



## RADIOGRAPHERS PROFESSIONAL COMPETENCE: PERCEPTION OF RADIOGRAPHERS AND RADIOLOGISTS IN NORTHERN NIGERIA

Hassan Maidugu Musa<sup>1</sup>, \* Suleiman Lawal<sup>2</sup>, Aliyu Galadima<sup>2</sup>, Olarinoye-Akorede Sefiya<sup>2</sup>,  
Abdulrahman Umar<sup>3</sup>

<sup>1</sup>Esteem Diagnostic Medical Services Ltd. Yaba-Lagos State. Nigeria.

<sup>2</sup>Radiology Department, Ahmadu Bello University Teaching Hospital, Zaria-Kaduna State Nigeria.

<sup>3</sup>Department of Medical Radiography, Ahmadu Bello University, Zaria-Kaduna State Nigeria.

**\*Correspondence:**

2, Act of Apostle Road, by Better-Life Market Makoko, Lagos.

**E-mail:** Twas505@gmail.com

---

### ARTICLE INFO

**Keywords:**

Radiographers,  
Radiologists,  
Radiography,  
Professional  
competence.

---

### ABSTRACT

**Background:** Professional competence is the global trend aimed at improving the standard of practice as well as professionalism among health practitioners. Very few studies assessing Radiographers' professional competence are available globally, and non in Nigeria to the best of the researchers' knowledge, hence the need that prompt this study.

**Objective:** to evaluate the level and frequency of use of professional competence among Radiographers from the perspective of Radiographers and Radiologists, and also to determine the association between years of working experience and professional competence in northern Nigeria.

**Methods:** This is a descriptive cross-sectional survey. Two distinct survey questions were used, one for Radiographers assessing self-level of professional competence and the frequency of use of the competence items, and the other for Radiologists' assessment of the Radiographer's level of professional competence from their perspective. The level of professional competence scale was rated by both groups of respondents through a 10 point scale (1–10) while the frequency of use of the competence items was assessed on a 4 point Likert scale by the Radiographers only.

**Results:** 154 valid responses were recorded comprising 108 Radiographers and 46 Radiologists. Response from Radiographers depicts that radiographers have above average to a high level of competence on all competence items. Likewise, the response from Radiologists showed that radiographers have an average to a high level of professional competence in almost all the competence items. Furthermore, competence items that received the least mean score from both respondents on the level of professional competence scale were the ones that Radiographers have shown to have used less frequently (**sometimes**) on the frequency of use scale.

**Conclusion:** Radiographers in this domain have an average to a high level of professional competence and frequency of use of professional competence items except for the few items that need to be improved.

## Introduction

Medical Radiography is an art and science that involves the use of radiant energies, which could either be ionizing e.g. x-rays and gamma rays, or non-ionizing e.g. ultrasound and radiofrequency/magnetic field for the production of images of internal structures and treatment (radiotherapy). A radiographer is a professional with these training and skills (1-3), the minimum qualification of a Radiographer in this study environment is a Bachelor's degree, though like any profession second and third degrees can also be acquired.

The art and science practice of radiography became known over a century ago, yet much discussion still arises concerning the role of a Radiographer and the limit of his/her competence, independence, and responsibilities when carrying out medical imaging procedures(4).

Radiographers share the radiation medicine space with other professionals like Radiologists, X-ray technicians, Medical physicists among others. By precedence, in Nigeria Radiographers organize their workplace (diagnostic and therapeutic suites), generate images, and ensure the quality, ensure patients and the general public safety during the radiological procedures while Radiologists interpret these images(8).

In recent years, radiography practice has witnessed tremendous rapid development in both diagnostic and therapeutic modalities. The continuous emergence of new imaging and treatment techniques, the increasing volume and complexity of the services have caused changes and expansion in the fields and the character of Radiographers' professional activity. This results in a tremendous need for increasing amounts of professional knowledge and competence among Radiographers that are not only technical but also related to patient care (nursing care) in their daily work(11,12). The Radiographer has a role to play in patients' safety, physical, psychological as well as social well-being during and post imaging and therapeutic procedures, hence their competence directly influences the quality and outcome of these procedures as well as patient safety, therefore the need for the evaluation of Radiographers competence cannot be overemphasized, especially in this environs(12,13).

