



KNOWLEDGE, ALTITUDE AND PERSPECTIVE OF RADIATION AMONG HEALTHCARE GIVERS IN AN AFRICAN HEALTH FACILITY.

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Abstract

Background: There is need for frank discussion between the staff of the department of radiology and staff of other departments about the risks and benefit of the use of various imaging devices using radiation in the healthcare facilities. Aim is to determine the level of knowledge and understanding of radiation and activity of radiology department among fellow healthcare givers in a tertiary health care facility. **Methods:** This is a cross-sectional study involving four hundred and twenty healthcare givers. It was a self-administered questionnaire. **Results:** Among the four hundred and twenty healthcare givers, two hundred and thirty-one (55.0%) were males while 189 (45.0%) were females. Their mean age was 41.2 years \pm 13.31, ranged between 20 and 69 years. When asked if staff were exposed to radiation emitted by radiology department, two hundred and seventy three (65.0%) believes 'yes' they were exposed while 147 (35.0%) do not think so. Of these responses, those who feel they are exposed to radiation were 105 Vs 168 (Junior Vs Senior) and those who felt not exposed were 63 Vs 84 (Junior Vs Senior). This difference was statistically significant ($p < 0.05$). **Conclusion:** The operational control and safety regulation of the department needs to be propagated to give confidence to the patients and co-workers in the hospital.

Key Words: *Radiology department, Radiation, Healthcare givers, Safety, Healthcare facility, Nigeria, Africa.*

Introduction: Radiology is a vital area of medicine where diagnosis are made in order to

alleviate patient medical conditions and while performing this role, other care giver usually from other departments may have a different view. The hospital is a big community with different professionals and workers, therefore one cannot ignore the perspective of other care givers about radiology department. The radiology care is usually one stage among many in the overall medical care process. The radiologists must obtain information from the

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patient's attending physician in order to perform the correct test and reach a diagnosis. A patient arriving at the radiology department passes through a process of registration, appointment setting, examination, one or more radiology procedures, and finally a diagnosis is reached.¹ Radiology, which has now evolved beyond mere X-rays, lies at the heart of medical diagnosis and treatment. Though its name has remained unchanged, many new modules which do not use X-rays are now part of this specialty, including numerous imaging procedures and heavy machines based on different physical principles, from sound waves to magnetic fields and other computerized devices but with this growing technology so also is the fears of patients and other care givers in the hospital keeps increasing, because issues of radiation and how it's being manages keeps coming up. Staff working in the hospital should be enlightened. about the relationship between radiation and cancer; about safety mechanisms in the department and the workings of the department. The failure to share knowledge effectively portends ill for the system.^{1,2}

The safety of patients and staff both in the radiology department and other departments is paramount in ground breaking innovative devices produced to improve patients care. There is an urgent need for patient-physician discussion about the benefits and risks of medical imaging examinations that involve the use of radiation and also frank discussion between the staff of the department of radiology and staff of other departments about the risks and benefit of the use of various imaging devices using radiation in the healthcare facilities.^{1,2,3}

Public recognition of the clinical role of radiology is essential and is very much dependent on contact with the patients. Radiologic imaging has made dramatic progress over the last decades. Current radiological imaging includes conventional radiology, ultrasonography, computed tomography, magnetic resonance imaging, interventional

radiology and nuclear medicine. All these technological advances needs to be transmitted and explained to other staff of the healthcare facilities who in turn will help to disseminate and explain such benefit to patients as they wheel patients to the department. Radiologist will also have to explain the risk and benefit to the patients and come to public glare to explain possible remedies to problems and discussed various challenge in order to demonstrate value,^{4,5,6,7,8}

There should be quality assurance program in diagnostic radiology. A quality control (QC) program should be performed on the X-ray machine, Computed tomography scan(CT-scan) and other equipment regularly, following international codes of practice. There must be regular quality control parallel to maintenance program for the X-ray equipment at regular intervals. The basic radiation protection principles of Justification and Optimization should be taken into consideration, in this period of rapid increase of investigation following the availability of new equipment. The outcomes of these QC should be made available to the staff in the departments and staff from other departments in order to give a positive perspective.^{4,9,10,11,12,13}

The summarization of responses to answers given by staff working in the hospital about radiology department will reflect on the general perspective of radiology department among the public who are the primary clients of the department. Good comments needs to go out there in the public but the hospital staff need to get the appropriate knowledge about the working of the department. There is paucity of data about the perspective of radiology department as it relates to radiation among other staff working with us in the same health facilities. Nevertheless, proper radiation education and awareness about the benefits of radiation, its uses in medicine, needs to be reinforced in the mind of the staff of radiology department, other staff of the hospital and the public.^{6,8,12,13,14}

Aim: The aim of the study is to determine the level of knowledge and understanding of radiation and activities of radiology department among fellow healthcare givers in a tertiary health care facility in Nigeria, Africa.

