Radiology In Focus: Career Aspirations Of Medical Students In A Private Medical College In Chennai

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ABSTRACT

Introduction

Radiology plays a central role in modern medical practice. Understanding students' perceptions and the factors influencing radiology as a specialty choice is essential for strengthening undergraduate education and workforce planning. This study aimed to assess awareness, attitudes, and determinants influencing radiology as a career choice among undergraduate medical students in a private medical college in South Chennai.

Methods

A prospective observational study was conducted among 180 final-phase MBBS students at a tertiary care Hospital, Chennai. Data were collected using a structured, self-administered questionnaire administered electronically. Variables included sociodemographic characteristics, academic exposure, teaching preferences, perceived barriers, and career interest. Data were analyzed using SPSS, with results expressed as frequencies and percentages.

Results

Among 180 participants, 110 (61.1%) were female and 70 (38.9%) male, with most aged 22–23 years (107, 59.4%). The majority belonged to non-medical families (father: 130, 72.2%; mother: 166, 92.3%) and upper-income groups (112, 62.2%). While 117 students (65.0%) acknowledged radiology as an important undergraduate subject, only 58 (32.2%) expressed strong interest in pursuing it as a career. Demonstration- and case-based teaching was the preferred learning method for 78 students (43.3%), whereas limited clinical exposure (64, 35.6%) and inadequate faculty guidance (39, 21.7%) were the most cited barriers. MRI (72, 40.0%) and CT (48, 26.7%) were the most favored imaging modalities, with neuro-radiology (58, 32.2%) and musculoskeletal radiology (41, 22.8%) being preferred subspecialties.

Conclusion

Despite strong academic recognition, career interest in radiology remains modest. Enhancing clinical exposure, mentorship, and applied teaching may improve informed career selection.

Keywords: Radiology education; Career aspirations; Medical students; Specialty choice; Clinical exposure

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INTRODUCTION

Radiology has emerged as one of the most dynamic and indispensable specialties in modern medicine, playing a central role in disease diagnosis, management, and longitudinal monitoring. Advances in imaging technologies—such as computed tomography (CT), magnetic resonance imaging (MRI), ultrasonography, and interventional radiology

have expanded the specialty far beyond its traditional diagnostic function, integrating it deeply into clinical decision-making across virtually all medical disciplines [1]. These technological innovations have not only transformed patient care but have also reshaped professional opportunities within medicine, positioning radiology as an increasingly attractive career option for medical graduates seeking a specialty that combines clinical relevance with technological sophistication.

Exposure to radiology during undergraduate medical training has been shown to significantly influence students' perceptions and career aspirations toward the specialty. Previous studies have demonstrated that early and meaningful engagement with radiology can positively shape students' interest; however, the determinants influencing this inclination are complex and multifactorial [2]. Career choice in medicine is rarely based on a single factor. Instead, it is shaped by an interplay of personal interests, perceived job prospects, lifestyle considerations, academic exposure, mentorship experiences, and socio-economic expectations. Understanding these factors is critical, particularly in competitive specialties such as radiology, where informed career decision-making can influence both workforce planning and educational policy.

The process of specialty selection among medical students is gradual and multidimensional. Throughout their pre-clinical and clinical years, students are exposed to multiple disciplines through classroom teaching, clinical postings, and interactions with faculty and peers. These experiences collectively shape perceptions of various specialties and influence long-term career goals. Radiology occupies a unique position in this context, as undergraduate exposure often occurs at a stage when students have limited direct patient interaction and are primarily introduced to imaging interpretation, diagnostic reasoning, and technology-driven decision-making [3]. While this aspect may appeal to students with strong analytical skills and an interest in precision and innovation, others may perceive radiology as less patient-facing compared to core clinical specialties such as internal medicine or surgery. Nevertheless, the integration of advanced technology with clinical problem-solving, coupled with opportunities in research and academic medicine, may further enhance the appeal of radiology as a career choice [4].

Globally, studies have explored factors influencing medical students' specialty preferences, consistently identifying the roles of academic exposure, mentorship, lifestyle expectations, financial prospects, and individual aptitude [5]. In India, the healthcare system is undergoing rapid transformation, with increasing reliance on advanced diagnostic services and imaging-guided interventions. This evolution has elevated the prominence of radiology within both public and private healthcare sectors. Private medical colleges, in particular, often offer exposure to state-of-the-art imaging facilities, structured training environments, and early subspecialty orientation, potentially shaping students' career aspirations. However, despite these opportunities, interest in radiology varies considerably among students. Contributing factors include limited exposure during early undergraduate years, lack of structured mentorship, misconceptions regarding the scope and patient interaction in radiology, and the highly competitive nature of postgraduate entrance examinations for radiology training programs [6].

