

PERCEPTION OF QUALITY CONTROL BY PERSONNEL IN DIAGNOSTIC RADIOLOGY FACILITIES IN AKWA IBOM STATE, NIGERIA

¹Inyang S O, ²Essien I E, ³Egbe N O

¹Department of Physics, University of Calabar, Calabar, Nigeria

²Department of Physics, University of Uyo, Uyo, Nigeria.

³Department of Radiography and Radiological Science, University of Calabar, Nigeria

ABSTRACT

BACKGROUND

The perception of quality control (QC) implementation by personnel in diagnostic radiology facilities can affect service delivery and deprive the facilities of the benefits associated with QC implementation. The responses by personnel working in diagnostic radiology facilities in Akwa Ibom State, Nigeria, concerning the implementation of quality control in diagnostic radiology has been assessed in order to ascertain their perception of QC implementation.

METHOD

A total of thirty eight (38) radiology personnel from twenty radiology facilities took part in the study that was conducted using a twenty item questionnaire that was initially tested for reliability.

RESULT

Responses from the surveyed personnel showed a positive perception for some QC items and a seeming lack of interest in some other items. This situation may be due to the perceived lack of interest and lack of cooperation from management of their facilities. The personnel also felt that they did not have sufficient training to implement QC and that QC results were difficult to analyse.

KEYWORDS: perception, quality control, personnel, management, diagnostic radiology

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INTRODUCTION

The interaction of x-rays with body tissues produces images of the inner anatomy from the differential attenuation of the beam as it passes through the body. This principle is used in x-ray examination of patients during medical diagnosis to obtain information regarding the internal structures of patients. Interaction of x-rays with body tissues, though useful, could create harmful health effects when its application is not properly regulated^{1,2}. In order to protect the patients, workers and public against the potential hazards of ionising radiation, it is required that the application of ionizing radiation should be justified, optimised and the procedures standardized to ensure that no one is unduly exposed to ionizing radiation doses higher than the set limits³⁻⁵.

Diagnostic application of x-ray forms the largest man made contribution to human exposures to external

ionising radiation. It has been observed that 80% of the radiation dose to the population comes from this source⁶. Justification is said to be valid only when the requested diagnostic procedure has clinical indication and results in a net benefit to the patient. IAEA⁷ maintains that every clinically justified diagnostic examination must be optimized in order to obtain the required diagnostic information at a patient dose that is as low as reasonably achievable. The responsibility of the radiation worker naturally includes making all effort to achieve this. Therefore, proper attitude of the personnel involved in the application of ionising radiation is quite important in the safe delivery of diagnostic x-rays.

Quality control (QC) is a major component of optimization in diagnostic radiology procedures and requires commitment and diligence to ensure that faults are detected before the system deteriorates irretrievably. Adequate and appropriate QC has been observed to enhance image quality and deliver lower radiation doses for patients⁸. Implementation of QC is known to reduce the financial burden on patients and

Corresponding Author: Inyang S O
Department of Physics, University of Calabar, Calabar, Nigeria

E-mail: inyangso@yahoo.com

the facility operators in terms of repeated exposures⁹ and is a basic requirement by regulatory authority for the licensing of diagnostic radiology facilities in Nigeria^{1,2}.

Previous studies on the levels of quality control (QC) in medical radiology indicate very low level of implementation^{10,11}. However, these studies did not examine the perception by personnel of the implementation of QC in the facilities considered. It is therefore necessary to evaluate the perception by personnel of QC as this may have serious implications on their attitude toward QC and subsequently the levels of its implementation. This study was set up to evaluate the perception by personnel of diagnostic radiology QC by use of a 20 item questionnaire in order to complement the work by Inyang et al¹⁰.

MATERIALS AND METHOD

The diagnostic radiology facilities in Akwa Ibom State, Nigeria considered for this study were tertiary, secondary and private. Tertiary facilities (TF) were facilities in teaching hospitals, Specialist hospitals and Federal Medical centres; secondary facilities (SF) were facilities in General hospitals while private facilities (PF) were stand alone diagnostic x-ray facilities owned by individuals or nongovernmental organisations. The questionnaire was tested for reliability by first administering it on five experienced professionals in the tertiary facility where more experienced and greater number of professionals was found. The suggestions of these professionals were considered and incorporated in the final questionnaire used for this study.

Twenty facilities existing within the State, which the researchers were able to identify, were visited. Only functional facilities (1 TF, 5 SF and 14 PF) as at the time of this study were considered for the study. Personnel in these facilities were administered with the questionnaire after they were properly informed of the basis of the study. The questionnaire consisted of 20 questions designed to investigate the perception by personnel of QC implementation. The personnel

considered for the study included radiologists, radiographers and x-ray technicians.

