



Assessment of Knowledge and Interest in Interventional Radiological Procedures among Radiography Students.

Author Name(s) and Affiliation(s)

1. Miss Piyush Yadav¹ PhD (Pursuing), Assistant Professor, Department of Allied Health Science, SBBS University Jalandhar (PB), Email id: lali1437dp@gmail.com,
2. Navreet Boora² PhD (Pursuing), Assistant Professor, Department of Paramedical, SGT University, Gurgaon HR, India.
3. Rajdeep Thidwar² PhD (Pursuing), Assistant Professor, Department of Allied Health Science, SBBS University Jalandhar (PB), Email id: rehanhts@gmail.com,
4. Raushan Kumar³ PhD (Pursuing), Assistant Professor, Department of Paramedical, TMU University, Moradabad UP, India
5. Prashant Kumar Jha³ PhD (Pursuing), Assistant Professor, Department of Allied Health Science, Brainware University, Barasat Kolkata. (WB), Ph: +91-9955373800

Corresponding Author: Prashant Kumar Jha, Department of Allied Health Science, Brainware University Barasat Kolkata, Email id: prashantjha25@yahoo.com, Ph: 91-9955373800

ABSTRACT

Background: Interventional radiology (IR) has experienced unprecedented growth in recent years. Having evolved from limb-saving angioplasties in 1964 to over 50 therapeutic procedures today, the sub-specialty of IR continues to flourish. Interventional radiology, also called image-guided therapy, is minimally invasive with local anaesthesia and early recovery. Therapeutic embolization, angiogenesis, anticoagulant, and thrombotic interventions in the treatment of a range of organs are now conducted through interventional radiology, which has expanded in the last few years. It has been followed, however, by an increased need for interventional radiology with added complexities and personnel issues. The aim is to assess the level of awareness, knowledge, and interest in interventional radiology among radiography students. **Materials and Methods:** This is a questionnaire based survey, using Google forms on the assessment of knowledge and attitude of radiography students about interventional procedure. **Result:** Total number of 136 (90%) out of 150 students responded to the survey including UG Students (78%) and PG Students (22%) in which 68% male and 32% female. Only 69% participants responded regarding positive response of a simple question i.e. IR Stand for in the radiology. **Conclusion:** Finally, postgraduates have better

knowledge than undergraduates in interventional radiology because they have attended more lectures or clinical postings or have had the most experience in this field.

Keywords: Interventional radiology, knowledge & awareness, Radiographer, Students

INTRODUCTION

Minimally invasive percutaneous interventional procedures permit evaluation and care. The growth of the interventional radiology industry has paralleled the emergence of non-vascular methods. **India's Interventional Radiology History:** Regenerative radiology has emerged as a recognised subspecialty in India, and global development is not an exception. Also, in its earliest days, IR was seen as a specialty requirement because of its extensive clinical effects. This scientific impression is based on the variety of treatment options that include both basic and complicated therapies, as well as the use of state-of-the-art imaging [1]. It's difficult to pinpoint the date of IR's origin in India. The radiologic interventions carried out in the 1970s may have been the last of their kind in India until recently [2]. Early in the 1980s, a few radiologists performed IR studies. Lubricant pipes and catheters were an additional expense and were not easily accessible during the period. Various angiographic tubes were sliced, formed, and autoclaved using steam before their usage. Guidewire coils were seldom, if ever, purchased off the shelf. Two handmade stents were required to reduce IR to manage costs. As far as I know, microchips have never been developed before. Despite these restraints, different restrictions and endovascular interventions were performed. The first endovascular operation known in human history to be conducted was renal tumour embolization. A homemade snare was used for extravascular foreign-body removal. Various embolizing agents were used to try to stop the bleeding. There was also further pressure on surgeons to advance in their understanding of IR due to the growing demand, so more IR procedures became available as time went on. IR hardware manufacturers already have IR hardware in the major cities in India. When more of these items became accessible, the treatments became more prevalent and varied, which benefited more patients. Following these three phases, an informal subspecialty was developed as innovative methods and practises were performed in brief sessions and residents received instruction on a range of models, including homemade ones [3].