Competency is an essential and challenging concept in health care practice that is continually discussed by professionals(14-17). There is a lack

of consensus about the definition of competency, as well as how to measure it in clinical practice(13). In nursing, competence is seen as a challenging concept that is continually being debated and discussed (16,18). The term used to describe competence may vary and in particular, the simultaneous use of the terms competence and performance gives rise to confusion (13,19,20). While the previous is concerned with perceived skills and/or being able to or having the ability to do something, the latter deals with an actual situated behavior that is measurable (21). Evaluation of professional competency of Radiographers will be seen as an important attempt at improving the quality of work of Radiographers and hence the departments as a whole, as well as encouraging skill development and professionalism. Furthermore, it is an essential requirement for assuring the professional standardization and progression of radiography practice (22-25).

This study aims to evaluate the level and frequency of use of professional competence among Radiographers from the perspective of Radiographers and Radiologists, and also to determine the association between years of working experience and professional competence in northern Nigeria.

## Methods

This is a descriptive cross-sectional survey assessing the professional competence of Radiographers in northern Nigeria. Two distinct online survey questions were prepared for data collection; one for Radiographers assessing self-level of professional competence and the frequency of the practical application of the competence, and the other for Radiologists to assess the Radiographer's level of competence from their point of view. The radiographers' questions were made up of 24 items and comprises of two sections; nursing care competencies (11 items) and technical radiographic competence (13 items). The Radiologists' questions were made up of 19 items and comprise two sections; nursing care scale (8 items) and technical radiographic competence (11 items). The questions were designed to suit the practice of radiography in Nigeria based on the information obtained from "the Radiographers Competence Scale (RCS)" (26). After the modification of the questions to suit the practice of radiography in Nigeria the reliability of the questions was evaluated by calculating the Cronbach Alpha which indicates .93 internal consistency of the scale. The level of competence

scale was rated through a 10 point scale (1–10) where 1 was the lowest and 10 the highest grade, and frequency of use of the competencies was assessed on a 4 point Likert scale ("always used", "often used", "sometimes used" and "never used") by the Radiographers only.

## Results

A total of 154 valid responses were recorded, comprising of 108 from the Radiographers and 46 from the Radiologists respectively, between November 2020 and January 2021.

The demographic characteristics of the respondents revealed that both Radiographers and Radiologists have predominant male respondents with 72.2% and 80.9% respectively. The majority of Radiographers are within the age range of 20-30 years (57.4%) followed by 31-40 years (38.0%), whereas the majority of Radiologists are within the age range of 31-40 years (51.1%) and followed by 41-50 years (21.3%). The majority of Radiographers (43.5%) and Radiologists (34.0%) are shown to have years of working experience within the age range of 2-5 years. The majority of the response was recorded among Radiographers working in the north-eastern part of the country having (51.1%), while on the other hand majority of the response was recorded among Radiologists working in the north-western part of the country having (66.0%)

Table 1.

Nursing care scale revealed the highest-rated competence by Radiographers as "protecting the patient integrity" mean value 7.86 ( $SD = 2.3$ ), followed by "protecting the patient from physical injury" mean value 7.85 ( $SD = 2.4$ ), and the least rated competence was "organizing and planning working suites, taking into account of the clinical situation" mean value 6.00 ( $SD = 2.3$ ) then "adequately informing the patient/patient relatives about the imaging and or treatment before the procedure" mean value 6.19 ( $SD = 2.6$ ) Table 2a.

Similarly, items from the nursing care scale "protecting the patient from physical injury" and "protecting the patient integrity" have revived the highest mean score from Radiologists of 5.34 and 5.05 ( $SD = 2.4$  and 2.5) respectively. The least rated competence was "observing and monitoring the patient" mean value 4.13 ( $SD = 2.2$ ) then followed by "organizing and planning working suites, taking account of the clinical situation" mean value 4.32 ( $SD = 2.1$ ) Table 2b.

The radiographic technical competence showed the highest-rated competence item among Radiographers was "minimizing radiation doses to patient and staff during imaging and or treatment procedures that involve ionizing radiation" mean value 7.88 ( $SD = 2.6$ ) followed by "producing accurate and correct images" mean value 7.73 ( $SD = 2.5$ ), and the least rated competence was "initiating new development projects through research and implementation" and "carrying out safety checks of medico-technical equipment" mean value 6.05 and 6.23 ( $SD = 2.5$  and 2.6) respectively Table 3a.

