

The 15th International Congress of the International Radiation Protection Association

KNOWLEDGE AND PRACTICE OF JUSTIFICATION OF MEDICAL EXPOSURES AMONG MEDICAL AND DENTAL PRACTITIONERS IN TEACHING HOSPITALS IN NIGERIA

Joseph Dlama .Z .,Abdullahi, O. Jelila., Garba Idris and Flavious Nkubli

Department of Radiography, Bayero University Kano, Nigeria.

Department of Radiography, University of Maiduguri, Borno State, Nigeria.

Corresponding authors' email - Josephdlama@gmail.com

ABSTRACT

Justification is the process of weighing the potential benefit of the exposure against its potential detriment to an individual. The main aim of this study was to assess knowledge and practice of justification of medical exposure among medical and dental practitioners in some selected teaching hospitals within Kano metropolis. The study was a prospective cross-sectional study conducted among medical and dental practitioners in two major hospitals within Kano metropolis. A convenient sampling technique was adopted for the study.. Data was collected by the use of a semi-structured questionnaire, which was administered to them and later retrieved after it was filled. A total of 180 questionnaires were administered to medical and dental practitioners in Kano metropolis to assess their knowledge and practice of justification of medical exposure. A response rate of 100%. Distributions of the respondents based on specialization were 109 (60.6%) medical practitioners and 71(39.4%) dental practitioners. Based on gender, there were 122(67.8%) males and 58(32.2%) females. On the assessment of knowledge of justification of medical exposure, the majority of the respondents have adequate knowledge with 84.4% medical practitioners and 64.6% dental practitioners. The practice of justification of medical exposure was found to be very poor. Only 10.1% of medical practitioners and 25.4% dental practitioners were found to practice it. The relationship between knowledge and practice of justification of medical exposure between the two cadres showed a weak positive correlation ($r=0.144$) for medical doctors. Positive correlation was noted among dental practitioners ($r =0.403$). Radiation hazard knowledge was inadequate with medical practitioners having 19.3% and dental practitioners having 42.3%. Although this is more among medical practitioners than dental practitioners. Knowledge of medical exposure is adequate among medical and dental practitioners while the practice of justification is very poor. Knowledge of radiation safety and hazards was also found to be inadequate among them.

Keywords: *Ionizing Radiation, Radiation Protection, Justification, Optimization, Dose limitation, Medical exposure*

1. INTRODUCTION

Radiation protection in medicine is supported by the concepts of justification, optimization and dose limitation [1]. One of the basic principles of radiation safety is to make sure that all exposures to ionizing radiation are clinically justified [2]. During the past decades, the extent of radiation exposure of patients has increased very significantly [3]. In some countries, the population dose from medical exposures now contends with that from natural background. The radiation protection of patients, therefore, attracts much greater importance. The two principal cornerstones of radiation protection of patients are optimization and justification of exposures [3]. One of the basic principles of radiation safety is to make sure that all exposures to ionizing radiation are clinically justified. All radiation exposures must be kept as low as reasonably achievable (ALARA principle) [2]. Regulation 11(1)(b) of guidance to ionizing radiation (IRMER), requires that all medical exposures carried out must be justified. This is based on evidence of knowledge of hazards associated with exposure and the clinical information of the patient [4]. However, it is not known whether medical and dental practitioners are aware of the justification of medical exposure or if justification is considered before referring patients to the radiology department for medical exposure. Lack of knowledge of justification of medical exposure leads to the poor practice of it. This leads to unnecessary and unwarranted exposure to ionizing radiation which increases the risks of radiation hazards.

Knowledge of justification of medical exposure is important to medical and dental practitioners this is because justification can only be practiced when knowledge of justification is adequate. It is also important in radiation protection because it prevents unnecessary and unwarranted exposure to patients thereby reducing radiation-induced hazards.

The study aims at assessing the knowledge of justification of medical exposure among medical and dental practitioners, evaluating the practice of justification of medical exposure among medical and dental practitioners, determining the relationship between knowledge of justification and practice of justification of medical exposure, and also accessing the knowledge of risks associated with radiation exposure.

2. MATERIALS AND METHODS

A prospective cross-sectional study was conducted among medical and dental practitioners in Aminu Kano Teaching Hospital and Abdullahi Wase specialist hospital within Kano metropolis.

A non-probability sampling method was adopted which is a convenient sampling technique where participants are selected based on availability and willingness to participate

The inclusion criteria for the study were medical and dental practitioners at Aminu Kano Teaching Hospital and Abdullahi Wase within Kano metropolis while the exclusion criteria were all radiologists, health workers, and non-medical staff at Aminu Kano Teaching Hospital and Abdullahi Wase specialist hospital within Kano metropolis. The tool used in collecting data for this research was the Questionnaire.