Personnel and facilities that took part in the study were assured that it was not a regulatory inspection for licensing and that no facility would be penalised on the basis of the study. Despite the assurance, some personnel, especially in standalone facilities, declined to take part in the study. This development accounts for the low number of respondents. The other reason is the paucity of personnel in radiology. The respondents were required to strongly agree (SA), agree (AG), strongly disagree (SD) disagree (DA) or indicate indecision (undecided (UD)) on some fundamental indicators in QC implementation which the researchers believed could affect the perception by personnel of QC.

RESULTS

A total of 38 respondents, consisting of 4 radiologist, 24 radiographers, and 10 x-ray technicians took part in the investigation. No medical physicist was involved since the only medical physicist that works for one of the facilities was a member of the research team. The number of respondents recorded in this study was not as high as it should be due to the dearth of professionals in diagnostic radiology in the Country. The rating of the perception by personnel of the implementation of QC in diagnostic radiology is presented in Table 1.

The number of respondents did not reflect the actual number of personnel in medical radiology facilities in Akwa Ibom State, because, personnel in non functional facilities were not included and some personnel in private facilities declined participation. However, this did not affect the result of the investigation, because the number of personnel who participated in the study is a fair representation of the diagnostic radiology workforce in the study area.

Table 1: Perception of personnel toward QC in diagnostic radiology [strongly agree (SA), agree (AG), disagree (DA), strongly disagree (SD) and undecided (UD)].

ITEM	SA	AG	DA	SD	UD	
Total						
QC provides information for machines integrity	12	17	5	3	1	38
Patients management is more important than QC	5	13	2	5	13	38
QC should be performed by radiologists only	4	4	12	5	13	38
QC should be performed by radiographers only	15	9	3	1	10	38
QC should be performed by medical physicists only	0	1	5	18	14	38
Administrative positions are more rewarding than QC	0	8	14	14	2	38
QC is beneficial to the facility	20	10	0	0	8	38
There is sufficient time for QC	5	10	10	5	8	38
There is adequate equipment for QC	0	0	15	15	8	38
There are adequate personnel for QC	0	6	12	12	8	38
Colleagues do not cooperate in QC	0	0	15	14	9	38
Management of facility does not cooperate in QC implementation	10	12	6	2	8	38
There is sufficient power supply for QC	0	7	23	0	8	38
Sufficient funds are provided for QC	5	0	24	6	3	38
It is important to document QC results	16	12	0	0	10	38
QC results are difficult to interpret	4	23	5	1	5	38
There is sufficient staff retraining on QC	0	5	17	16	0	38
There is adequate manual for QC	3	4	18	13	0	38
There is sufficient computer and software for QC data analysis	1	3	16	15	3	38
QC is cost saving for the facility	12	18	1	2	5	38

DISCUSSION

The definition of QC in radiology includes the fact that QC provides information on the integrity of the equipment. About 76% of the respondents agreed at different levels that QC provides information on the integrity of the machines. This response indicates a positive perception of the implementation of QC in the different facilities considered. Despite this level of agreement on the importance of QC in establishing the integrity of the equipment, about 34% of respondents were undecided on whether the care for patients was more important than QC. This may indicate that they could take either QC program or care for patient depending on which was presented to them. Another 34% of the respondents agreed that the care for patients was more important to them, indicating that they could set aside QC program to take care of patients, not minding the attendant risk.

The perception by respondents of QC implementation was more supportive than their perception of administrative positions in their facilities. About 63%

of the respondents disagreed that administrative positions were more rewarding than QC. In comparison to the 47% of respondents that agreed to manage patients rather than undertake QC program, it is obvious to conclude that respondents were more interested in patients' management than administrative positions.

Figure 1 shows that 15 respondents strongly agreed that radiographers should be in charge of QC in diagnostic radiology with no respondent strongly agreeing to the fact that medical physicists should be in charge of QC. A total of 22 respondents, forming about 58% of the total number of respondents, felt that QC should be directed by the radiographers. This is contrary to the principle stated in AAPM⁸ which maintains that the responsibility of establishing QC program has moved away from the domain of the radiographer into that of the medical physicist following the fundamental development that has taken place in diagnostic radiology as a result of the introduction of more complex equipment for use in

diagnostic and interventional radiology. The perception that radiographers should direct QC program is not surprising as most of the respondents were radiographers, and radiographers are long known as the major players in diagnostic radiology in Nigeria.