The term for the section of radiology in which all diagnostics and therapy are done at the same time The radiologic treatment we use covers a variety of specialties, including

neuroradiology, paediatrics, nuclear medicine, pain, vascular, and more. The Board of Physicians and Surgeons officially approved interventional radiology as a subspecialty in 2012. Interventional radiology, also known as image-guided therapy, is a minimally invasive procedure that only requires local anaesthesia and promotes quick recovery. Procedures that come under interventional radiology includes, Therapeutic embolization, angiogenesis, anticoagulant, and thrombotic interventions Treatment of a range of organs is now conducted through interventional radiology, which has expanded in the last few years [4]. It has been followed, however, by an increased need for interventional radiology with added complexities and personnel issues [5]. Because interventional radiology requires knowledge as well as education, there would be more interest in interventional radiographers than in students or the general population. faculty and radiologic personnel. It often benefits the general population because of the minimally invasive techniques; these procedures provide a far lower risk factor for general anaesthesia, so there are many reasons to disseminate information and teach radiology to residents and students about these modalities [6]. It is a form of diagnostic radiology that may include another operation (non-invasive) or open-brain treatment. This does away with the lengthy and life-threatening operations, such as open-heart surgery, in favour of the minimally intrusive ones, which result in fewer post-operative problems and strike out the serious, life-threatening ones. It is a cutting-edge treatment option when compared to traditional surgery. Through making a tiny incision on the patient's skin, the radiologist opens the incision, and with the implementation of interventional radiological therapy, treatments will be able to accurately or precisely manage common conditions. Interventional radiological approaches are less painful and traumatic than practice. Pressure levels during interventional procedures are lower after the operation is completed than before or in the immediate post-procedure period. evasive radio determination, radiosurgery, and radionuclide studies Ultrasound, MRI, and X-ray.

It is going to be advantageous for the radiographer to map the internal anatomy to depict the patient's body layout. Because of this, surgical protocols can be implemented in interventional radiology when a large variety of interventions include. Cancer, Cardiovascular Disease, Infertility, Kidney Failure, Uterine Fibroids, Varicose Veins

The interventional procedures it performs cause a small incision, which reduces the amount of pain and suffering for the patient and shortens recovery time, but there is more danger. In this case, if recovery from traditional surgery takes more than two days, although there are no

complications from the procedure, a patient will be discharged the next day. To keep more problems to a minimum, the patient is only allowed to do today's normal, routine activities. In many surgical procedures, general anaesthesia is given to the patient because there is more pain. Interventional radiological procedures use conscious sedation, which helps to make the patient more comfortable and relaxed at the time of the procedure without the risk of complications or any allergic reactions from general anaesthesia. Studies have also shown that conventional surgery is more disappointing as compared to interventional radiological procedures.

Types of Interventional Radiology: Interventional radiology methods enable physicians to gain entry to the internal systems of the body through openings or very minor cuts with the help of imaging procedures, which minimises the risk of complications. In either case, even though the treatment includes a standard intervention, such as the use of a needle, the procedure is almost certain to be medical. When a guidewire is contained or kept in place, an externally mounted guidewire is used to guarantee that it does not damage nearby items, or a sheath is used to direct the guidewire through structures such as blood vessels, the biliary system, or the urinary system (that allow fluids to be pushed through them) [7].

The instruments often used in different kinds of interventional radiology are the same as in other kinds of radiology. Fluoroscopy is used by a minority of physicians, while others do not (as seen in a few medical cases) (such as ultrasound and MRI). The photographs may be optical subtraction angiography, CT, interactive imagery, or mixed reality displays in each case [8].

Diagnostic interventional radiology: Angiography: Imaging the blood vessels using different contrast media, such as iodinated contrast, gadolinium-based chemicals, and CO₂ gas, to check for anomalies. Cholangiography: To scan for regions of blockage in the bile ducts inside the liver, imaging is used. Biopsy: A percutaneous or trans venous procedure is used to obtain a tissue sample from the area of concern for clinical analysis [9].

Therapeutic interventional radiology: Vascular: Narrow or obstructed blood vessels are a prerequisite for effective balloon angioplasty or stenting. Endovascular aneurysm repair: An endovascular stent graft is placed over an aneurysm to keep the defective artery from expanding or progressing.

Embolization: The insertion of a metallic coil or embolic fluid (gel foam, polyvinyl alcohol) into the bloodstream to prevent bleeding or reduce blood supply to a desired organ or tissue.

