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Assessment of the Perceptions of Interventional Radiology among Radiologists in India

Research Article

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Abstract

Background: Interventional radiology is an upcoming branch in India and globally and the impact it holds on the field of traditional diagnostic radiology is vast. Not only does it mark the shift of radiology from a purely diagnostic branch to a majorly therapeutic branch, but it also opens up the avenue of super specialization options for radiologists which was not unavailable until recently. This study aims to record the existing perceptions of Interventional Radiology among radiologists in India and with the help of its study hopes to shed light on ways to better the stream of Interventional Radiology in India and existing programs.

Methods: It was a cross-sectional study conducted on 73 participants across the country.

Results: Only 71.2% (52) participants were aware about IR when they joined Radiology. Among those, only 73.1% (38) were aware of all subtypes of interventional radiology. Only 45.2% (33) participants had IR specialization available at their institute at the start of their training. 39.7% (29) participants thought that the exposure to IR in radiology residency currently is insufficient whereas only 6.8% (5) thought that the exposure to IR currently is great. 65.8% (48) participants said they would opt for fellowship programs over DM programs. 56.2%(41) participants felt that IR training programs should last 2 years compared to a 1 year fellowship or a 3 year DM program.

Conclusion: There is a severe knowledge and opportunity deficit within institutes which is serving as a deterrent towards candidates picking this specialization. This complete data suggests that Radiology candidates want to pursue IR but there is a severe gap on multiple levels within institutes in India, which if addressed well will not only improve the scope of IR in India but change the way this sub-stream of radiology is perceived.

Abbreviations: IR- Interventional Radiology

Keywords: Interventional Radiology; Perceptions; India Radiology Trends; Super Specialization; Post Graduate; Training; Radiology

Introduction

Radiology has traditionally been regarded as a diagnostic specialty, but the advent of Interventional Radiology (IR) has significantly expanded its scope.It has not only transformed radiology into a therapeutic discipline but has also made it a lifesaving speciality in emergency situations. Procedures such as trans arterial embolization, mechanical thrombectomy, and endovascular aortic aneurysm repair exemplify its critical role in acute care.As IR continues to evolve, perceptions of the field vary widely—not only among established radiologists but also among those currently undergoing postgraduate training or recently completing it.In India, the trend of pursuing super-specialization has gained momentum, and IR has emerged as a prominent option, offering radiologists the opportunity to

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redefine their practice and impact on patients. Given that IR differs significantly from traditional radiology, its emergence as a training option raises important questions about existing perceptions of the field in India, the level of awareness among radiologists, and the demand for specialized training. This study aims to gauge all these perceptions and to tackle them systematically and identify foci where IR training can be improved within India and to present institutes across the country with a systematic overview of how IR training programs can be altered in India and how the perceptions regarding it can be improved upon. We would also like to tackle social impact of existing IR programs such as gender inequality within the branch alongside the professional scope of the subject. This study is largely a reflection of existing norms and perceptions, coupled with solutions to acknowledge and tackle the same, so as to encourage trainees to take up IR while addressing grass root issues. There are some India specific challenges also addressed like the standardization of training programs between fellowship and DM programs and the scope of procedures which IRs can perform post training.

Materials and Methods

Study Setting

This study based in India was conducted on 73 participants across the country over a period of three months. (June 2024-August 2024).

Study Design

The study was a descriptive cross-sectional study. The study population included all individuals who gave their consent, and were radiologists who have completed their training from an institute in India. The study also included participants who were currently undergoing training in Radiology in India. The exclusion factors in the study were, if the participant denied giving consent, had completed their training in Radiology outside India or were already in training for Interventional Radiology or had completed it. A predesigned and structured questionnaire was developed and circulated online through the Google Forms portal. The questionnaire was in English and captured the perceptions, understanding, knowledge and suggestions regarding Interventional Radiology among radiologists in India.

Sample Size

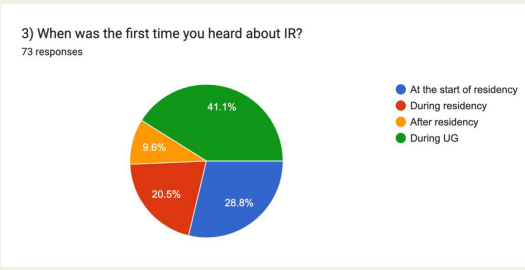
Using a confidence level of 95%, with a margin of error of 10% and population proportion of 50% (as no similar study had been conducted previously in India), and using the number of diagnostic radiologists in India as population size, a sample size of 70 was calculated.