The questions in the questionnaire were arranged in a semi-structured manner comprising of four sections. The questionnaire was a 24 item scale that was administered to all medical and dental practitioners that were willing to participate in the study. The questionnaire was made up of four parts, A,B, C, D,

Data was acquired by compilation of filled questionnaires; it was organized in an orderly manner and classified. It was then analyzed using statistical package for social sciences (SPSS) Version 23.0. Descriptive and inferential statistics were carried out.

3. RESULT

Table 1: Age, Gender, Hospital, Specialization Of The Respondents

S/N	ITEMS	OBSERVATION	FREQUENCY	PERCENTAGE (%)
1	Age	<25	46	25.6
		26-35	83	46.1
		36-45	36	20.0
		46-55	15	8.3
2	Gender	Male	122	67.8
		Female	58	32.2
3	Hospital	AKTH	130	72.2
		AWSH	50	27.8
4	Specialization	Medical	109	60.6
		Dental	71	39.4

Table 2: Respondent Knowledge of Justification Of Medical Exposure

ASSESSMENT	SPECIALIZATION	
	MEDICAL	DENTAL
ADEQUATE	84.4%	67.6%
INADEQUATE	15.6%	32.4%
TOTAL	100%	100%

Table 3: Respondent Practice of Justification Of Medical Exposure

ASSESSMENT	SPECIALIZATION	
	MEDICAL	DENTAL
GOOD	10.1%	25.4%
POOR	89.9%	76.6%
TOTAL	100%	100%

Table 4: Respondent Knowledge of Radiation Safety And Hazards

ASSESSMENT	SPECIALIZATION	
	MEDICAL	DENTAL
ADEQUATE	19.3%	42.3%
INADEQUATE	80.7%	57.7%
TOTAL	100%	100%

Table 5: Relationship between Knowledge And Practice Of Justification Of Medical Exposure

ASSESSMENT	SPECIALIZATION	
	MEDICAL	DENTAL
Correlation coefficient(r)	0.144	0.403
Significance	0.135	0.000

4. DISCUSSION

Justification of medical exposure is governed by regulation 11(1)(b) of guidance to ionizing radiation (IRMER), it requires that any medical exposure to be carried out must be justified and this is based on evidence of knowledge of hazards associated with exposure and the clinical information of the patient [4]. Justification in practice is an integral aspect of radiation protection; hence the need to ensure for every radiological examination, the benefit must outweigh the risks. Medical and Dental practitioners play a key role in patients' protection from unnecessary radiation exposure as they are the ones

referring to the patients for radiological examinations. Justification of medical exposures, referral criteria, and clinical decision support, requirement 37 focuses on the justification of medical exposures. Three levels are involved

- General/overarching justification for the use of ionizing radiation in medicine (level 1) [5].
- Justification for a generic clinical condition (level 2) [5].
- Justification of a radiological procedure for an individual patient (level 3) [5].

Justification of medical exposure for an individual patient" shall be carried out through consultation between the radiological medical practitioners and the referring medical practitioners, as appropriate [6].

A semi-structured questionnaire was administered to Medical doctors and Dentists in Aminu Kano Teaching Hospital and Abdullahi Wase Specialist hospital in Kano metropolis. A convenience sample size was used with a simple random sampling technique to select the study participants. A total of 180 questionnaires were distributed and the response level was 100%. This study was aimed at assessing the level of knowledge and practice justification of exposure for the referring clinicians. The demographic data, 72.2% of the respondents were from AKTH while 27.8% were from AWSH (Table 1). Similarly, Table 1 shows the distribution of respondents based on the profession as 60.6% and 39.4% for Medical and Dental practitioners respectively. Descriptive data based on age group, rank and year of practice of the respondents were summarized and presented in Table 1.

The result obtained showed that on average, both medical and dental practitioners in Kano metropolis have adequate knowledge of justification of medical exposure. The percentage scored was 84.4 and 67.6 for Medical and Dental doctors respectively. (Table 2). This finding can be associated with the training they received in their course of study. All medical and Dental students do offer mandatory courses in Radiology that usually include courses on the justification of the practice. This finding, however, disagrees with the finding of Moifo *et al.*, [3], which suggested an inadequate knowledge of justification for medical and dental practitioners in Cameroon. Similarly in another study by Avadanei *et al.*, [6] on Practitioners Education Justification of Medical Exposure, it was also found that knowledge of justification was inadequate.