Uterine artery embolization (UAE) or uterine fibroid embolization (UFE)

- Prostate artery embolization (PAE)
- Pulmonary arteriovenous malformation (PAVM) embolization
- Thrombolysis: A catheter-directed procedure for dissolving blood clots, such as those associated with pulmonary embolism and deep vein thrombosis, using either medicinal or mechanical methods.
- IVC filters: Metallic filters are inserted in the vena cava to prevent deep venous thrombosis from spreading.
- Dialysis-related procedures include tunnelled haemodialysis catheter placement, peritoneal dialysis catheter placement, and revision or thrombolysis of surgically implanted AV fistulas and grafts that aren't working [10]

The objective of the study is to assess awareness and level of knowledge of interventional radiology among medical imaging students.

MATERIAL AND METHODS

Inclusion Criteria: Students pursuing a bachelor's (2nd year and above) or master's in radiological imaging techniques.

Exclusion criteria: Students of first year including UG.

Study Duration: This questionnaire-based study carried out for the period of six months from June 2020 to May 2021 at the College of Paramedical Sciences TMU, Delhi road Moradabad UP, India.

This study was based on questionnaire form designed using Google forms. This prospective, comparative, and questionnaire-based study was designed and conducted among paramedical students of Radiology to know the knowledge of interventional radiology among undergraduate and postgraduate students. The topic was approved by the college review committee.

Total number of 150 participants were included in the study. Consent was obtained from all participants participated in this study. The questionnaire was created with Google Forms and

distributed via the internet to various WhatsApp groups. The questions were separated into two section, first section of the questionnaire involved demographic data, including name, age, gender, program, department, and year. The second section of the questionnaire contained basic queries regarding assessing the participant's adequate theoretical and practical knowledge of interventional radiology

STATISTICAL ANALYSIS: The collected data was compiled, tabulated, and analysed. Analysis was done using a Google Form in MS Excel.

RESULT: Total number of 136 (90%) out of 150 students responded to the survey including UG Students (78%) and PG Students (22%) in which 68% male and 32% female. For the first question about IR stands for? Only 69% participants respond correct answer. Details of response shown in fig-1.

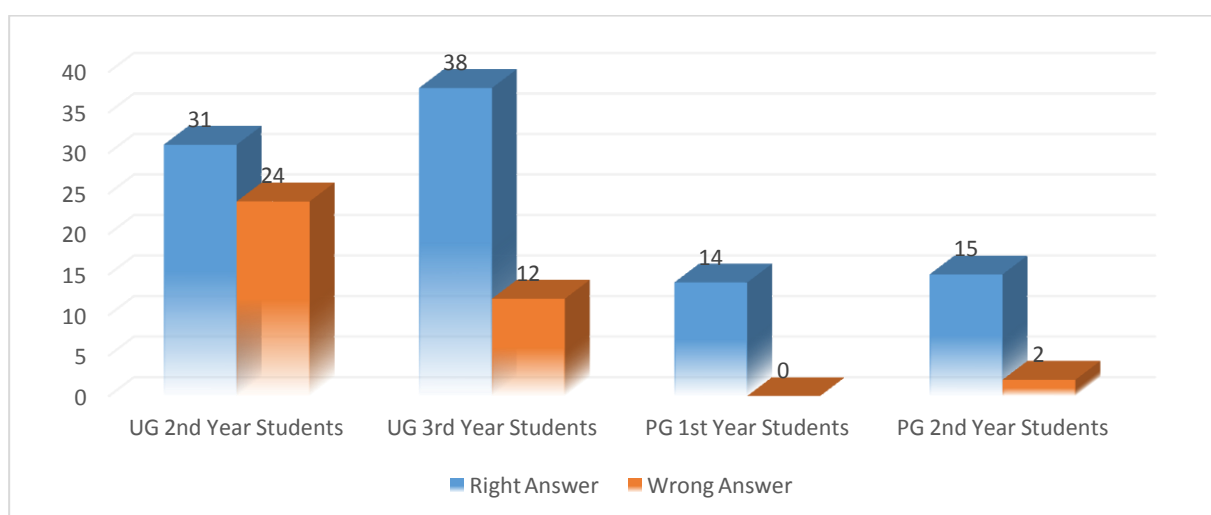


Fig-1. The graph represents the response regarding IR Stand for?

second question was comparison between interventional procedure and open surgery, about 82% participants are agree that, interventional procedures are safer than open surgical procedure. For third question regarding have you seen the IR procedure during clinical posting? total number of 54% was positive response, including total number of 31 out of 55 from UG 2nd Year, 38 out of 50 from UG 3rd Year, 6 out of 14 from PG 1st Year and 14 out of 17 from PG 3rd Year students.