Ethical Requirements

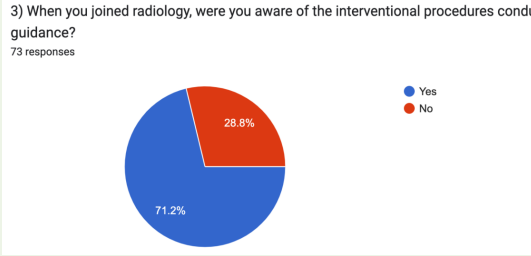
Ethical clearance was obtained from the Institutional Ethics Committee of Goa Medical College, Bambolim, Goa. Confidentiality of responses and informed consent were maintained.

Results

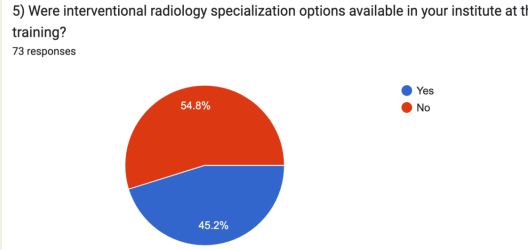
Out of the 73 participants approached in the study, all of them gave their consent and met the criteria for the study. All of them are radiologists or radiologists in training from India and none of them are training in IR or have completed it already.



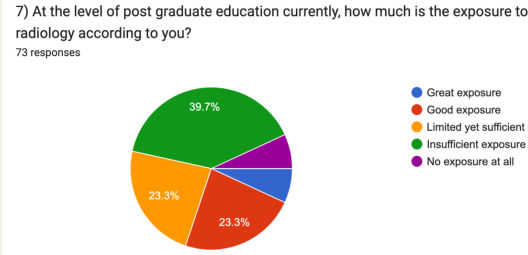
Graph 1: When was the first time you heard about IR?



Graph 2: When you joined radiology, were you aware of the image guided procedures done by IR?



Graph 3: Were IR specialization options available in your institute at the start of your training? Were IR specialization options available in your institute at the start of your training?



Graph 4: At the level of PG education currently, how much is the exposure to IR according to you?

Demographic Data

Results were recorded from across the country with respondents spanning almost 15 states of the country. This ensured that the results are uniform and not reflective of the perceptions of just one state or institution.

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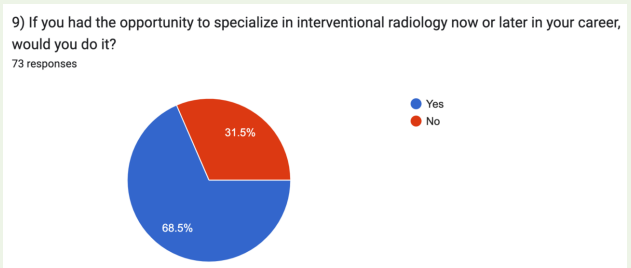
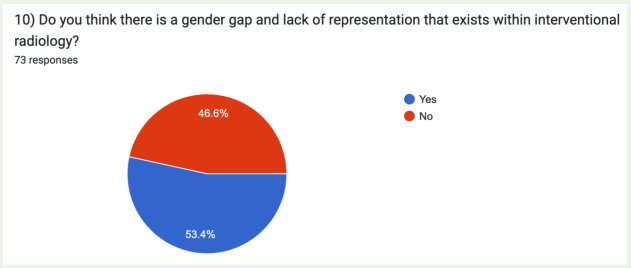
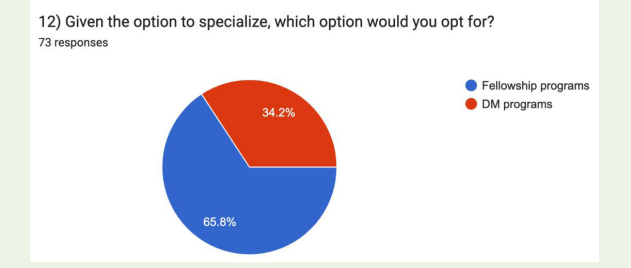


Graph 5: If you had the opportunity to specialize in IR now or later in your career, would you do it?



Graph 6: Do you think there is a gender gap and lack of representation which exists within IR?



Graph 7: Given the option to specialize, which option would you opt for?

Graph 8: How long do you feel IR training/programs should last?

1) CURRENT WORKING POSITION

Out of the 73 participants, 41.1%(30) are working as consultants, 39.7%(29) are working as junior residents and 19.2%(14) are working as senior residents.