Examining the career aspirations of medical students in a private medical college in South Chennai provides an opportunity to explore both individual and institutional determinants influencing specialty choice. Such an investigation offers insights into how educational infrastructure, faculty engagement, clinical exposure, and student perceptions converge to shape interest in radiology [7]. Identifying motivators and deterrents associated with choosing radiology as a specialty can inform curriculum design, strengthen mentorship initiatives, and improve career guidance mechanisms, enabling students to make informed decisions aligned with their interests and competencies [8]. This inquiry is particularly relevant in a metropolitan setting like Chennai, where rapid technological advancement in healthcare coexists with traditional models of patient care, offering a unique environment for evaluating perceptions of radiology as a career pathway.

Understanding medical students' career aspirations in relation to radiology extends beyond individual preference, encompassing broader educational, professional, and socio-economic dimensions. By examining these factors within a private medical college setting in South Chennai, this study seeks to provide a comprehensive perspective on how future physicians perceive radiology and what drives their inclination toward this specialty. Such evidence has the potential to guide academic policy, curriculum reform, and mentorship strategies, ultimately contributing to the development of a motivated, well-prepared, and competent radiology workforce [9]. This study aimed to assess the career aspirations of

medical undergraduate students in radiology at a tertiary care hospital in Chennai, South India.

METHODOLOGY

Study Design and Setting

This prospective observational study was conducted in the Department of Radiodiagnosis at Sree Balaji Medical College and Hospital, Chennai, a tertiary care teaching institution with established undergraduate radiology training and clinical imaging services. The study aimed to assess career aspirations toward radiology among undergraduate medical students and to explore factors influencing their specialty preferences. Ethical approval for the study was obtained from the Institutional Ethics Committee of SBMCH, Chennai, prior to initiation of data collection. The study was conducted in accordance with ethical standards governing research involving human participants.

Study Population and Participant Recruitment

The study population consisted of undergraduate medical students enrolled in the final phase of the MBBS program at Sree Balaji Medical College and Hospital, Chennai. Final-phase students were selected because they had completed structured academic teaching and clinical postings in radiology, ensuring adequate exposure to imaging sciences and radiodiagnostic practice. All eligible students present during the study period were invited to participate, and recruitment was based on voluntary participation. A total of 180 students consented and completed the study. Inclusion was restricted to students who were willing to provide informed consent and complete the questionnaire in full, while those who declined participation or submitted incomplete responses were excluded from the analysis. The participant cohort represented a range of socio-economic and educational backgrounds, enabling a comprehensive assessment of factors influencing career aspirations toward radiology.

Study Instrument and Questionnaire Development

Data were collected using a structured, self-administered questionnaire developed specifically to meet the objectives of the study. The questionnaire was designed following a review of existing literature on medical career choice and specialty preference, with particular attention to determinants relevant to radiology. Faculty members from the Departments of Radiodiagnosis and Medical Education reviewed the questionnaire to ensure clarity, relevance, and alignment with undergraduate training contexts. Based on their feedback, minor revisions were made to improve comprehensibility and face validity.

The final questionnaire was administered in Microsoft Excel format and comprised multiple sections capturing sociodemographic characteristics, academic exposure to radiology, perceptions of radiology as a specialty, career aspirations, and perceived facilitators and barriers to choosing radiology. Questions addressed students' exposure to different imaging modalities, perceived quality of radiology teaching, interest in technology-driven diagnostics, perceptions regarding patient interaction, lifestyle considerations, financial prospects, mentorship influence, and concerns related to competitiveness of postgraduate entrance examinations and radiation exposure. Responses were recorded using a combination of dichotomous options, multiple-choice formats, and Likert-type scales to facilitate structured analysis.

Data Collection Procedure

Following ethical approval, eligible students were approached during scheduled academic sessions and informed about the purpose and procedures of the study. Written informed consent was obtained from all participants prior to questionnaire administration. Participation was voluntary, and students were assured that refusal to participate would not affect their academic standing. The questionnaire was distributed electronically in Excel format and completed by participants in a supervised setting to minimize discussion or influence among peers. No personal identifiers were collected, ensuring anonymity and confidentiality of responses. Completed questionnaires were reviewed for completeness prior to data entry and analysis.