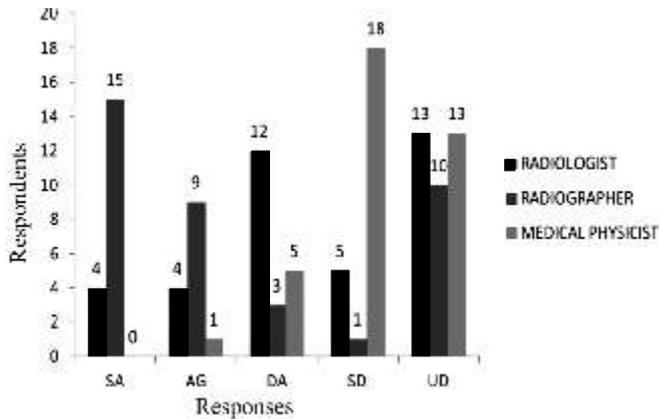


Figure 1: Rating of leadership in diagnostic radiology QC program

The respondents (76%) agreed that they cooperate among themselves to conduct QC, though 58% of the respondents felt that the management of their facilities did not cooperate with them in the implementation of QC. The level of cooperation amongst personnel in the conduct of QC observed in this study is an indication of teamwork attitude which is desirable in the delivery of high quality patient care¹². The perceived lack of cooperation by facilities' management toward the implementation of QC could be due to the low level of awareness concerning the regulatory requirements for the establishment and operation of diagnostic radiology facilities in the nation. As observed previously by Inyang et al¹⁰, notwithstanding the emphasis on the implementation of QC in diagnostic radiology recently introduced in Nigeria following the establishment of the Nigerian Nuclear Regulatory Authority to regulate the use of radioactive and ionizing radiation sources, operators of diagnostic radiology facilities are yet to adjust fully to this requirement.

About 42% (16) of the respondents disagreed that there were adequate number of computers for use in the performance of QC while about 40% of the respondents strongly disagreed there were sufficient computers for QC services. Generally, not less than 80% of the respondents felt that the computers available for QC were insufficient, about 11% of the respondents felt that there were sufficient computers for QC services while the rest were undecided. The feeling of the respondents concerning the availability of QC equipment in the facilities was similar to those observed for computers, except that no respondent agreed that there was any equipment for QC program (Fig. 2).

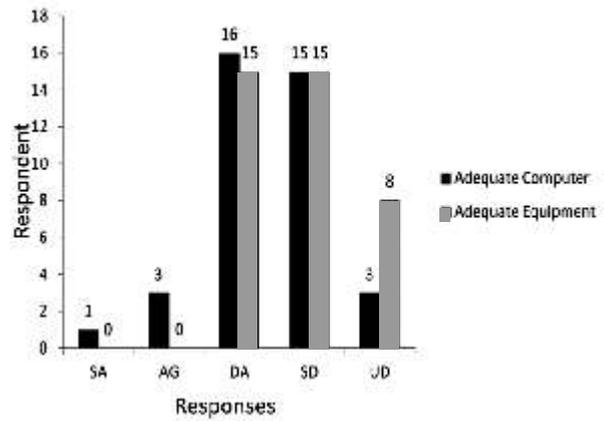


Fig 2: Adequacy of equipment and computers for QC

No respondent strongly agreed that there were adequate personnel, power supply and staff training for QC; a situation that can warrant negative attitude towards QC implementation. This is corroborated by the fact that about 32%, 61% and 45% of respondents respectively, disagreed that there were adequate personnel, power supply and staff training for implementation of QC program (Fig 3). Staff training was another major issue with about 89% of respondents indicating different levels of disagreement that they had adequate staff training and retraining. Staff training and retraining enhances the competence of the staff to carry out their job. The personnel in this case will not feel confident in themselves to implement QC program.

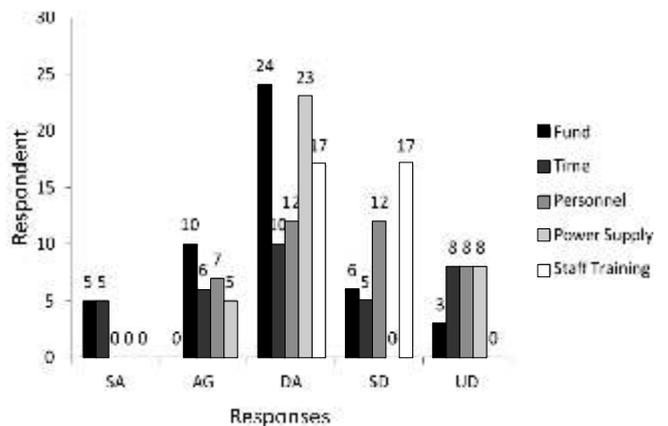


Fig 3: Adequacy of funds, time, personnel, power supply and staff training

About 79% of respondent agreed at different levels that QC is beneficial and cost saving to the facilities (Fig 4). In essence, the personnel were confident that implementation of QC could save costs for the facilities thereby making more funds available in the facilities for other requirements. The perception by personnel that implementation of QC would be beneficial to the facility may be an indication of their knowledge in enhancing radiation protection through the

implementation of QC. The benefits to facilities is also supported by Muhogora et al¹³ who maintain that a good image quality could be obtained by x-ray facility after the implementation of QC tests.

