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AWARENESS OF INTERVENTIONAL RADIOLOGY AMONG MEDICAL STUDENTS IN A NIGERIAN UNIVERSITY

Ehigiamusoe, FO and Ighodaro, EO

Radiology Department, School Of Medicine, University Of Benin

ABSTRACT

Introduction: Interventional radiology (IR) is an emerging specialty which is more established in the western nations but yet to take root in Nigeria. It involves the use of radiological imaging modalities to perform minimally invasive procedures for patients. The specialty can only grow and be sustained when there is continuous supply of manpower which starts by engendering the interest of medical students.

Objective: To assess the level of awareness of IR among medical students following exposure to radiological posting.

Methods: This was a cross sectional prospective questionnaire based study carried out at the University of Benin. Subjects were final year and penultimate final year medical students of the school of medicine of the University of Benin. The questionnaires consisted of 16 questions that assessed the students' awareness of interventional radiology. Data analysis was done using Statistical Package for Social Science, SPSS statistics (Version 23; IBM Corp., Armonk, NY, USA).

Results: Eighty six of the students (90.5%) knew the definition of IR. Sixty five of the students (69.4%) had poor knowledge of IR. Sixty six students (69.5%) knew that IR patients can be admitted into the hospital while 74 students (77.9%) knew that IR doctors can conduct ward rounds in the hospital. Seventy nine (83.2%) of the students knew that IR outpatients' clinic can be conducted. Many (63.2%) knew the pathway of training for interventional Radiologists in Nigeria. Only 24 of the students (25.3%) were interested in IR in the future. The most common reason for not considering a career in IR in the future was lack of interest (46).

Conclusion: There is an abysmally low level of awareness of IR among students in this centre, although this may not be true reflection of the whole country. Hence, a nationwide study may need to be conducted.

Keywords: interventional, radiology, medical, students, knowledge, Nigeria.

Corresponding author:

Festus Oghanina Ehigiamusoe

Radiology Department, School Of Medicine,
University Of Benin.
Email: oghanina.ehigiamusoe@uniben.edu.ng

Introduction

The presence of radiology in Nigeria was first recorded in 1913 with the installation of the first x-ray machine at the Lagos General Hospital by the colonial government, a year before the country was birthed¹. This has metamorphosed over the years to its present state where there are many radiological equipment in the country owed by both public and private institutions with the presence of about 250 to 300 Radiologists resident in the country². Radiology could be diagnostic or interventional. The latter is a more recent specialty which involves the use of imaging modalities to perform minimally invasive procedures for patients.

Interventional radiology is a rapidly developing specialty which was fully recognized for independent residency training by the American Board of medical specialties in 2014³. Since then it has grown remarkably in the western world but yet to take root in our country. There has been an exponential increase in the availability of radiological imaging machines in Nigeria but no commensurate increase in the required manpower to utilize these facilities. Nigeria has less than twenty trained interventional radiologists for a population of over 200 million; an abysmally low ratio. Therefore, there is need to develop manpower in this specialty which starts by way of creating awareness among medical students and then engendering their interest for residency in this specialty. Many studies have been done to assess the level of awareness of interventional radiology among medical students in other climes but such is lacking in our country^{3,4,5,6,7}. This study was aimed at assessing the level of awareness of interventional radiology among medical students who have had clinical exposure to radiology.

Materials and Methods

This was a cross sectional prospective questionnaire based study carried out at the University of Benin between July 1st and 21st, 2019. Subjects were final year and penultimate final year medical students of the school of medicine of the University of Benin. Ethical clearance was obtained from the ethical committee of the institution before commencement of the study. Self-administered questionnaires were distributed to all students in 5-level and 6-level in the medical school. There were eighty two (82) students in 6-level and eighty six (86) in 5-level class as at the time of this study making a total of one hundred and sixty eight (168) students. This questionnaire was a modified form of one used in a previous study⁸. Rotation in radiology is done for three weeks in the first semester of 5-level wherein students rotate through the various available modalities and also receive didactic lectures in all aspects of diagnostic radiology and interventional radiology.

