

A Study to Ascertain the Current Status of Interventional Radiology in Medical Students by Assessing the Knowledge, Exposure, and Interest of Interventional Radiology among Students from Medical Colleges: A Pan India Survey

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Abstract

Aim: To ascertain the current status of IR in medical students by assessing the knowledge, exposure, and interest of IR among students from medical colleges in various parts of the country.

Methodology: An online questionnaire was completed by Department of Radiology, Katihar medical College and Hospital, Katihar, Bihar, India for 1 year. Different college students were contacted and requested to volunteer in disseminating the information about the survey. The students were informed about the survey and the online link to questionnaire was posted in their common WhatsApp groups and shared further to more students. Responses were received from 1,500 medical students. The survey questions were formulated based on similar studies conducted in the past [11-13]. However, questions 7 and 8 were newly introduced to know their specialty inclination and to assess the exposure to cardiology (one of the popular higher subspecialties). Survey responses were arranged on a spreadsheet, statistically analyzed and results were obtained.

Results: The 1,500 respondents comprised 792 (52.8%) males and 708 (47.2%) females. The majority (56.3%) of the respondents were currently in the clinical years of their training. With regard to their inclination of a career choice, 26.9% chose medical and 23.1% chose surgical as their choice of specialty. At the same time, 20.8% responded as they have an interest in both core specialties alike while 29.1% had not decided yet. Most (58.3%) of the students had exposure to the radiology department. Interventional Radiology services were present in 46.4% of the respondent's institutions. Regarding their interest in radiology as a career, 43% responded positively, while 57% were either unsure or negative. About 23.9% of the students responded that they would consider IR as a career. The most common reason for not choosing IR as a career is lack of awareness about the specialty (59.7%), followed by the already made decision on another specialty before exposure to IR (27.5%). Desire for a relaxed lifestyle was the reason for 10.6% of respondents. There were also reasons like lack of patient interaction, threat from artificial intelligence, health reasons (familial tremors), and lack of formal training programs, which altogether comprised less than a percent.

Conclusion: This study demonstrates that medical undergraduate students in India have a poor understanding of IR due to limited exposure to the sub-specialty. An intervention, in the form of introducing IR in medical undergraduate teaching may have a positive impact on the

knowledge and skills of medical students and a critical understanding of the scope of practice in IR.

Keywords: Radiology, diagnostic radiology, interventional radiology

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Introduction

Medical imaging is any technological process used to view and create data about the human body for diagnosing, monitoring, or treating a medical condition [1]. There are many types of technologies, such as computed tomography (CT), magnetic resonance imaging (MRI), X-ray radiography, ultrasonography (US), and positron emission tomography (PET), which offer different information depending on the body part on which they are used [1]. Therefore, imaging is a critical and growing component of modern medical diagnosis and practice. Its importance lies in its ability to diagnose and reduce unnecessary procedures safely and effectively [2]. When imaging is used for diagnostic purposes, it is termed diagnostic radiology. In recent years, technological innovations have given rise to the field of interventional radiology (IR) which uses imaging for the treatment of various diseases [3].

IR has shown tremendous growth and has become an integral part of the patient management, sometimes the only life-saving option. There are independent IR residency programs currently being approved in various parts of the world. For instance, in United States the integrated IR and diagnostic radiology (DR) residency received Accreditation Council for Graduate Medical Education approval in 2014. In the United Kingdom IR gained subspecialty status in 2010. Within a short span of its introduction, IR has become one of the most sought-after specialties. In India, there are several IR fellowship programs of 1 to 2 years duration after the radiology residency. In addition, 3-year super-specialty training courses have been

introduced; these are DM (Doctor of Medicine) by Medical Council of India and DNB (Diplomate of National board) by National Board of India [4, 5].

A key World Health Organization (WHO) report entitled 'Efficacy and radiation safety in interventional radiology', published in 2000, also concluded that IR has a growing scope of practice in treating diseases of cardiovascular and non-vascular origin in both developed and developing countries [6]. As technical means to provide minimally invasive interventions with better outcomes continue to grow, it is of paramount importance to train the future workforce. The Cardiovascular and Interventional Society of Europe (CIRSE) [7], British Society of Interventional Radiology (BSIR) [8] and the Society of Interventional Radiology (SIR) [9], and they have been continuously working towards addressing a lack of IR knowledge and awareness among medical students.

Expansion of IR services in concordance with the rapidly evolving health care system in India is currently nonexistent. Lack of awareness among other specialty colleagues, poor interest, and sparse formal IR training opportunities for aspiring medical graduates are amongst the various reasons for this. The root cause eventually lies in the current medical curriculum where IR has been under-represented. Rectifying this can solve a few of the challenges faced by interventional radiologists like shortage of personnel and inter-specialty conflicts [10]. This study aims to ascertain the current status of IR in medical students by assessing the knowledge, exposure, and

interest of IR among students from medical colleges in various parts of the country.