On radiographic technical competence, the highest-rated competence among Radiologists' response was "performing the examination according to the referral (request)" mean value 6.11 ( $SD = 2.2$ ) followed by "applying ethical guidelines during imaging and or treatment procedure" mean value of 5.89 ( $SD = 2.4$ ). The least rated competence was "initiating new development projects through research and implementation" and "participating in the development of new examination methods (departmental protocol) to suit the working environment" 3.64 and 3.79 ( $SD = 2.2$  and 2.4) respectively Table 3b.

The majority of Radiographers (71.3%) have demonstrated to have *always* used the "protecting the patient from physical injury" competence item. Then "minimizing radiation doses to patient and staff during imaging and or treatment procedures that involve ionizing radiation" having (69.4%), "protecting the patient integrity" having (68.5%) and "producing accurate and correct images" having (59.3%). Among the professional competence items that radiographers *often* use were "performing the examination according to the referral (request)" having (46.3%). Then "preliminary assessment of images" having (43.5%), and "requesting information from the patient" having (38.0%). The competence items "Organizing and planning working suites, taking account of the clinical situation", "Guiding and educating the patient/patient relatives during the imaging and or treatment procedure" and "Initiating new development projects through research and implementation" were the items with the highest frequency that Radiographers reported to have used *sometimes* having (43.5%, 41.7% and 41.7%) respectively Table 4.

## TABLES

**Table 1.** Demographic information of the respondents

		Radiographers n (%)	Radiologists n (%)
Total number of respondents		108 (100)	47 (100)
Gender	Male	78 (72.2)	38 (80.9)
	Female	30 (27.8)	9 (19.1)
Age (years)	20-30	62 (57.4)	6 (12.8)
	31-40	41 (38.0)	24 (51.1)
	41-50	2 (1.9)	10 (21.3)
	Above 50	3 (2.8)	7 (14.9)
Active years of service (years)	< 2	37 (34.3)	7 (14.9)
	2-5	47 (43.5)	16 (34.0)
	6-10	19 (17.6)	14 (29.8)
	11-15	1 (0.9)	6 (12.8)
	16-20	1 (0.9)	1 (2.1)
	> 20	3 (2.8)	3 (6.4)
Designated region of work	North-Central	35 (32.4)	12 (25.5)
	North-East	55 (51.1)	4 (8.5)
	North-West	18 (16.6)	31 (66.0)

*n* = Frequency

**Table 2a.** Radiographers' level of nursing care professional competence (*Radiographers response*)

Nursing Care Scale	Years of experience						Total
	<2	2-5	6-10	11-15	16-20	>20	
Organizing and planning working suites, taking account of the clinical situation	5.76(2.4)	6.17(2.4)	5.74(1.8)	7.00	8.00	7.00(2.6)	6.00(2.3)
Prioritizing patients based on their clinical condition in the work flow	6.43(2.7)	7.49(2.4)	6.53(2.5)	9.00	10.00	6.00(1.0)	6.95(2.5)
Observing and monitoring the patient	6.03(2.6)	7.17(2.2)	6.37(2.3)	5.00	9.00	6.67(2.1)	6.62 (2.4)
Protecting the patient from physical injury	7.51(2.8)	8.17(2.1)	7.58(2.3)	7.00	10.00	8.33(1.5)	7.85 (2.4)
Protecting the patient integrity	7.51(2.7)	8.34(1.9)	7.26(2.5)	7.00	10.00	8.00(2.6)	7.86 (2.3)

Adequately informing the patient/patient relatives about the imaging and or treatment prior to the procedure	5.57(2.9)	6.91(2.3)	5.74(2.5)	5.00	6.00	6.00(1.7)	6.19 (2.6)
Alleviating the patient anxiety	6.00(2.5)	6.77(2.6)	6.05(2.9)	8.00	4.00	7.00(1.0)	6.37 (2.6)
Guiding and educating the patient/patient relatives during the imaging and or treatment procedure	6.32(2.5)	7.11(1.9)	6.16(3.1)	6.00	9.00	7.00(1.7)	6.68 (2.4)
Empowering the patient by involving him/her in the imaging and or treatment procedure	5.73(2.6)	6.87(2.1)	5.68(2.3)	6.00	8.00	6.67(2.5)	6.27 (2.4)
Requesting information from the patient (interviewing)	6.27(2.9)	7.87(1.9)	5.84(2.6)	7.00	9.00	7.33(.58)	6.95 (2.5)
Taking care and performing the examination/treatment of the seriously injured patient	7.38(2.7)	8.04(2.1)	7.05(2.3)	7.00	8.00	8.33(1.5)	7.64 (2.3)