About 168 questionnaires were distributed to the students using a simple random sampling method after written informed consent was obtained from them. Only 95 questionnaires could be retrieved giving a response rate of 56%. The questionnaires consisted of 16 questions that attempt to assess the students' awareness of interventional radiology. Questions asked included: what is interventional radiology?, level of knowledge on IR (this was based on personal perception), exposure to IR, knowledge of IR procedures, hospital duties of interventional Radiologist, training pathway of IR in Nigeria and desire for future career in IR in Nigeria.

Data collated were analyzed using Statistical Package for Social Science, SPSS statistics (Version 23; IBM Corp., Armonk, NY, USA). Only descriptive statistical tests were done for the data in this study.

RESULTS

A total of 168 self-administered questionnaires were given out to final year and penultimate final year students of the School of medicine of the University of Benin but only 95 could be retrieved from the respondents given a response rate of 56.9%. Females were more in this study with a male to female ratio of 1:1.4. The mean age of the study population was 24.9 ± 2.7 year ranging from 20 years to 34 years. Students below 25 years of age were 53 (55.8%) and those above 25 years of age were 42 (44.2%) (Table 1)

Table 1: Demographics of study population

		Frequency (percentage)
Gender	Male	40 (42.1)
	Female	55 (57.9)
Age		
	<25 years	53 (55.8)
	>25 years	42 (44.2)
Had IR lectures	Yes	69 (72)
	No	28 (28)
Number of IR lecture had		
	3 lectures	4 (5.8)
	2 lectures	12 (17.4)
	1 lecture	53 (76.8)

All students had some weeks' rotation in Radiology. Only 69 students (72%) had lectures on interventional radiology (IR) while 26 (28%) missed lectures on interventional radiology. Among those that had IR lectures only four had three lectures, twelve had two lectures and fifty three (76.8%) of them had only one lecture. However, 86 of the students (90.5%) knew what interventional radiology is while 6 (6.3%) thought IR was image guided laparotomies and LAZER guided treatment. Three (3.2%) did not respond to this question (Tables 1 and 2).

More than half of the students (52.6%) first heard about IR from the lecture given during their radiology posting, 21% heard about IR during their clinical posting in other departments, 10.5% heard about IR from the internet, 9.5% heard about IR from general reading while one person heard from a friend. Five (5.3%) never heard about IR previously (Table 2).

Table 2: Source of information and definition of IR

Source of information on IR	Frequency (percentage)
General reading	9 (9.5)
Internet	10 (10.5)
Lecture	50 (52.6)
Clinical posting	20 (21.0)
Friends	1 (1.1)
Never heard	5 (5.3)
What is interventional radiology?	
Image guided minimally invasive procedure	86 (90.5)
Image guided laparotomy	6 (6.3)
No response	3 (3.2)

Regarding level of knowledge about IR (based on each student's personal assessment), sixty five of the students (69.4%) had poor knowledge of IR, 12 (12.6%) had adequate knowledge of IR, 9 (9.5%) had good knowledge of IR while 2 (2.1%) adjudged themselves to have excellent knowledge about IR. Seven (7.4%) claimed to have no knowledge about IR (Table 3).

Sixty seven (70.5%) and sixty six (69.5%) of them respectively knew that tumour embolization and peripheral angioplasty are done by IR doctors while about seventy six (80.0%) opined that percutaneous coronary angioplasty are done by IR. Less than half of the students (twenty nine, 30.5%) knew that insertion of drainage catheters are done by IR practitioners (Table 3).