4th Question regarding the consent form for IR procedure, 79% participants respond right answer while 21% said it's not mandatory, in which PG students were responded 100% correct answer. 5th question regarding equipment used in interventional procedures using

which type of radiation? only 69% (94) received correct response. 6th Question regarding use of equipment in the IR Procedure, only 24% received correct information from all the participants including UG & PG students.

7th question regarding identification of IR procedure, 54% got correct response out of 136 participants. 8th question was knowledge about most common procedure i.e. angioplasty, only 58% candidate responded yes. Next 9th question regarding advantage of interventional procedure, we got 63% correct response only and 37% responded wrong answer.

10th question regarding radiation safety principle and measures used in interventional procedure, 88% candidate responded correct answer. 11th question regarding need of patient preparation requirements and pre-procedure assessment, 95% Candidates responded right information.

12th question regarding job opportunity and clinical interest of medical imaging students in interventional radiology, 90% candidate responded positive response.

DISCUSSION: Interventional radiology is a rapidly expanding field that is facing several challenges, including a shortage of personnel and a lack of awareness. The combined value for undergraduate and postgraduate shows that only 57% of undergraduates are aware of or know about IR, and 77.2% of postgraduates are aware of the IR department. The most important findings of the study are that less than 44% of undergraduates feel that they are not familiar with the procedures done in interventional radiology. These figures suggest that 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 or familiar with the IR procedures making more effort to learn IR fundamentals. Several complications face the interventional radiology profession, such as a shortage of workers and a lack of knowledge. The most important findings of the study are that less than 44% of undergraduates feel that they are not familiar with the procedures done in interventional radiology. The students have expressed a lack of expertise and insufficient exposure to IR during their undergraduate or master's studies, which is a significant result. Interventional Radiology is one of the most diverse scientific disciplines, and as it evolves, there is a need to include it in the undergraduate or master's curriculum of the radiology department. The absence of IR as a specialty in undergraduate or master's teaching modules

can have a significant effect on both the decision to choose IR as a profession and patient awareness of diagnosis or treatment choices. This means that the existing radiology programme and clinical rotations can be revised to include IR early in the educational process. Radiology students can undergo curriculum-based instruction and learning goals as well as workshops about how to treat basic acute clinical conditions through image-guided therapies.

Radiation safety recommendations for interventional procedures should be understood. Similar tests in Europe found that medical students were exposed to insufficient amounts of IR. In response to the current problem among medical students in European countries, the CIRSE has released an interventional radiology programme for medical students that provides detailed advice on IR learning objectives in medical schools. There are several other initiatives underway to remedy this deficit. CIRSE's *be Inspired* programme supports medical students' participation at scientific sessions and simulation sessions to promote the IR instructional model. This has proven to be a successful means of raising awareness in the area, with over 1500 students participating in the last three years. In the future, the CIRSE has launched the European Trainee Forum (ETF), which focuses on introducing and enhancing educational resources for trainees and citizens. The effectiveness of these initiatives highlights the value of encouraging early engagement in IR as a viable method for addressing students' lack of IR awareness [11].

CONCLUSIONS: Radiography students should not possess the expertise and interest in interventional radiographic techniques. Choosing a profession and being a good or more accomplished radiology technician can both serve the same purpose in answering this question, but we need either an interventional radiologist or a radiographer to do it. Radiotoxic education is currently being implemented in many ways, such as seminars, targeted radiologic education, or obligatory radiology placement in radiology departments for radiography residents. As we can see from the results, the master's students have more knowledge in IR compared to undergraduates. This happened due to proper lectures, clinical postings, or having more experience in this field.

LIMITATIONS: The current report has several flaws. To begin, only a limited number of students were polled. Second, since these students attended the same institution, they shared an academic atmosphere. This is unquestionably a significant change in understanding. It is

not, though, used in the undergraduate medical program. As a result, further research is required to back up our claims.