Methodology

Study background: This was a cross – sectional study involving four hundred and twenty (420) healthcare givers (staff), the research was initiated in the Department of Radiology, University of Abuja Teaching Hospital (UATH), Gwagwalada, Abuja, Federal Capital Territory (F.C.T), Nigeria and conducted over a period of four months. UATH is the largest and the only teaching hospital in Abuja. Abuja is the fastest growing city in the world and virtually hosts thousands of Africans on daily basis. Abuja is the headquarters of Economic committee of West Africa State (ECOWAS).

Study population: Healthcare givers (staff) who consented to participate in the study were recruited for the study upon sited their hospital identity card. It was self-administered questionnaire with no attempt to assist in answering of questions by the investigator. The questionnaires were randomly given to three sets of research assistance who in turn randomly select participants, with the pick of ‘YES’. They were freely allowed to bear their mind about radiology department and their perspective about the instruments we use in making diagnosis.

Inclusion Criteria:

- i. Should be a staff of the hospital
- ii. Should be a staff whose appointment is confirmed
- iii. Should be able to write and read in English language.

Exclusion Criteria:

- i. Those on industrial attachments.
- ii. Newly appointed staff.
- iii. Those on annual leave.
- iv. Staff of radiology department.

Data Analysis: Data were analyzed using SPSS 19.0 software. The chi square-test and Fischer

exact test were used to perform and establish any statistical difference. Probability values of <0.05 was considered as statistically significant.

Results: There were four hundred and twenty healthcare givers working actively in the tertiary health facility that consented to participate in the study and none withdrew after consenting. The demography of the respondent revealed that of the four hundred and twenty staff who participated, two hundred and thirty-one (231) were males representing 55.0% of the responders while 189 were females representing 45.0% of the respondents, with M: F ratio of 1:1. This difference was statistically significant ($p<0.05$, Table 1). The cadre of the staff were divided into junior staff (those are staff appointed without a tertiary educational qualification) and senior staff (staff appointed with a tertiary educational qualification). There were 168 junior staff and 252 senior staff respondents representing 40.0% and 60.0% respectively (Table 2). Their ages ranged between 20 and 69 years with a mean of 41.2 years ± 13.31 . The highest proportion of respondents falls within the age range of 20-29 years, 30-39 years and 50-59 years accounting for 25.0% respectively and the lowest proportion being 60 and above years accounting for 10.0% of the respondent. This difference was not statistically significant ($p>0.05$, Table 1).

The entire four hundred and twenty respondents were aware of the existence of radiology department popularly called “X-ray department” by most staff but only 84 respondent representing 20.0% were not aware of the full range of services rendered in the department (Table 3). Also, 252 respondents (60.0%) believe that services rendered in the department to patients were very harmful to patients and staff while five percent feels that the services rendered were not harmful to the patients and staff (Table 3). Of this responses, 105 (62.5%) junior staff believe that services rendered were very harmful, while 63 (37.5%) believe services offered were slightly harmful

and none felt the services were not harmful at all. For the senior staff their responses were similar to that of the Junior staff, among the senior staff; were very harmful responses were 147 (58.3%), slightly harmful responses were 84 (33.3%), and not harmful 21 (8.3%). This difference was statistically significant ($p < 0.05$, Table 2). When asked if staff were exposed to radiation emitted by radiology department, two hundred and seventy three representing 65.0% believes 'yes' they were exposed while 147 (35.0%) do not think so. Of these responses, those who felt they were expose to radiations were 105 Vs 168 (Junior Vs Senior) and those who felt not exposed were 63 Vs 84 (Junior Vs Senior). This difference was statistically significant ($p < 0.05$, Table 2). The response by the two cadres of staff positively correlated with the level of danger posed by the services rendered by the department and negatively correlates with the level of exposure awareness to radiation (Pearson correlation .187 and -.281).

The investigator went further to enquire about the staff perspective of radiation as it relates to some of the equipment used in the department. Two hundred and ten respondents believe that X-ray machine emits a lot of radiation which was 50.0% of the respondents while 168 (40.0%) and 42 (10.0%) believes that the

machine emits small and not at all radiation respectively. Follow-up to this was the fact that 95.0% of all the entire respondents believe that X-ray machine is dangerous; this was due to radiation while 5.0% do not think this way. Furthermore, 70.0% of the staff believes ultrasound emits a lot of radiation while 15.0% of the respondent thinks otherwise. 95.0% thinks the machine is dangerous. As regards to CT-scan, the respondent feels that the machine emits small amount of radiation with 210 (50.0%) responding this way, but 42 (10.0%) thinks the machine does not emit radiation at all (Table 4).

Out of the 420 staffs that participated, 315 healthcare givers representing 75.0% believes that the radiation emitted from radiology departments is capable of causing cancer and do not feel comfortable going to the department while 25.0% do not think that way. The respondents do not believe in siting radiology department around the epicenter of the hospital, 378 (90.0%) responded 'No' and 252 representing 60.0% believes that radiology department should be sited outside the hospital premises rather than within the healthcare facility. The remaining 40.0% thinks the department and its equipment can be siting in the hospital but at the far-end of the health care facility.