Sixty six students (69.5%) knew that IR patients can be admitted into the hospital while 74 students (77.9%) agreed that IR doctors can conduct ward rounds in the hospital. Seventy nine (83.2%) of the students also agreed that IR outpatients' clinic can be conducted. Many (63.2%) knew the pathway of training for the few interventional Radiologists in Nigeria presently that they have to be trained as diagnostic radiologists before subspecializing in IR. About 15 (15.8%) thought that IR training entails doing junior residency in diagnostic radiology and then senior residency in interventional radiology. Nine of them (9.5%) thought one has to do surgical residency before subspecializing in IR. Only 24 of the students (25.3%) were interested in IR in the future and the remaining 71 (74.7%) showed no interest in IR in the future. The most common reason for not considering a career in IR in the future was lack of interest (46), followed by 'no training in IR in Nigeria' (14) while 8 gave exposure to radiation as their reason. Only one gave 'stress' as the reason for not considering IR in the future. Two did not respond to this question (Table 4).

DISCUSSION

Interventional radiology (IR) is an established specialty in most western nations but still in its evolving state in most developing nations like ours. The IR specialists in our country are often diagnostic Radiologists who went for further training in IR in western nations. Invariably, there is no established specialty training for IR in Nigeria presently. Awareness of IR among medical students is pertinent to growing their interest in this specialty in later life as some authors have reported that exposure to a specialty in medical school engenders students interest to postgraduate training in such specialty in the future⁹.

Sixty-nine percent of students reported poor knowledge of IR in this study, much higher than previous studies done in other climes^{4,8,10}. This low level of perceived knowledge about IR in our study may be due to its poor capacity in our country with attendant poor exposure to it by the students. Moreover, students rotate through radiology for 3 weeks and only receive three lectures in IR in the index institution. However, 76.8% of the students in this index study had only one lecture in IR which is down too low to spark any interest among the students in IR. Furthermore, only few non-vascular interventions are done by two trained diagnostic Radiologists who had further training in IR in this institution. Hence; the poor knowledge of IR among medical students so reported in this study.

Table 3: knowledge and level of knowledge of IR procedures among medical students

Procedures	Correct responses Frequency (%)	Incorrect responses Frequency (%)
Doppler ultrasound	85 (89.5)	10 (10.5)
Reporting vascular images	57 (60.0)	38 (40.0)
Insertion of drainage catheters	29 (30.5)	66 (69.5)
Insertion of central lines	50 (52.6)	45 (47.4)
Peripheral angioplasty and stenting	66 (69.5)	29 (30.5)
Tumour embolization	67 (70.5)	28 (29.5)
Coronary angioplasty and stenting	76 (80.0)	19 (20)
Level of knowledge of IR	Frequency	Percentage
Excellent	2	2.1
Good	9	9.5
Adequate	12	12.6
Poor	65	68.4
No knowledge	7	7.4

In our study most of the students (52.6%) first heard about IR during the lecture in their radiology posting. It's amazing that not until fifth year in the medical school more than half of our respondents did not hear about IR. Early introduction of lectures in IR in medical school may help create the awareness of this specialty before the students get to the clinical classes. DePietro *et al.* compared medical student knowledge of IR before and after the integration of an IR lecture series in a gross anatomy course and reported an increase in the number of students that would consider

Table 4: clinical admission, ward rounds, out patients clinic, IR training

Clinical process	Correct responses Frequency (%)	Incorrect responses Frequency (%)
Admission		
IR can admit patients	66 (69.5)	29 (30.5)
IR cannot admit patients	27 (28.4)	68 (71.6)
No response	2 (2.1)	
Ward rounds		
IR can do ward rounds	74 (77.9)	21 (22.1)
IR cannot do ward rounds	19 (20.0)	76 (80.0)
No response	2 (2.1)	
Out patients clinic		
IR have outpatient clinic	79 (83.2)	16 (16.8)
IR have no outpatient clinic	15 (15.8)	80 (84.2)
No response	1 (1.1)	
IR training pathway		
Diagnostic radiology before interventional radiology	60 (63.2)	35 (36.8)
Junior residency in diagnostic radiology before interventional radiology	15 (15.8)	80 (84.2)
Surgical residency before interventional radiology	9 (9.5)	86 (90.5)
Internal medicine before interventional radiology	2 (2.1)	93 (97.9)
No response	9 (9.5)	
Future training in IR		
Interested in IR in the future	71 (74.7)	
Not interested in IR in the future	24 (25.3)	
Reasons for no interest in IR		
Not interested in IR	46	
Exposure to radiation	8	
No IR training in Nigeria	14	
Too stressful	1	
No reason	2	