*M* = mean, *SD* = standard deviation

**Table 2b.** Radiographers' level of nursing care professional competence (*Radiologists response*)

Nursing Care Scale	Years of experience						Total	
	<2		2-5		6-10			
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)		
Organizing and planning working suites, taking account of the clinical situation	4.86(2.6)	4.13(2.3)	4.36(2.2)	4.50(1.9)	3.00	4.00	4.32(2.1)	
Prioritizing patients based on their clinical condition in the work flow	4.71(2.5)	5.13(2.2)	4.57(2.6)	4.67(1.0)	3.00	5.33(1.2)	4.81(2.2)	
Observing and monitoring the patient	3.86(3.2)	4.50(1.8)	4.21(2.4)	3.50(2.1)	3.00	4.00	4.13(2.2)	
Protecting the patient from physical injury	5.00(3.1)	5.38(2.1)	5.36(2.6)	5.50(2.8)	6.00	5.33(1.2)	5.34(2.4)	
Protecting the patient integrity	4.29(2.7)	5.06(2.6)	5.07(3.0)	5.67(1.8)	7.00	4.67(0.6)	5.04(2.5)	
Adequately informing the patient/patient relatives about the imaging and or treatment prior to the procedure	3.86(2.8)	4.19(2.2)	4.86(2.2)	5.17(3.0)	3.00	3.67(1.2)	4.40(2.3)	
Guiding and educating the patient/patient relatives during the imaging and or treatment procedure	4.29(3.2)	4.44(2.3)	5.07(2.8)	5.33(2.5)	4.00	3.67(1.2)	4.66(2.5)	
Empowering the patient by involving him/her in the imaging and or treatment procedure	3.57(2.8)	4.63(2.1)	5.00(3.1)	5.17(3.1)	4.00	3.00(1.7)	4.53(2.5)	

*M* = mean, *SD* = standard deviation

**Table 3a.** Radiographers level of radiographic technical competence (*Radiographers response*)

Radiographic Technical Competence scale	Years of experience						Total
	<2 M (SD)	2-5 M (SD)	6-10 M (SD)	11-15 M (SD)	16-20 M (SD)	>20 M (SD)	
Collaborating with other professional colleagues in the radiation medicine space	6.03(2.9)	7.30(2.2)	5.74(2.7)	5.00	10.00	8.00(1.0)	6.61 (2.6)
Performing the examination according to the referral (request)	7.30(2.8)	7.66(2.4)	6.42(2.9)	10.00	10.00	7.67(.58)	7.36 (2.6)
Adapting the examination to the patient prerequisites and needs	6.78(2.5)	7.19(1.9)	6.63(2.5)	10.00	8.00	8.33(.58)	7.02 (2.2)
Minimizing radiation doses to patient and staff during imaging and or treatment procedures that involves ionizing radiation	7.54(2.7)	8.45(2.2)	6.84(3.1)	10.00	10.00	8.33(1.5)	7.88 (2.6)
Applying ethical guidelines during imaging and or treatment procedures	6.95(2.9)	8.09(2.1)	6.47(2.8)	10.00	10.00	8.67(1.2)	7.46 (2.6)
Producing accurate and correct images	7.27(2.3)	8.28(2.0)	6.89(3.0)	10.00	10.00	8.67(.58)	77.73 (2.5)
Evaluating the quality of images produced in relation to the referral and the question stated therein	6.84(2.3)	8.15(2.0)	6.89(3.1)	9.00	10.00	8.33(1.2)	7.51 (2.5)
Preliminary assessment of images	6.38(3.0)	7.74(2.0)	6.16(2.8)	8.00	10.00	8.00(1.0)	7.02 (2.6)
Participating in the development of new examination methods (departmental protocol) to suit the working environment	5.89(3.0)	7.53(2.3)	5.74(2.7)	9.00	9.00	6.33(1.5)	6.65 (2.8)
Participating in quality improvement regarding patient safety and care	6.65(2.7)	7.55(1.9)	6.26(2.5)	8.00	9.00	6.33(2.5)	7.00 (2.4)
Carrying out safety checks of medico-technical equipment	5.76(2.8)	6.77(2.5)	5.68(2.6)	7.00	8.00	8.00(2.6)	6.28 (2.6)
Identifying new areas in need of improvement	5.84(2.8)	7.21(2.1)	5.89(2.4)	5.00	10.00	6.00(2.0)	6.48 (2.5)
Initiating new development projects through research and implementation	5.05(2.7)	7.02(2.2)	5.58(2.2)	3.00	9.00	6.00(1.7)	6.05 (2.5)