2)WORK EXPERIENCE IN RADIOLOGY

61.6%(45) had a less than 5 years working experience in radiology, 15.1%(11) had a 6-10 years experience, 11%(8) had an 11-20 years experience whereas 12.3%(9) had more than 20 years work experience in radiology.

3)WHEN DID YOU FIRST HEAR ABOUT INTERVENTIONAL RADIOLOGY

41.4%(30) participants said they first heard about IR during their under graduate years, 28.8%(21) said at the start of residency, 20.5%(15) said during post graduate years, whereas 9.6%(7) heard about it after residency.

4A)AWARENESS ABOUT IMAGE GUIDED PROCEDURES CONDUCTED BY IR 71.2%(52) participants said they were aware about the procedures conducted by image guidance within IR, whereas 28.8%(21) were not aware.

4B) IF YES, WERE YOU AWARE OF ALL THE SUBTYPES WITHIN IR?

73.1%(38) participants said they were aware of all the subtypes within IR while 26.9%(14) said they were not aware of all the subtypes within IR.

5) WERE IR SPECIALIZATION OPTIONS AVAILABLE IN INDIA AT THE START OF YOUR TRAINING

76.7%(56) of the respondents said yes while 23.3%(17) of them said that these options were not available in India at the start of their training.

6) WERE IR SPECIALIZATION OPTIONS AVAILABLE IN YOUR INSTITUTE AT THE START OF YOUR TRAINING

45.2%(33) participants responded yes while 54.8%(40) said no.

7) WHAT DO YOU THINK IS THE SCOPE FOR RADIOLOGISTS TO FURTHER SPECIALIZE INTO IR IN INDIA?

49.3%(36) said there is great scope, 32.9%(24) said there is good scope, 16.4%(12) said there is limited scope, 1.4%(1) said there is insufficient scope, whereas none of the participants said there is no scope at all.

8) AT THE LEVEL OF POST GRADUATE EDUCATION IN INDIA CURRENTLY, HOW MUCH IS THE EXPOSURE TO IR ACCORDING TO YOU?

6.8%(5) said there is great exposure, 23.3%(17) said there is good exposure, 23.3%(17) said there is average exposure, 39.7%(29) said there is insufficient exposure, and 6.8%(5) said there is no exposure at all.

9) WITHIN IR, WHICH PROCEDURES DO YOU FEEL HAVE A MAJOR POSITIVE IMPACT IN REDUCING PATIENT MORTALITY AND MORBIDITY?

84.9%(62) said vascular procedures while 15.1%(11) said non-vascular procedures.

(Vascular procedures namely being DSAs, balloon angioplasties, stent angioplasties, bleeder and tumor embolizations, fistuloplasties, guided vascular and catheter insertions)

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(Non-vascular procedures namely being USG/CT guided FNACs, biopsies, aspirations, pigtail and drain insertions.)

10) IF YOU HAD THE OPPORTUNITY TO SPECIALIZE IN IR NOW OR LATER IN YOUR CAREER, WOULD YOU DO IT?

68.5%(50) participants said yes, while 31.5%(23) said no.

10A) If yes, why? (This was a multiple correct option question)

Some of the responses were as follows, 64%(32) people said because it has greater fulfilment than just diagnostics, 72%(36) people said because it involves clinical therapeutic procedures, 58%(29) said to help patient care in a hospital setting, whereas 32%(16) said because it has greater financial gain. 48%(24) said that it was a good super specialty option for career growth.

10B) If no, why? (This was a multiple correct option question)

Some of the responses were as follows, 65.2%(15) said because they were interested in diagnostics only, 26.1%(6) said because it increased exposure to radiation, 56.5%(13) people said because it had comparatively bad work timings as compared to diagnostics, 30.4%(7) people said that it added to additional years of training, whereas 8.7%(2) people said that there was not sufficient opportunity.

11) DO YOU THINK THERE IS A GENDER GAP AND LACK OF REPRESENTATION WHICH EXISTS WITHIN IR?

53.4%(39) participants said yes while 46.6%(34) said no.

11A) If yes, why? (This was a multiple correct option question)

46.2%(18) said because women are not encouraged enough to pursue super-specialty branches, 38.5%(15) said that there was a lack of opportunities or negative bias towards women in IR. 35.9%(14) said that there was a male predominance in the field which makes women apprehensive to join the branch, while 28%(11) said that preference was given to men over women in the branch.