Materials and Methods

An online questionnaire was completed by Department of Radiology, Katihar medical College and Hospital, Katihar, Bihar, India for 1 year. Different college students were contacted and requested to volunteer in disseminating the information about the survey. The students were informed about the survey and the online link to questionnaire was posted in their common WhatsApp groups and shared further to more students. Responses were received from 1,500 medical students.

The questionnaire consisted of 15 mandatory questions including both multiple-choice questions and Yes/No responses, intended to assess the awareness and knowledge on IR, familiarity with IR procedures, exposure to IR, and interest in IR as a career. The survey questions were formulated based on

similar studies conducted in the past [11-13]. However, questions 7 and 8 were newly introduced to know their specialty inclination and to assess the exposure to cardiology (one of the popular higher subspecialties). Survey responses were arranged on a spreadsheet, statistically analyzed and results were obtained.

Results:

The 1,500 respondents comprised 792 (52.8%) males and 708 (47.2%) females. The majority (56.3%) of the respondents were currently in the clinical years of their training. With regard to their inclination of a career choice, 26.9% chose medical and 23.1% chose surgical as their choice of specialty. At the same time, 20.8% responded as they have an interest in both core specialties alike while 29.1% had not decided yet. Most (58.3%) of the students had exposure to the radiology department. Interventional Radiology services were present in 46.4% of the respondents' institutions.

Table 1: Demographic details, study and information related to radiology

Variables		Number (n=1500)	%
Gender	Males	792	52.8
	Females	708	47.2
Year of study	1 st year	292	19.5
	2 nd year	364	24.3
	3 rd year	207	13.8
	4 th year	637	42.5
Choice of specialty	Medical	404	26.9
	Surgical	347	23.1
	Both	312	20.8
	Not decided	437	29.1
Exposure to the radiology department	Yes	875	58.3
	No	625	41.7
Interventional Radiology services in institute	Present	696	46.4
	Absent	804	53.6

Regarding their interest in radiology as a career, 43% responded positively, while 57% were either unsure or negative. About 23.9% of the students responded that they would consider IR as a career. Specialty

inclination did not show a statistically significant influence on choosing IR or radiology as a career (p-value is 0.101). The most common reason for not choosing IR as a career is lack of awareness about

the specialty (59.7%), followed by the already made decision on another specialty before exposure to IR (27.5%). Wanting a relaxed lifestyle was the reason for 10.6%. There were also reasons like lack of patient interaction, threat from artificial

intelligence, health reasons (familial tremors), and lack of formal training programs, which altogether comprised less than a percent. However, only 15.9% had a teaching session or talk related to IR ever.

Table 2: participant's responses regarding IR

Variables		Number	%
Radiology as a career	Yes	645	43.0
	No	855	57.0
Interventional radiology as a career	Yes	358	23.9
	No	1142	76.1
Why would you not choose interventional radiology as a career?	Already decided on another specialty	413	27.5
	Don't know much about interventional radiology	895	59.7
	Want a relaxed lifestyle	159	10.6
	Radiation exposure	23	1.5
	Others	10	0.7
Do you know a person who underwent any kind of interventional radiology procedure?	Yes	494	32.9
	No	1006	67.1
Ever had an educational session or a talk on interventional radiology?	Yes	238	15.9
	No	1262	84.1
Considering interventional radiology as a career/ management option?	Not at all	42	5.2
	Less likely	117	7.8
	Not sure	462	30.8
	Likely	481	32.1
	Very likely	369	24.6
Scope of interventional radiology	Not at all	43	2.9
	Bad	121	8.1
	Moderate	384	25.6
	Good	491	32.7
	Excellent	461	30.7

The majority (56.7%) of the students responded that they would consider IR as a management option for their patients in the future, while 30.8% were neutral in their response, and 7.8% were less likely to consider. However, 5.2% of students would never consider IR as a management option. Majority of respondents believed that the scope of IR is promising-excellent (30.7%) and good (32.7%).

Discussion:

These figures suggest that a knowledge and awareness of IR principles and techniques may precipitate an active interest in the field. However, it may be argued that the effects are correlated with students who are already interested in radiology making more effort to learn IR fundamentals. The other important finding is that the students expressed a lack of knowledge and insufficient exposure to IR in their undergraduate years.

Interventional radiology is one of the most dynamic fields in medicine and as it continues to evolve, there is a need to incorporate IR within the undergraduate curriculum appropriate for medical schools. A lack of IR as a discipline within undergraduate teaching modules could have a direct impact on both, the choice of IR as a career and an understanding of treatment options available to patients. This, in turn, suggests a need to revise the current radiology curriculum and clinical rotations to introduce IR at an early stage of medical education.

Recently, IR as a novel specialty has evoked a lot of interest among medical students and budding radiologists apart from colleagues practicing other specialties. To our knowledge, this is the largest such survey conducted among multiple institutions in a country involving the maximum number of medical students from all years. In this study 36% of respondents were interested in IR as a career. This varied from 15 to 73% in six previous studies in literature conducted at single institutions globally from 2009 to 2019 [12-17]. There is a steady rising trend of interest for IR among medical students.