*M = mean, SD = standard deviation*

**Table 3b.** Radiographers level of radiographic technical competence (*Radiologists response*)

Radiographic Technical Competencies	Years of experience						Total
	<2	2-5	6-10	11-15	16-20	>20	
M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Collaborating with other professional colleagues in the radiation medicine space	4.71(3.4)	5.50(2.9)	5.71(2.5)	6.67(2.1)	4.00	3.00(1.7)	5.40(2.7)
Performing the examination according to the referral (request)	5.14(3.2)	5.31(2.0)	6.79(1.8)	7.50(1.9)	7.00	6.33(1.2)	6.11(2.2)
Minimizing radiation doses to patient and staff during imaging and or treatment procedures that involves ionizing radiation	5.14(5.5)	5.12(2.3)	6.50(2.2)	6.67(2.0)	5.00	5.00	5.72(2.4)
Applying ethical guidelines during imaging and or treatment procedures	6.14(3.0)	5.44(2.9)	6.50(2.2)	6.00(1.3)	3.00	5.67(0.6)	5.89(2.4))
Producing accurate and correct images	5.57(2.8)	5.06(1.6)	6.50(1.6)	5.86(1.6)	7.00	7.33(1.2)	5.85(1.9)
Evaluating the quality of images produced in relation to the referral and the question stated therein	4.71(2.6)	5.06(1.7)	5.21(2.1)	6.33(2.0)	5.00	6.00	5.28(1.9)
Preliminary assessment of images	4.00(2.6)	5.31(2.2)	4.86(2.7)	5.33(1.0)	2.00	6.33(1.2)	4.98(2.3)
Participating in the development of new examination methods (departmental protocol) to suit the working environment	3.57(2.4)	3.88(2.8)	4.36(2.6)	2.83(1.6)	3.00	3.33(0.6)	3.79(2.4)
Participating in quality improvement regarding patient safety and care	4.43(2.6)	4.25(2.6)	4.71(2.4)	3.33(2.0)	5.00	4.00	4.30(2.3)
Carrying out safety checks of medico-technical equipment	4.86(2.2)	4.38(2.1)	5.07(2.1)	4.00(1.5)	10.00	4.67(0.3)	4.74(2.1)
Identifying new areas in need of improvement	4.43(2.5)	4.44(2.2)	4.50(2.2)	4.50(2.3)	4.00	3.67(0.6)	4.40(2.1)
Initiating new development projects through research and implementation	3.29(2.8)	3.75(2.1)	4.07(2.6)	3.17(1.9)	3.00	3.00	3.64(2.2)