12) IF YOU HAD TO PURSUE IR IN YOUR CAREER, WHICH PROCEDURES DO YOU FEEL WOULD BRING THE MOST PROFESSIONAL, FINANCIAL AND WHOLISTIC SATISFACTION?

76.7%(56) said vascular procedures whereas 23.3%(17) said non-vascular procedures.

13) GIVEN THE OPTION TO SPECIALIZE, WHICH OPTION WOULD YOU OPT FOR?

65.8%(48) participants said they would opt for fellowship programs whereas 34.2%(25) said they would opt for DM programs.

14) HOW LONG DO YOU FEEL IR PROGRAMS SHOULD LAST?

56.2%(41) said 2 years, 27.4%(20) said 3 years whereas 16.4%(12) said 1 year.

15) ON A PAN-INDIA LEVEL, DO YOU THINK OPPORTUNITIES FOR IR EXIST ONLY IN METRO CITIES CURRENTLY?

84.9%(62) said yes, while 15.1%(11) said no.

16) DO YOU FEEL SPECIALIZATIONS IN IR WILL BECOME COMMON WITH TIME?

94.5%(69) said yes, while 5.5%(4) said no.

16A) If yes, why? (This was a multiple correct option question)

71%(49) said that radiologists will want to explore more career options rather than an end branch experience, 31.9%(22) said that it is a conducive and compelling super-specialization option, 26.1%(18) said that peer pressure and growth of super specialty departments will drive people towards IR, 71%(49) said that more opportunities will emerge as compared to before.

16B) If no, why? (This was a multiple correct option question)

50%(2) said that IR does not indulge radiologists as much, 50%(2) said that residents will prefer diagnostics as an end branch, 25%(1) said that there will not be sufficient opportunities, while 25%(1) said that there is a long learning curve and risk of exposure.

17) WHAT ACCORDING TO YOU, WILL HELP IMPROVE THE UNDERSTANDING OF IR AMONG RADIOLOGISTS IN INDIA? (MULTIPLE CORRECT ANSWERS)

89%(65) said rotations in IR, 42.5%(31) said seminars or CMEs, 61.6%(45) said promoting mentorship and interactive learning will help, whereas 26%(19) said that research and publications will help.

Discussion

According to a study conducted by Sallee et al[1],undergraduate students had a fair understanding about radiology but that is only as far as diagnostics is concerned and they thought of it as a lucrative field owing to the better working hours and lesser stressful environments compared to other clinical fields. They also identified gaps in the knowledge of the students, and that is where methods such as rotations, mentors and CMEs come into the picture. There are a lot of studies showing the impact of integrating undergraduate medical students into radiology electives[2,3] but hardly any about integrating radiology residents into Interventional Radiology especially in India. The exposure to radiology itself is drastically minimal at an undergraduate level [4], and the same reflects in what we have concluded from the responses of diagnostic radiologists or those just entering the field. Firstly, 39.7% and 19.2% of our respondents were working as junior and senior residents respectively, and these are the candidates most likely to take up a super specialization course in the coming future. Having half of our participants be residents and nearly the other half be already established diagnosticians gave us a fair understanding of the differences between different strata of diagnosticians. Only 41.4% of our participants had heard about IR during their undergraduate years which sheds lights on the problem of the disconnect in the understanding of the field in the formative years in medicine. The majority of our participants had exposure to the field of IR only once they commenced their training in radiology and not before. The participants were aware of the procedures conducted within IR, but only 73.1% had a complete understanding of the procedures performed by IR specialists. This reflects a disconnect between diagnostic radiology and interventional radiology across India.We now discuss the availability of this specialty in India. Only