Most of the students had exposure to radiology (58.3%) and acknowledged that there are IR services provided in their institution (46.4%). Similar to previous studies there is a statistically significant difference between the preclinical and clinical year medical students in their level of radiology exposure (p -value < 0.01) [10, 12]. Also, 69.9% of the students responded that they have not come across anyone who had undergone an IR procedure. Not surprisingly, the exposure of medical students to other higher subspecialty procedures was also low. [18]

In our study, there was no statistically significant difference in the interest in IR as a career among students who had attended an IR teaching session/talk or

have met someone who underwent an IR procedure or the presence of an IR department in their hospital versus those who did not have all these. We believe this may be due to the availability of information from various sources like social media, websites, and other specialty textbooks. This also highlights the fact that, if the medical students were provided with adequate exposure and knowledge about IR in a systematic method, the outcome could be beneficial. This has been identified by previous studies such as the one conducted by Shaikh et al among fourth-year Irish medical students in 2015. They found out that the knowledge (6–45%) and interest in IR as a career (60–73%) increased after the students attended a 10-hour didactic lecture on IR [13].

It is recommended that medical students receive a curriculum-based teaching and the learning goals be focused on common acute clinical problems managed with image-guided interventional treatments. Our study highlights the need to incorporate a systematic undergraduate IR medical curriculum in India. We need inclusion of IR procedure details in the standard textbooks as one of the management options wherever suited. Dedicated handbooks on IR for undergraduates could generate the interest for them to know more.

Conclusion:

This study demonstrates that medical undergraduate students in India have a poor understanding of IR due to limited exposure to the sub-specialty. An intervention, in the form of introducing IR in medical undergraduate teaching may have a positive impact on the knowledge and skills of medical students and a critical understanding of the scope of practice in IR.

References:

1. Medical Imaging. <https://www.fda.gov/radiation-emitting-products/radiation>

- emitting-products-and-procedures/medical-imaging. Accessed on 12 April 2022
2. Diagnostic imaging. https://www.who.int/diagnostic_imaging/en/. Accessed on 12 April 2022.
 3. Alnajjar SF, Alshamrani HM, Banasser AM, Alshehri HZ, Wazzan MA, Abduljabbar AH. Awareness of interventional radiology among medical students at a Saudi Medical School: clerkship versus pre-clerkship years. *Oman Med J* 2019;34(5):420
 4. e-Gazette | NMC. Available at: <https://www.nmc.org.in/e-gazette>. Accessed 15 April 2022.
 5. Welcome To National Board of Examination. Available at: https://natboard.edu.in/matter.php?notice_id=2012. Accessed 18 April 2022.
 6. Worldcat.org (2019) Efficacy and radiation safety in interventional radiology. (Book, 2000) [WorldCat.org]. [online] Available at: <https://www.worldcat.org/title/efficacy-and-radiation-safety-in-interventional-radiology/oclc/45947497>. Accessed 18 April 2022.
 7. Cirse.org (2019) [online] Available at: https://www.cirse.org/wp-content/uploads/2018/07/CIRSE_IR_Curriculum_for_Medical_Students.pdf. Accessed 9th April 2022
 8. Bsir.org (2019) [online] Available at: https://www.bsir.org/media/resources/UK_Undergraduate_Curriculum_for_IR_2014.pdf Accessed 9th April 2022
 9. Sirweb.org (2019) Society of interventional radiology- society of interventional radiology. [online] Available at: <https://www.sirweb.org/>. Accessed 18 April 2022
 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(4):623–629.
 11. O'Malley L, Athreya S. Awareness and level of knowledge of interventional radiology among medical students at a Canadian institution. *Acad Radiol* 2012;19(7):894–901.
 12. Nissim L, Krupinski E, Hunter T, Taljanovic M. Exposure to, understanding of, and interest in interventional radiology in American medical students. *Acad Radiol* 2013;20(4):493–499.
 13. Shaikh M, Shaygi B, Asadi H, et al. The Introduction of an Undergraduate Interventional Radiology (IR) Curriculum: impact on medical student knowledge and interest in IR. *Cardiovasc Intervent Radiol* 2016;39(4):514–521.
 14. DePietro DM, Kiefer RM, Redmond JW, et al. Increasing medical student exposure to IR through integration of IR into the gross anatomy course. *J Vasc Interv Radiol* 2017;28(10):1455–1460
 15. 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
 16. Atiiga PA, Drozd M, Veettil R. Awareness, knowledge, and interest in interventional radiology among final year medical students in England. *Clin Radiol* 2017;72(9): 795.e7–795.e12
 17. Commander CW, Pabon-Ramos WM, Isaacson AJ, Yu H, Burke CT, Dixon RG. Assessing medical students' knowledge of IR at two American medical schools. *J Vasc Interv Radiol* 2014;25(11):1801–1806, 1807.e1–1807.e5
 18. Mansour, M. B., & Ahmedana, S. E. Assessment of Post Exposure Prophylaxis (PEP) in Omdurman Voluntary Counselling and Testing

Center (OVCTC). Journal of Medical
Research and Health Sciences,

2020:3(1), 836–849.