career in IR from 24% to 64% before and after the lecture series¹¹. This underscores the place of lecture series in IR in promoting students interest. A Pakistani study showed that lectures was the most preferred method of learning of IR compared with other methods such as tutorial, ward rounds, radiology elective, etc⁶. Some authors have advocated restructuring in the medical curriculum to accommodate new specialty like IR. Shah opined that teaching time should be taken from the core clinical specialties to accommodate lectures in new specialties to create robust exposure and awareness among the students¹². The usefulness of introducing a core IR curriculum in medical school was further corroborated by Shaikh *et al* who assessed 309 medical students in a questionnaire based study¹³. He observed an increase from 60% to 73% in the number of students who said they would consider a career in IR after a 10-hour teaching curriculum. The results of this study suggest that incorporation of an effective IR curriculum not only raises awareness of, but can also increase enthusiasm for pursuing the specialty as a future career¹⁴. Some universities in the western world have been very practical in their approach. The Emory University in America introduces clinical case presentation of uterine fibroid embolization at the first-year clinical level; the students shadow IR physicians in the second pre-clinical year and have some hands-on sections in their third clinical year¹⁵.

Other methods of creating awareness of IR among medical students have been advocated and being practiced in the western world. Such methods include creating IR clubs in medical schools, organizing symposiums for students and having students attend IR conferences organized by IR societies.

Diagnostic radiology is seen as a support department to other clinical departments as it does not run outpatient clinics, do ward rounds or admit patients into the wards hence, patients contact is minimal. However, this same script cannot apply to interventional radiology where patients contact is maximal, like other clinical departments. A large percentage of students in this study knew that interventional radiologists can run clinics, admit patients into the ward and do ward rounds. Alshumrani in Saudi Arabia made a contrary observation in a similar study among medical students⁴. He opined that 62% of respondents thought interventional radiologists have no outpatients' clinic and 64% thought interventional radiologist have no ward rounds. Rehman *et al* in a Pakistani study also made a contrary observation; 51% of students thought that interventional radiologist have outpatients' clinic, 34.7% thought interventional radiologist do ward round while 37% thought that interventional radiologist admit patients⁶. The difference in this observation between our study and these studies may be due to difference in climates as the two countries are in the Middle East. Having the knowledge that interventional radiologists have a good deal of patients' contact during clinics, ward rounds and admission may positively engender the medical students' interest in choosing a career in interventional radiology in the future.

Being able to identify the procedures done by interventional radiologists can be an objective way of assessing the level of awareness of interventional radiology among medical students. More than half of the students knew that tumour embolization and peripheral angioplasty are interventional radiological procedures. This high score portends good will for interventional radiology as it may increase the propensity among the students to consider this specialty in the future even though these procedures are not done in the index institution right now. A higher percentage of students knew that peripheral angioplasty is an IR procedure in a study done in Saudi Arabia⁴. Quite a number of students in our study thought that coronary angioplasties are done by interventional radiologists; this is similar to the Saudi study. This observation may not be unconnected

with the fact that this procedure is not done in our institution. Majority of our respondents showed no interest in interventional radiology in the future and the most reason for this was lack of interest in the specialty. Other reasons given were lack of training in interventional radiology in Nigeria, exposure to radiation and training stress. The most reason for not considering career in IR in the Saudi study was lack of knowledge⁴. The lack of exposure to interventional radiology in our country may make students assume that the non-contact with patients in diagnostic radiology also applies to interventional radiology and this has been documented to affect students' choice in the future. Clinical specialties with good patients contact are known to have more student choice than those with less or no patients contact.

Some limitations were encountered in the course of this study. Only one medical school was used, hence findings may not truly reflect the knowledge of interventional radiology in Nigeria. There will be need for future studies with more medical schools involved. The questionnaires were distributed to students in class and retrieved about three weeks later. Some students may have sourced their responses from consultation with their friends or the internet. This can probably introduce some bias into the study. Subsequent studies on this topic should be electronically conducted such that the students are given a short time to respond to the questionnaires. The low response rate of 56% was also a limitation in this study.