The practice of justification of, medical exposure in this study was found to be very poor with medical practitioners having 10.1% and dental practitioners having 25.4% (Table 3). This could be attributed to the negligence of these personnel or forgetfulness due to their heavy workload. This can be rectified by providing every personnel handbook on justification. Considerations for justification of medical exposure should also be included in referral forms this will guide and enable them to follow the requirement stated in it properly thereby increasing its practice. The principle of justification states that any decision that alters the r

radiation exposure situation should do more good than harm. For this to be appropriately carried out, the following factors must be considered; the urgency of the procedure, characteristics of the exposure, characteristics of the individual patient, special considerations for children, pregnant & breastfeeding patients, Relevant information from previous radiological procedures, Relevant national or international referral guidelines to be taken into account [7].

Other considerations are specific objectives of the exposure, potential diagnostic or therapeutic benefits to the individuals from the exposure, detriments the exposure may cause, efficacy, benefits, and risks of alternative techniques having the same objectives but involving no or less exposure to ionizing radiation [8]. The relationship between knowledge and practice of justification of medical exposure was between the two cadres. (Table 5) shows that a weak positive correlation was noted ($r=0.144$) for medical doctors. This means that while both variables (knowledge and practice) tend to go up in response to one another, the relationship is not very strong. A moderate positive correlation was also found for dental practitioners ($r =0.403$). This means that the relationship is similar to that of medical practitioners except that it is stronger. The study also revealed that knowledge of radiation safety and hazards was inadequate with medical practitioners having 19.3% and dental practitioners having 42.3% as pass mark (Table 4) although this is more so among medical practitioners than in dental practitioners. In a study by Ighodaro& Igbinedion, [9] it was found that there is poor knowledge on radiation protection, effects of irradiation, and awareness/utilization of guidelines across most of the disciplines of the clinicians. This finding agrees with the findings of the present study. In another study carried out at Suez Canal University Hospital in Egypt, knowledge, and practices toward radiation safety-related to radiological imaging were found to be poor. [10]. A study on knowledge of radiation and its effects among doctor [11] disagreed with the current findings of this study. It revealed that there was an appreciable level of awareness of radiation hazards among doctors but there were limited radiation knowledge and lack of use of referral guidelines.

5. CONCLUSION

This study which was aimed at assessing Knowledge and Practice of justification of medical exposure and also knowledge of radiation safety and hazards found that knowledge of medical exposure is adequate among medical and dental practitioners while the practice of justification is very poor. Knowledge of radiation safety and hazards was also found to be inadequate among them.

ACKNOWLEDGEMENT: We acknowledge the department of Radiography Bayero University Kano, Nigeria

REFERENCES

- [1] Malone, J., Guleria, R., Craven, C., Horton, P., Järvinen, H., Mayo, J., Czarwinski, R. (2012). Justification of diagnostic medical exposures: some practical issues. Report of an International Atomic Energy Agency Consultation. *The British Journal of Radiology*, 85(1013); 523–538. <https://doi.org/10.1259/bjr/42893576>
- [2] Beneyto, Y. M., Baños, M. A., Lajarín, L. P., & Rushton, V. E. (2007). Clinical justification of dental radiology in adult patients: A review of the literature. *Med Oral Patol Oral Cir Bucal*, 12; 244–251.
- [3] Moifo, B., Edzimbi, A. L., Tebere, H., Tambe, J., Samba, R. N., & Fotsin, J. G. (2014). Referring Physicians' Knowledge on Justification of Medical Exposure in Diagnostic Imaging in a Sub-Saharan African Country, Cameroon. *Open Journal of Radiology*, 4(1); 60–68. <https://doi.org/10.4236/ojrad.2014.41008>
- [4] The Department of Health and Social Care. (2018). *Guidance to the Ionising Radiation (Medical Exposure) Regulations 2017*. 1–37.
- [5] Dr. Maria del Rosario Pérez. (2013, October). *Justification of medical exposures Referral criteria and clinical decision support*. Presented at the 2nd International Symposium on the System of Radiological Protection, Abu Dhabi, UAE.
- [6] Avadanei, C., Rosca-Fartat, G., & Stanescu, G. (2011). Practitioners education on justification medical exposure. *Radiation Protection Dosimetry*, 147(1–2); 346–348. <https://doi.org/10.1093/rpd/ncr332>
- [7] IAEA. (2016). World Health Organization, FDI World Dental Federation, International Association of Dental-Maxillofacial Radiology, International Organization for Medical Physics, and Image Gently Alliance. *Radiation Protection in Dental Radiology*.
- [8] The royal college of radiologist. (2015). A guide to understanding the implications of the Ionising Radiation (Medical Exposure) Regulations in diagnostic and interventional radiology. *British Institute of Radiology*, 1–66.
- [9] Ighodaro, E., & Igbinedion, B.-E. (2017). Justification of doctors' referral for radiological imaging among some Nigerian doctors. *Sahel Medical Journal*, 20(3); 117. <https://doi.org/10.4103/1118-8561.223165>