In Fig 4, 5% of respondents that disagreed while 3% strongly disagreed that QC is cost saving. This is not in line with the basic principles of QC which maintains that implementation of QC is cost saving to the facility since issues like repeated exposures could be minimized through early detection of defects in the imaging process.

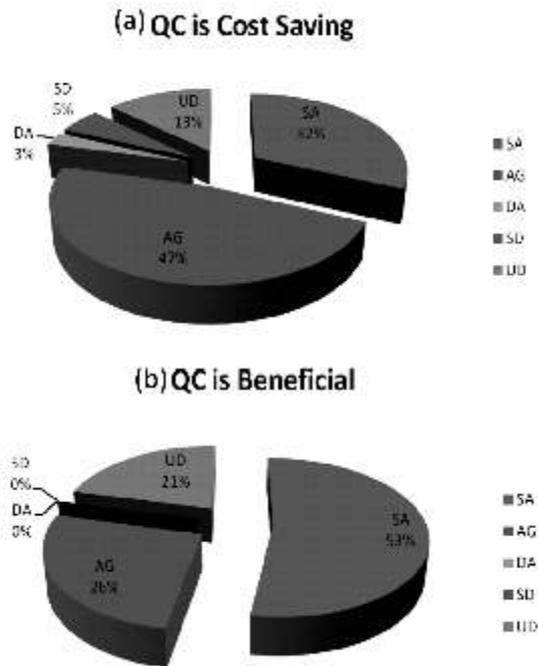


Figure 4: Impact of QC on the facility

At least 18 respondents disagreed that there were adequate QC manuals for use in QC implementation while 13 respondents strongly disagreed to this (Fig 5). A combination of these different levels of disagreement indicates that about 82% of respondents felt that QC manuals which are basic necessity for the implementation of QC were not available and may tend to adopt a negative attitude towards the implementation of QC.

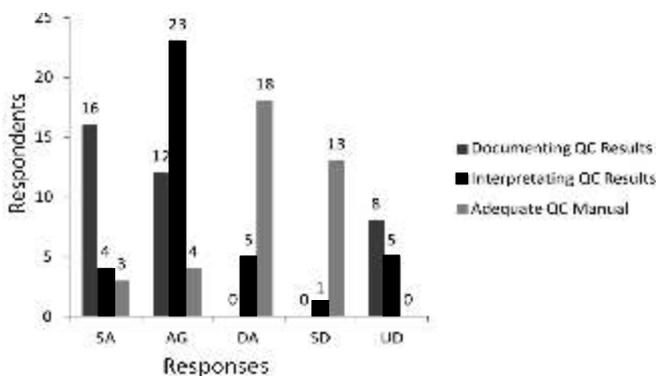


Figure 5: Assessment of QC records, results and manual

Some 27 (71%) respondents agreed at different levels that the results of QC are difficult to interpret (Fig 5) indicating a possible lack of self confidence resulting from inadequate staff training as mention previously. More than half of the respondents (74%) agreed at different levels that it was necessary to document QC results. Documented QC results could be used by the facility as a reference in easily monitoring possible changes that may occur in the imaging process. This is corroborated by CRCPD¹⁴ who maintain that QC could allow for the monitoring of the basic components of the imaging process at low cost.

Table 1 shows that no respondent felt undecided (UD) on issues concerning staff training and adequacy of QC manual which is an indication that all the respondents had some knowledge on these two issues. Most of the items investigated in Table 1 had undecided responses mostly from 8 to 14 respondents, which may be caused by lack of adequate training, low level of cooperation by management and perceived difficulties in the analysis of results.

CONCLUSION

This study shows that the personnel in diagnostic radiology facilities in Akwa Ibom State, Nigeria that participated have a fair knowledge of quality control in diagnostic imaging and their perception of QC implementation may be adjudged positive toward certain aspects of QC. However, personnel retraining may be required to improve their knowledge of QC in order to enhance their confidence in the implementation of QC. Enhanced self confidence could lead to the development of positive attitude towards the implementation of QC in their facilities. There is need for management of radiology facilities in Akwa Ibom State to cooperate with the personnel on the implementation of QC and provide adequate funds for same in order to positively impact on the attitude of personnel towards QC implementation.

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