Conclusion

In conclusion, knowledge of interventional radiology among medical students at the University of Benin has been documented. There is an abysmally low level of awareness among students in this centre, although this may not be true reflection of the whole country. This brings to limelight the need to vigorously enhance this specialty both in practice and in teaching. The medical school curriculum should be restructured with introduction of basic lectures in interventional radiology and the students made to know the relevance of interventional radiology in all clinical departments. Inarguably, interventional radiology will come to full public glare in our country as medical practice advances hence the need to address this basic aspect.

References

1. Idowu B M. Postgraduate radiology education in Nigeria: Looking backward and forward. *SA. J. Radiol* 2018; 22(1): 1362.
2. Idowu B M, Okedere T A. Diagnostic radiology in Nigeria: a country report. *J Glob Radiol* 2020; 6: 1072.
3. Jain N, O'Neill S, Chandra V, Sokalaw S, Alam A, Kumar A, et al. Trends in interventional radiology: Survey of medical students at an educational symposium. *Am J Interv Radiol* 2019; 3:12.
4. Alshumrani G.A. Awareness of interventional radiology among final-year medical students and medical interns at a university in South-western Saudi Arabia. *Saudi Med J*. 2013;34:841-847.
5. Albaqawi R, Alreshidi M, Alshubrami D, Alraseedi H, Alrashidi I. Awareness of interventional radiology among clinical years' medical students and medical interns at University of Hail. *Arab J Interv Radiol* 2019; 3: 58-64.
6. Rehman IU, Ahmed M, Assad S, Rahman MA, Rahman DT, Jehangir M. Assessment of level of awareness and knowledge of interventional radiology among medical students at a Pakistani institution. *J Postgrad Med Inst* 2016; 30(1): 66-72.
7. Agrawal D, Renfrew MA, Singhal S, Bhansali Y. Awareness and knowledge of interventional radiology among medical students at an Indian institution. *CVIR Endovasc*. 2019;2(1):45.
8. O'Malley L, Athreya S. Awareness and level of knowledge of interventional radiology among medical students at a Canadian institution. *Acad Radiol* 2012; 19: 894-901.

9. Singh N, Causey W, Brounts L, Clouse WD, Curry T, Andersen C. Vascular surgery knowledge and exposure obtained during medical school and the potential impact on career decisions. *J Vasc Surg.* 2010;51:252-8
10. Leong S, Keeling AN, Lee MJ. A survey of interventional radiology awareness among final-year medical students in a European country. *Cardiovasc Intervent Radiol* 2009; 32: 623-629. 4.
11. DePietro DM, Kiefer RM, Redmond JW, Workman AD, Nadolski GJ, Gade TP, et al. Increasing medical student exposure to IR through integration of IR into the gross anatomy course. *J Vasc Interv Radiol.* 2017;28:1455-60.
12. Shah S. Are curriculum changes the ideal method for increasing undergraduate exposure to tomorrow's specialties? *Adv Med Educ Pract.* 2015;6:153-154.
13. Shaikh M, Shaygi B, Asadi H, Thanaratnam P, Pennycooke K, Mirza M, et al. The introduction of an undergraduate interventional radiology (ir) curriculum: impact on medical student knowledge and interest in IR. *Cardiovasc Intervent Radiol.* 2015;39(4):514-521.
14. Ojha U, Mohammed R, Vivekanantham S. Should there be greater exposure to interventional radiology in the undergraduate curriculum? *Adv Med Educ Pract.* 2017; 8:791-795.
15. Goldman, D. T., Peters, G. L., Fischman, A. M., Vatakencherry, G. G., Bream, P. R., Martin, J. G, et al. Best Practices From the APDR: Improving Medical Student Exposure to Interventional Radiology. *Academic Radiology* 2018; 25:789-791.