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76.75% of participants stated that IR training programs were available in the country at the start of their training, while a significantly lower 45.2% reported that these specialization options were available at their institute. This suggests that one of the key reasons for the low transition rate from diagnostic radiology to interventional radiology is the limited availability of training opportunities. Many candidates must relocate to different institutes and states if they wish to pursue further studies in IR. The emphasis, therefore, should be on expanding the scope of IR in all medical colleges where it is financially and academically feasible, ensuring that all radiology aspirants have a fair chance to specialize in this field[5].Encouragingly, 49.3% and 32.3% of participants rated the current scope of specializing in IR in India as "great" and "good," respectively, indicating a positive outlook for the field. This optimism among aspiring candidates is a crucial factor in the development of this emerging specialty.However, a significant issue identified was at the postgraduate training level. Only 6.8% of participants felt that there was "great" exposure to IR during their postgraduate training, while only 23.3% considered the exposure to be "good." Within the field, 84.9% believed that vascular procedures—despite requiring more time, effort, and higher radiation exposure in a cath lab setting—had a significant impact on reducing patient mortality and morbidity.When asked about their interest in specializing in IR, 68.5% stated that they would consider pursuing it either now or later in their career. Among them, 72% cited their primary motivation as the opportunity to contribute to patient care in a clinical setting, which they found highly fulfilling. Other common reasons included better career growth, greater involvement with other departments, and improved financial prospects. Conversely, those who chose not to pursue IR cited the demanding nature of the specialty, the increased workload, the steep learning curve, and concerns about radiation exposure.Additionally, 53.4% of participants felt that a gender gap exists within IR. The most commonly cited reasons were the lack of encouragement for women to pursue super-specialization, the presence of a negative bias toward women in IR, and the historically male-dominated nature of the field. This gender disparity is also evident in many surgical specialties, where representation is critically low—for instance, only 2.5% of neurosurgeons and 16% of orthopedic surgeons are women. Unlike purely surgical fields, IR presents an opportunity to bridge this gap. However, this will require concerted efforts from the existing IR fraternity and governing authorities to create a more inclusive and supportive environment for female candidates.Finally, 65.8% of participants expressed a preference for fellowship programs over DM programs. This statistic underscores the need to tailor training pathways to better align with candidate preferences and career aspirations.56.2% said that they would prefer a 2 year fellowship over a 1 year fellowship or a 3 year DM program. 84.9% said that opportunities for IR existed only in Tier 1 and metro cities in India currently, which makes the competition more and accessibility lesser. 71% said that IR will increase over the coming years because radiologists will want a super specialization option instead of an end branch experience. On promoting IR and increasing the understanding among radiologists and the fraternity in India, 89% said that rotations in IR would help, 42.5% said that CMEs or seminars would help, 61.6% said that mentorship would help while 26% said that research and publications would help.

Scope and reach of IR: The latest trends in Radiology are hinting towards a higher scope in conversion towards IR and the stream is picking up not only in Tier 1 and Tier 2 cities, but even in Tier 3 cities although a bit slowly, owing to the cost expenses of having a fully functional Cath lab, trained staff and other operative expenses, along with minimum required patient load to have a fellowship or DM program. As far as special machinery is concerned, the basic operative material for Interventional Radiology is a fluoroscopy and USG machine, along with basic hardware like sheaths, guidewires, catheters, balloons, stents, coils, and embolizing agents along with different needles, drains and biopsy guns for non-vascular procedures. The presence of such high-tech material makes IR a financially intensive field which is another reason why the spread to Tier 2 and 3 cities has been gradual, although it is the need of the hour where medical resources are inadequate already and minimally invasive procedures are highly in demand. As far as training periods are concerned, as stated earlier in this paper, current training programs in India are between 1 and 2 years fellowship programs to 3 year DM programs.

Conclusion

Interventional Radiology is an upcoming branch which will provide radiologists a viable option for super specialization but issues exist at grass root level where candidates are unaware of this field until they join training. It would help to conduct programs for new residents by IR specialists which would increase knowledge and curiosity immediately after entering training as well as hosting CMEs on the same. Compulsory rotations with IR departments or mentorship with IR specialists would also have a great impact. Increase in the number of IR specialization options would also drastically change the outlook on the field. A 2 year fellowship program would interest candidates a lot more than DM or short fellowship programs. There is a gross lack of representation in the field by women which needs to be addressed and the key for inclusivity comes by initiative from IR specialists and authorities. This is paramount so that in the near future, IR does not stagnate with statistics like that of neurosurgery or orthopedic where there are less than 10% female physicians. The deeply patriarchal nature of South Asia also plays a vital role in this statistic but can be overcome with departmental analysis and the help of the governing bodies of IR in India. Encouraging more female physicians to rotate through the department and addressing misinformation regarding radiation hazards in IR will significantly boost the number of women in interventional radiology in India.It is vital to improve working hours in IR which appeared to be a deterrent towards aspiring radiologists picking IR as well as ruling out the misconceptions about radiation hazards. In conclusion, IR is an upcoming field with a lot of promise in India, tackling some issues as stated above will help the conversion rates of diagnostic radiologists into interventional radiologists, and this will only strengthen radiology across India. This novel and brilliant super specialization field has a lot to offer aspiring candidates and the path ahead will be paved by a multitude of young radiologists choosing IR.

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