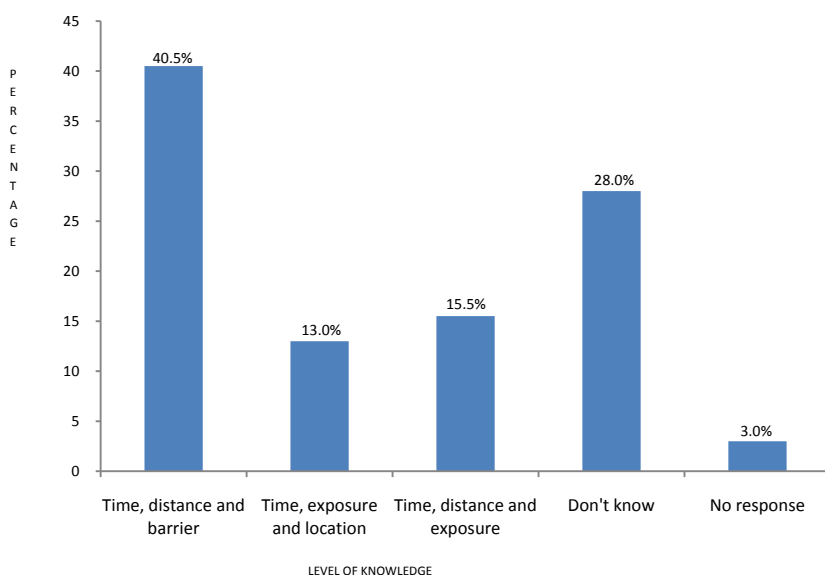


Fig. 7. Knowledge on the basic radiation protection measures

In figure 5, 23.5% of the respondents inferred that radiation protection is the process of measuring radiation dose to patient, 50.5% said that radiation protection is a process of using equipment and techniques to monitor and protect patient, radiation workers and the public, 6.5% agreed that radiation protection is a system of producing radiation for clinical purposes, 8.0% had no idea while 11.5% gave no response. Similarly, in figure 6, 35.5% put it that lead apron should be worn during radiographic procedures, 8.5% agreed standing behind the operator's console during the investigation, 15.5% left the x-ray room or ward during the investigation, 8.0% inferred standing far from the x-ray machine while 32.5% gave no response. Meanwhile in figure 7, 40.5% agreed that time, distance and barrier were the basic radiation protection measures, 13.0% agreed with time, exposure and location, 15.5% agreed with time, distance and exposure, 28.0% did not know while 3.0% gave no response.

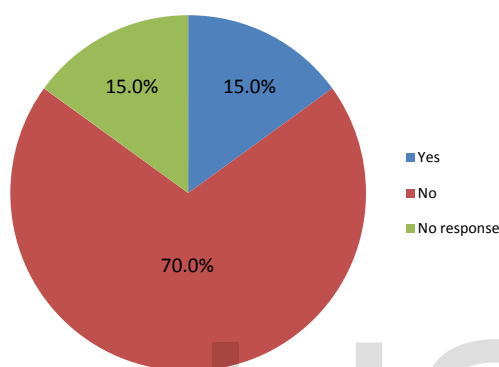


Fig. 8. Attendance to training on radiation protection

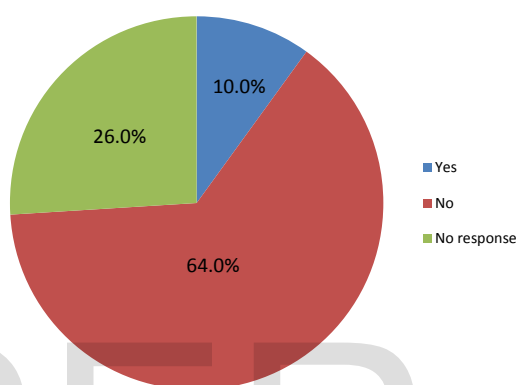


Fig. 9. Knowledge on the POPUMET regulations

Discussion:

Nurses and other non-radiation workers (health professionals) sometimes assist and accompany patients to the Departments of Radiology or Radiotherapy for medical exposure. This study evaluated Nurses' knowledge of radiation protection practice while carrying out their responsibilities in the UCTH and GH, Calabar. Results obtained, reveal that majority of the Nurses (85.0%) do not like being posted to the Radiology Department (figure 3) irrespective of their work experience and levels of educational qualification (figures 1 and 2). This could probably be attributed to the fact that majority of the Nurses share negative thoughts on the use (harmful effects) of radiation for medical purposes on man.

On the use of radiation in medicine, figure 4 reveals that majority of the Nurses demonstrated a fair knowledge of the benefits of radiation on medical exposure applied to diagnosis and treatment that must outweigh the possible risks. This agrees with previous works "[7]" which showed that the benefits accruing to the patient should outweigh the possible radiation risks, as this is the most important factor to be considered before carrying out any radiographic or radiologic investigation which should be medically justified.

Similarly, Nurses in the study health institutions have fair knowledge of radiation protection (figure 5), as majority (50.5%) of the total respondents were able to infer that radiation protection is a process of using equipment and techniques to monitor and protect patients, radiation workers and the public. This result also supports studies carried out in Kuwait and Malawi "[6], [8]". Significantly, observations from figures 6 and 7 show that majority of the Nurses were aware of the basic radiation safety measures since about 35.5% (figure 6) put it that lead apron should be worn during radiographic procedures and 40.5% (figure 7) agreed with time, distance and barrier as the basic radiation protection measures. However, these do not agree with the work of "[9]" in his "knowledge and practice of radiation safety among invasive cardiologists" where he attributed this to lack of radiation safety measures and equipment in cardiac catheterization laboratories as different from the use of lead apron during radiographic or radiologic investigations in connection with time, distance and barrier as the basic radiation protection measures inferred by our respondents in the present study.

On their attendance of radiation protection training (figure 8), a very poor attendance to radiation protection training was observed in the present study. This may probably be due to lack of awareness, ignorance, negative thoughts or believes about radiation to man as propagated by the public.

Meanwhile, figure 9, on the POPUMET regulations shows that majority of the Nurses (90.0%) had very little or no information about the POPUMET regulations on radiation protection which may probably be attributed to their poor attendance to trainings, as has been previously observed "[10]".

Conclusion:

In conclusion, the results obtained from this study showed a fair level of knowledge of radiation protection practices by the Nurses. However, their training on this important aspect of care appears to be insufficient. Conscious effort is needed to train Nurses on the POPUMET regulations in UCTH and GH, Calabar, Nigeria.

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