Data Management and Statistical Analysis

Data from completed questionnaires were systematically coded and entered into the Statistical Package for the Social Sciences (SPSS) software for analysis. Data cleaning procedures were undertaken to identify and exclude incomplete or inconsistent responses. Descriptive statistics were used to summarize participant characteristics and questionnaire responses, with categorical variables expressed as frequencies and percentages. Inferential statistical analysis was performed using the Chi-square test to examine associations between demographic variables, academic exposure, and interest in radiology as a career choice. Statistical significance was assessed at a p-value threshold of less than 0.05.

Ethical Considerations

Ethical approval for the study was obtained prior to data collection, and all procedures were conducted in compliance with institutional ethical guidelines.

Participation was voluntary, and written informed consent was obtained from all participants. Anonymity and confidentiality were strictly maintained throughout the study, and data were used exclusively for research purposes. Participants were informed of their right to withdraw from the study at any stage without academic or personal repercussions.

RESULTS

The study population comprised predominantly female students, with 110 females (61.1%) and 70 males (38.9%). Most participants were aged 22–23 years (107/180, 59.4%), reflecting the final-phase MBBS cohort. A majority of students belonged to non-medical families, with fathers of 130 students (72.2%) and mothers of 166 students (92.3%) engaged in non-medical professions. Socioeconomic distribution showed that 112 students (62.2%) were from upper-income backgrounds, while 31 (17.2%) belonged to the upper-middle class and 37 (20.6%) to middle or lower income groups.

Table 1. Sociodemographic profile of study participants (n = 180)

Variable	Category	n (%)
Gender	Female	110 (61.1)
	Male	70 (38.9)
Age (years)	21	36 (20.0)
	22	53 (29.4)
	23	54 (30.0)
	≥24	37 (20.6)
Father's occupation	Medical	50 (27.8)
	Non-medical	130 (72.2)
Mother's occupation	Medical	14 (7.8)
	Non-medical	166 (92.3)
Socio-economic status (Modified BG Prasad)	Upper income	112 (62.2)
	Upper-middle income	31 (17.2)
	Middle / Lower income	37 (20.6)

Although radiology was widely perceived as an important undergraduate subject, this did not translate into equivalent career interest. A total of 117 students (65.0%) either agreed or strongly agreed that radiology is an important component of the undergraduate curriculum. However, only 58 students (32.2%) expressed strong interest in pursuing radiology as a career, while 99 students (55.0%) reported a neutral stance. Statistical analysis demonstrated a significant association between perceived curricular importance and career interest in radiology ($\chi^2 = 20.22$, $p < 0.001$), indicating that students who valued radiology academically were more likely to consider it professionally, though overall enthusiasm remained limited.

Table 2. Interest in radiology as a career and perceived importance in undergraduate curriculum (n = 180)

Response category	Interest in radiology n (%)	Importance of radiology in UG curriculum n (%)
Strongly disagree	9 (5.0)	1 (0.6)
Disagree	14 (7.8)	13 (7.2)
Neutral	99 (55.0)	49 (27.2)
Agree	43 (23.9)	76 (42.2)
Strongly agree	15 (8.3)	41 (22.8)
Total	**180 (100)**	**180 (100)**

Demonstration-based and case-based teaching sessions were the most preferred learning method, reported by 78 students (43.3%), followed by audio-visual or PACS-based lectures (41, 22.8%) and small-group tutorials (32, 17.8%). Conventional didactic lectures were preferred by 21 students (11.7%). Regarding barriers to learning radiology, limited clinical exposure was the most frequently cited challenge (64, 35.6%), followed by inadequate faculty guidance (39, 21.7%) and restricted access to digital resources such as PACS or e-modules (33, 18.3%). These findings indicate a strong student preference for applied, clinically oriented teaching and highlight gaps in experiential exposure and mentorship.

Table 3. Preferred teaching methods and perceived barriers in learning radiology (n = 180)

Domain	Category	n (%)
Preferred teaching method	Demonstration / case-based sessions	78 (43.3)
	Audio-visual / PACS-based lectures	41 (22.8)
	Small-group / problem-based tutorials	32 (17.8)
	Conventional didactic lectures	21 (11.7)
	Self-learning / online modules	8 (4.4)
Major learning barriers	Limited clinical exposure	64 (35.6)
	Inadequate faculty guidance	39 (21.7)

	Limited access to digital resources	33 (18.3)
	Heavy theoretical content	26 (14.4)
	Time constraints / subject overlap	18 (10.0)

Magnetic resonance imaging (MRI) emerged as the most preferred imaging modality, selected by 72 students (40.0%), followed by computed tomography (CT) (48, 26.7%) and ultrasonography (32, 17.8%). Interventional radiology was preferred by 18 students (10.0%), while nuclear medicine and PET imaging attracted limited interest (10, 5.5%). In terms of subspecialty preference, neuro-radiology was the most favored (58, 32.2%), followed by musculoskeletal radiology (41, 22.8%) and abdominal/hepatobiliary imaging (33, 18.3%). These preferences suggest a greater inclination toward technologically advanced and diagnostically complex domains within radiology.