*M* = mean, *SD* = standard deviation

**Table 4.** Frequency of use of professional competence items by Radiographers

	Always n(%)	Often n(%)	Sometimes n(%)	Never n(%)
Organizing and planning working suites, taking account of the clinical situation	29(26.9)	30(27.8)	47(43.5)	2(1.9)
Prioritizing patients based on their clinical condition in the workflow	54(50)	32(29.6)	21(19.4)	1(0.9)
Observing and monitoring the patient	54(50)	33(30.6)	21(19.4)	
Protecting the patient from physical injury	77(71.3)	23(21.3)	8(7.4)	
Protecting the patient integrity	74(68.5)	27(25.0)	7(6.5)	
Adequately informing the patient/patient relatives about the imaging and or treatment prior to the procedure	32(29.6)	37(34.3)	36(33.3)	3(2.8)
Alleviating the patient anxiety	31(28.7)	32(29.6)	40(37.0)	5(4.6)
Guiding and educating the patient/patient relatives during the imaging and or treatment procedure	33(30.6)	29(26.9)	45(41.7)	1(0.9)
Empowering the patient by involving him/her in the imaging and or treatment procedure	29(26.9)	33(30.6)	37(34.3)	9(8.3)
Requesting information from the patient (interviewing)	35(32.4)	41(38.0)	32(29.6)	
Taking care and performing the examination/treatment of the seriously injured patient	63(58.3)	36(33.3)	8(7.4)	1(0.9)
Collaborating with other professional colleagues in the radiation medicine space	40(37.0)	32(29.6)	32(29.6)	4(3.7)
Performing the examination according to the referral (request)	47(43.5)	50(46.3)	11(10.2)	
Adapting the examination to the patient prerequisites and needs	45(41.7)	36(33.3)	25(23.1)	2(1.9)
Minimizing radiation doses to patient and staff during imaging and or treatment procedures that involves ionizing radiation	75(69.4)	31(28.7)	2(1.9)	
Applying ethical guidelines during imaging and or treatment procedures	60(55.6)	34(31.5)	11(10.2)	3(2.8)
Producing accurate and correct images	64(59.3)	40(37.0)	4(3.7)	
Evaluating the quality of images produced in relation to the referral and the question stated therein	56(51.9)	40(37.0)	12(11.1)	
Preliminary assessment of images	45(41.7)	47(43.5)	13(12.0)	3(2.8)
Participating in the development of new examination methods (departmental protocol) to suit the working environment	30(27.8)	34(31.5)	41(38.0)	3(2.8)
Participating in quality improvement regarding patient safety and care	39(36.1)	39(36.1)	28(25.9)	2(1.9)
Carrying out safety checks of medico -technical equipment	30(27.8)	35(32.4)	38(35.2)	5(4.6)
Identifying new areas in need of improvement	33(30.6)	32(29.6)	41(38.0)	2(1.9)
Initiating new development projects through research and implementation	19(17.6)	33(30.6)	45(41.7)	11(10.2)

*n = Frequency*

## Discussion

Professional competence is a common global trend not only among Radiographers but among all health practitioners. Radiography practice is constantly evolving with the innovation of new technologies that require Radiographers to strike balance between patient care and the handling of equipment. This study assessed the level and frequency of use of various professional competence among Radiographers in the northern part of Nigeria. Radiographers exhibit how competent they are when dealing with patients (nursing care), interact with other colleagues in the field of radiation medicine as well as dealing with sophisticated radiographic and radio-therapeutic equipment. Self-assessment of competence may be subject to bias (27), therefore this study sought to get feedback from Radiologists on Radiographers' self-competence for objective evaluation of responses from Radiographers whilst working together in radiology departments as a team.

Findings from the current study show that Radiologists exhibited an average to a high assessment of the level of Radiographers' professional competence, hitherto their assessment for the greater majority of the competence items were at a lower level compared to the level of assessment exhibited by Radiographers who rated their professional competence from high to very high.

Radiographers' responses on their level of professional competence show a direct relationship with years of working experience, as the years of experience increase the professional competence also increases.

The Radiographers' assessment of their level of professional competence depicts an above-average to a high level of competence on all competence items on the nursing care scale. On the other hand, the response from Radiologists shows an average level of professional competence in almost all the nursing care professional competence items by the radiographers.

Protecting patients' integrity and protecting the patient from physical injury items on the nursing care competence scale has the highest mean score. Similarly, the response of Radiologists on the same item has a high mean score. This is an indication that Radiographers within the domain of this study

are well informed and doing all it takes within their capacity in protecting patient's integrity through respecting norms and culture, believe, the privacy of the patients as well as protecting them from a physical injury that may arise due to error or technical fault from diagnostic or therapeutic procedures.

A similar item that deals with a direct relationship between the Radiographers and the patient on the nursing care competence scale were "adequately informing the patient/patient relatives about the imaging and or treatment procedure", "empowering the patient by involving him/her in the imaging or treatment procedure", "alleviating the patient anxiety", and "observing and monitoring patient". These items also received a high mean score, nevertheless with the least mean score compared with other competence items on the scale from Radiographers' responses respectively. A study conducted by Vanckavičienė *et al.* (28) revealed high evaluation on these competence items. However, from the Radiologists' perspective in this study, these items receive the least mean score of below-average to average. From the pattern of this finding, it can be deduced that despite the high mean score there is a need for Radiographers to review these competence items and improve on them. Another study conducted by Andersson *et al.* (26) reported that cooperating with the patient and or patient relatives/caregivers prior to and during procedures reflects the Radiographers' nursing care skills. Failure to provide patient-centered care has been reported to be the most common complaint made by patients and can be improved through good interaction between health personnel and patients and or relatives/caregivers(26).