Table 1: Age distribution and Sex distribution

Age	Freq (percent)	Males (percent)	Females (percent)
20 – 29	105 (25.0)	63 (60.0)	42 (40.0)
30 – 39	105 (25.0)	63 (60.0)	42 (40.0)
40 – 49	63 (15.0)	42 (66.7)	21 (33.3)
50 – 59	105 (25.0)	42 (40.0)	63 (60.0)
>60	42 (10.0)	21 (50.0)	21 (50.0)

Table 2: Distribution of Cadre in relation to exposure to radiation

Cadre	Freq (percent)	VH(Percent)	SH(Percent)	NH(Percent)	Yes(Percent)	NO(Percent)
Junior	68 (40.0)	105(62.5)	63(37.5)	0 (0.0)	105(62.5)	63(37.5)
Senior	252 (60.0)	147(58.3)	84(33.3)	21(8.3)	168(66.7)	84(33.3)

Note

VH- Very Harmful

SH- Slightly Harmful

NH- None Harmful

Table 3: Service Render in the Department

Factors	Frequency	Percent (%)
Awareness		
FAW	147	35.0
SAW	189	45.0
NFAW	84	20.0
Services Render		
VH	252	60.0
SH	147	35.0
NH	21	5.0
Exposure Risk		
Yes	273	65.0
No	147	35.0

Note

FAW- Fully Aware

SAW- Slightly Aware

NFAW- Not Fully Aware

VH- Very Harmful

SH- Slightly Harmful

NH- None Harmful

Table 4: Distribution of Responses in relation to radiation emission and safety of imaging modalities

Radiation emission	Freq	Percent (%)	Responses	Freq	Percent (%)
X ray			Response on X ray if dangerous		
ALT	210	50.0	DAN	399	95.0
SML	168	40.0	NDAN	21	5.0
NAL	42	10.0			
Ultrasound			Response on Ultrasound if dangerous		
ALT	294	70.0	DAN	399	95.0
SML	63	15.0	NDAN	21	5.0
NAL	63	15.0			
CT – SCAN			Response on CT – SCAN if dangerous		
ALT	168	40.0	DAN	399	95.0
SML	210	50.0	NDAN	21	5.0
NAL	42	10.0			

Note**ALT- A lot of radiation****SML- Small amount of radiation****NAL- Not at All****DAN- Dangerous****NDAN- Not dangerous**

Discussion: The healthcare facilities in Africa both the secondary and tertiary health facilities were built base on specialties and equipment made available for the populace to access. Most of the health facilities do not have state of the art (latest) facilities and this will also impact on the quality of control and safety in such areas. Certain areas may be considered as harmful, although their diagnostic capabilities cannot be overemphasize. Radiology department offers

diagnostic, prognostic, screening and most recently interventional services. These services are often than not readily available in the health facilities but the patients and caregivers needs to know and appreciates the operational principle of these machines in the radiology department in order to realize that the department is like any other department in the hospital instead of making up wrong believes. Several questions keep flying; some wanted to know if the harm

overweighs the benefit regarding the department. Some believes that females are not fit to work in the department because of cancer concern. Some will not touch the walls in the department in order to avoid consuming radiation. we set out to educate the staff working in our health facility but their level of understanding of radiation from radiology department needs to be determined.

The outcome of this study revealed that staff of the health facility were very much aware of the department which many still referred to as X-ray department and majority of respondent were aware of range of services rendered but were unaware that the services rendered were not harmful to the patients and staff alike. The responses were not surprising from the fact that posting of staff to the department is usually considered as punishment- another wrong notion among the staff. Radiologist and indeed the staff of the department need to disabuse the mind of other staff of the health facility that services rendered are very safe and not punitive. It is worrisome that most of the caregiver who are expected to know more about hospitals believe they are expose to radiation from radiology department and that such radiation is capable of causing cancer. This notion is wrong from the fact that every staff in the department possesses a radiation purse which measured the amount of radiation consumed by the person, so much so that the individual subsequent exposure is regulated. It is a fact that some areas in the department have radioactive and biosafety signs to regulate movement of persons in the department. Radiation emissions are wholly limited to areas where they are produced and there mechanisms of absorbing them, it not possible for radiation to bend and navigate corners, also, perimeter space were created separating the room of production-absorption of radiation from the other areas such as the reception and offices.

The findings in this research revealed that healthcare provider believe that USS produce a lot of radiation and that CT-scan emits less

radiation, this findings is wrong from the fact that USS is a non-invasive and does not emit radiation rather works on the principle of sound waves which are non-ionizing radiation while CT-scan emit a lot of radiation because it works on the principle of x-rays. Most of the respondent believes that manufacturer of equipment needs to take safety seriously, therefore thinks that new equipment like CT-scan will be manufactured with less radiation emission.

Conclusion: Diagnostic areas of the hospital are very vital in the hospital so also the services rendered, radiology department had for several years unravel mystery surrounding patients illness but the operational control and safety regulation of the department needs to be propagated to give confident to the patients and co-workers in the hospital. Radiology department is an integral part of health facility where male and females operate without fear of radiation induced cancer.

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