ACKNOWLEDGEMENT

I would like to acknowledge and thank my supervisor **Mr. NAVREET BOORA** for his thoughtful and creative comments, guidance, support, editing, and commitment during the lengthy preparation and writing of this report. He taught me how to express my ideas, showed me different ways to approach handle and present my research, and the need to be persistent in order to accomplish my goals. Thank you for your confidence in me when I doubted myself. Without you, this study would be worthless. My gratitude goes to **Prof. Navneet Kumar, Vice Principal of College of Paramedical Sciences, Teerthanker Mahaveer University, Delhi Road Moradabad, and Uttar-Pradesh.** My appreciation goes to **Mr. Raushan Kumar and Mr. Niraj Kumar Sah** my faculties who greatly assisted me during the study. Without your co-operation, this project would have been impossible. My special thanks are extended to **my parents** who have provided me with constant emotional and spiritual support. I would also like to thank my colleagues and my friends **Mr. Deepak Kumar, Vansh Saxena, Sameer, Amrit Kumar, and My elder sister Priya Yadav, and brother Souryansh Yadav, Sandeep Yadav** for encouraging and supporting me throughout the project.

CONFLICT OF INTEREST: None

DISCLOSURE

The author did not receive any type of commercial support in forms either compensation or financial support for this study.

ETHICAL APPROVAL

The study has been approved by the research committee of the College of Paramedical Sciences, Teerthanker Mahaveer University, Moradabad, Uttar Pradesh

REFERENCES:

- [1]. Baum RA, Baum S (2014) Interventional radiology: a half century of innovation. *Radiology*. 2014 Nov;273(2 Suppl):S75-91. doi: 10.1148/radiol.14140534. PMID: 25340439.
- [2]. Madhusudhan, KS, Srivastava DN, Sharma S, (2018) Interventional Radiology in India, *American College of Roentgenology*. 2018;211:730-735, 10.2214/AJR.18.
- [3]. Alnajjar SF, Alshamrani HM, Banasser AM, Alshehri HZ, Wazzan MA, Abduljabbar AH. (2019) Awareness of Interventional Radiology Among Medical Students at a Saudi Medical School: Clerkship versus Pre-clerkship Years. *Oman Med J*. 2019;34(5):420-426. doi:10.5001/omj.2019.77
- [4]. Ramaswamy RS, Choi HW, Mouser HC, Narsinh KH, McCammack KC, Treesit T, Kinney TB. (2014) Role of interventional radiology in the management of acute gastrointestinal bleeding. *World J Radiol*. 2014 Apr 28;6(4):82-92. doi: 10.4329/wjr.v6.i4.82. PMID: 24778770; PMCID: PMC4000612.

- [5]. Hill GQ, Bob Smouse H. (2006) The Basics of Interventional Radiology Management in a Large Radiology Group: A Bird's-Eye View. *Semin Intervent Radiol.* 2006 Dec;23(4):311-4. doi: 10.1055/s-2006-957018. PMID: 21326780; PMCID: PMC3036394.
- [6]. Alchallah MO, Ismail H, Dia T, et al. (2020) Assessing diagnostic radiology knowledge among Syrian medical undergraduates. *Insights Imaging.* 2020;11(1):124. Published 2020 Nov 23. doi:10.1186/s13244-020-00937-9
- [7]. Taslakian B, Ingber R, Aaltonen E, Horn J, Hickey R. (2019) Interventional Radiology Suite: A Primer for Trainees. *J Clin Med.* 2019 Aug 30;8(9):1347. doi: 10.3390/jcm8091347. PMID: 31480308; PMCID: PMC6780384.
- [8]. Aghapour, M.; Bockstahler, B. (2022) State of the Art and Future Prospects of Virtual and Augmented Reality in Veterinary Medicine: A Systematic Review. *Animals* 2022, 12, 3517. <https://doi.org/10.3390/ani12243517>
- [9]. Keshava SN, Mammen T, Surendrababu N, Moses V. (2008) Transjugular liver biopsy: What to do and what not to do. *Indian J Radiol Imaging.* 2008 Aug;18(3):245-8. doi: 10.4103/0971-3026.41839. PMID: 19774169; PMCID: PMC2747432.
- [10]. Beecham GB, Aeddula NR. (2022) Dialysis Catheter. [Updated 2022 Aug 10]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK539856>
- [11]. Agrawal, D., Renfrew, M. A., Singhal, S., & Bhansali, Y. (2019). Awareness and knowledge of interventional radiology among medical students at an Indian institution. *CVIR endovascular*, 2(1), 45. <https://doi.org/10.1186/s42155-019-0093-x>