Both Radiographers and Radiologists have scored the item organizing and planning working suites taking into account the clinical situation professional competence item with the least mean score. This finding contravenes the findings of Vanckavičienė *et al.* (28), who reported high evaluation of the competence item from both groups of respondents.

Both groups of respondents considered that Radiographers have an average to high competence in almost all the radiographic technical competence items. The few items that received a below-average

score from Radiologists perspective were “initiating new developmental projects through research and implementation”, “participating in the development of new examination method (departmental protocol)”, “participating in quality improvement regarding patient safety and care”, identifying new areas in need of improvement”. Similarly, these items were also the ones with the least mean score from the radiographer's perspective. This finding pinpointed that participation of Radiographers in developmental projects for the betterment of patient safety and care is inadequate. Hence the need for improvement in these aspects of their professional practice.

Findings from this current study have revealed a similar pattern between the level and frequency of use of clinical competence items among Radiographers. It was observed that most of the competence items that received the least mean score from both groups of respondents were the ones that Radiographers sometimes used while carrying out diagnostic or therapeutic procedures. Among these items that Radiographers indicated were “organizing and planning working suites, taking into account the clinical situation”, “carrying out safety checks of medico-technical equipment”, “empowering the patient by involving him/her in the imaging and or treatment procedure”, identifying new areas in need of improvement”, and “initiating new developmental projects through research and implementation”. These findings can be attributed to the fact that most of the suites organization and medico-technical checks are being carried out by nurses in the department or x-ray technicians in a few clinical settings. With Radiographers ratio to Nigerian population of 1:6.7 million (29) Radiographers barely have time to explain and involve patients in the imaging and or treatment procedure due to the high demand for these services.

## Conclusion

This current study has identified Radiographers' professional competence using modified RCS developed by T. Bodil. Both the Radiographers and the Radiologists have rated the Radiographers' professional competence level as very high and average respectively. Similarly, some professional competence items received low-level ratings from

both groups of respondents. Analogous to these competence items that received the low ratings, Radiographers have also affirmed these findings by identifying such items to be less frequently used (sometimes) on the four Likert scales.

## Recommendation

A wider study with a larger sample size involving the southern part of the country is recommended.

## Conflicts of interest

No conflicts of interest.

## Financial support and sponsorship

None at all.

## Acknowledgment

The authors will like to acknowledge Dr. Ibrahim Muhammad Zaria and Hon. Abdulfatai Kolawole Bakre for their support by providing enabling environment throughout this study. Additional acknowledgement goes to Prof. Ibinaeye P. O., Dr. Igashi J. B., Bamanga A., Muhammed Y. M., S. O. Nuhu, Mathew A. G., Birma I. I. and M. K. Kurama, for their enormous contribution and assistance.

## References

1. Radiographers Registration Board of Nigeria (RRBN) [Internet]. 2006 [cited 2021 Apr 2]. Available from: <https://www.rrbn.gov.ng/2.>
2. Health C for D and R. Radiography. FDA [Internet]. 2020 Sep 28 [cited 2021 May 20]. Available from: <https://www.fda.gov/radiation-emitting-products/medical-x-ray-imaging/radiography>
3. World Health Organization. WHO [Internet]. [cited 2021 May 20]. Available from: [https://www.who.int/diagnostic\\_imaging/imaging\\_modalities/dim\\_plain-radiography/en/](https://www.who.int/diagnostic_imaging/imaging_modalities/dim_plain-radiography/en/)
4. Challen V, Pronk-Larive D. Radiology Management, ICU Management, Healthcare IT, Cardiology Management, Executive Management [Internet]. [cited 2021 Apr 1]. Available from: <https://healthmanagement.org/c/imaging/issuearticle/a-european-perspective-on-the-role-of-radiographers-in-imaging-departments>
5. Bologna Working Group. Framework for Qualifications of the European Higher Education Area - ECApedia [Internet]. [cited 2021 Apr 2]. Available from: [http://ecahe.eu/w/index.php/Framework\\_for\\_Qualifications\\_of\\_the\\_European\\_Higher\\_Education\\_Area6](http://ecahe.eu/w/index.php/Framework_for_Qualifications_of_the_European_Higher_Education_Area6). European Parliament Council. EUR-Lex -

32008H0506(01) - EN - EUR-Lex [Internet]. [cited 2021 Apr 2]. Available from: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32008H0506%2801%29>

7. European Federation of Radiographer Society (EFRS). [Internet]. [cited 2021 May 20]. Available from: <https://www.efrs.eu/publications>

8. Adejoh T. An Inquest into the Quests and Conquests of the Radiography Profession in Nigeria. *JARNigeria*. 2019;33:138.

9. Great Britain. Department of Health. National Health Service. Meeting the challenge: a strategy for the allied health professions - Social Care Online [Internet]. [cited 2021 Apr 3]. Available from: <https://www.scie-socialcareonline.org.uk/meeting-the-challenge-a-strategy-for-the-allied-health-professions/r/a11G00000017yN7IAI>

10. Snaith B, Williams S, Taylor K, Tsang Y, Kelly J, Woznitza N. Is a nurse consultant impact toolkit relevant and transferrable to the radiography profession? An evaluation project. *Radiogr Lond Engl* 1995. 2018;24(3):257261.

11. Cowling C. A global overview of the changing roles of radiographers. *Radiogr Lond* 1995. 2008;14:2832.

12. Williams P. L, Berry J. E. What is competence? A new model for diagnostic radiographers: Part 1. *Radiography*. 1999; 5(4):221235.

13. Watson R, Calman L, Norman I, Redfern S, Murrells T. Assessing clinical competence in student nurses. *J Clin Nurs*. 2002;11(4): 554555.

14. Redfern S, Norman I. Quality of nursing care perceived by patients and their nurses: an application of the critical incident technique. Part 2. *J Clin Nurs*. 1999;8(4):414421.

15. Cowan D. T, Norman I, Coopamah V. P. Competence in nursing practice: A controversial concept A focused review of literature. *Nurse Educ Today*. 2005;25(5): 355362.

16. McCready T. Portfolios and the assessment of competence in nursing: a literature review. *Int J Nurs Stud*. 2007;44(1):143151.

17. Lejonqvist G-B, Eriksson K, Meretoja R. Evidence of clinical competence. *Scand J Caring Sci*. 2012;2(2):340348.

18. Redfern S, Norman I, Calman L, Watson R, Murrells T. Assessing competence to practice in nursing: a review of the literature. *Res Pap Educ*. 2002;17(1):5177.

19. Ramritu P, Barnard A. New graduates understanding of competence. *Int Nurs Rev*. 2001;48:4757.

20. While AE. Competence versus performance: which is more important? *J Adv Nurs*. 1994;20(3):52531.

21. Eraut M, Germain J, James J (and others). Evaluation of vocational training of science graduates in the NHS Project EVETSIN; final report. 1999.

22. Meretoja R, Koponen L. A systematic model to compare nurses optimal and actual competencies in the clinical setting. *J Adv Nurs*. 2012;68(2):414422.

23. Fridell K, Aspelin P, Edgren L, Lindskold L, Lundberg N. (PDF) PACS influence the radiographers work | Peter Aspelin - Academia.edu [Internet]. [cited 2021 Apr 2]. Available from: [https://www.academia.edu/13339319/PACS\\_influence\\_the\\_radiographers\\_work](https://www.academia.edu/13339319/PACS_influence_the_radiographers_work)

24. Ott L. K, Hravnak M, Amesur N. B, Clark S. Patients instability, emergency response, and outcomes in the radiology department - PubMed [Internet]. [cited 2021 Apr 2]. Available from: <https://pubmed.ncbi.nlm.nih.gov/22045143/>

25. Eklund K, Klefsgård R, Ivarsson B, Geijer M. Positive experience of a mobile radiography service in nursing homes. *Gerontology*. 2012;58(2):107111.

26. Andersson B. T, Fridlund B, Elgán C, Axelsson AB. Radiographers areas of professional competence related to good nursing care. *Scand J Caring Sci*. 2008;22(3):401409.

27. Davis D. A, Mazmanian P. E, Fordis M, Van Harrison R, Thorpe K. E, Perrier L. Accuracy of physician self-assessment compared with observed measures of competence: a systematic review. *JAMA*. 2006;296(9): 10941102.

28. Vanckavičienė A, Macijauskienė J, Blaževičienė A, Basevičius A, Andersson B. T. Assessment of radiographers competencies from the perspectives of radiographers and radiologists: a cross-sectional survey in Lithuania. *BMC Med Educ*. 2017;17(1):25.

29. Idowu B. M, Okedere T. A. Diagnostic Radiology in Nigeria: A Country Report. *J Glob Radiol*. 2020;6(1):1072.