Table 4. Preferred imaging modalities and radiology subspecialties (n = 180)

Variable	Category	n (%)
Preferred imaging modality	Magnetic resonance imaging (MRI)	72 (40.0)
	Computed tomography (CT)	48 (26.7)
	Ultrasonography	32 (17.8)
	Interventional radiology	18 (10.0)
	Nuclear medicine / PET	10 (5.5)
Preferred subspecialty	Neuro-radiology	58 (32.2)
	Musculoskeletal radiology	41 (22.8)
	Abdominal / hepatobiliary imaging	33 (18.3)
	Cardiothoracic imaging	28 (15.6)
	Breast & women's imaging	20 (11.1)

Among 180 students, interest in radiology, income potential, and work–life balance were the main motivators, yet only 32.2% included it in their top three choices, with deterrents like high NEET-PG rank, limited patient contact, and radiation fear; additionally, limited exposure to radiologists (25.6%) modestly influenced career preference, highlighting that mentorship and perceived competitiveness shape specialty selection.

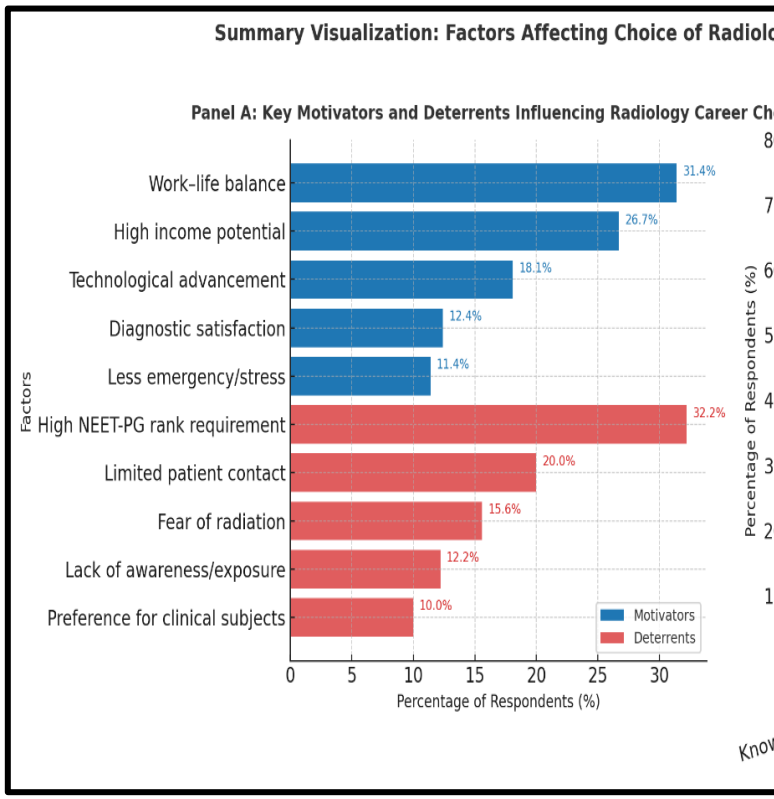

Figure 1: Summary Visualization: Factors Affecting Choice of Radiology as a Career (n = 180)

DISCUSSION

The present study examined medical students' perceptions, motivations, and barriers influencing radiology as a career choice in a private medical college in South Chennai. The findings highlight a complex interplay of demographic characteristics, academic exposure, teaching methodologies, and perceptual factors that collectively shape students' attitudes toward radiology. These results are consistent with existing literature, which emphasizes that specialty choice in medicine is rarely determined by a single factor but instead reflects cumulative educational and experiential influences [10].

Although radiology was widely acknowledged as an integral component of the undergraduate curriculum, only a minority of students expressed a definitive intention to pursue it as a postgraduate specialty. This observed gap between academic recognition and career aspiration mirrors findings from previous studies, which report that appreciation of a subject does not necessarily translate into professional commitment [10]. This disconnect may be partly attributed to limited clinical exposure, insufficient mentorship, and misconceptions regarding the scope

of radiology practice. The results underscore the importance of aligning undergraduate teaching with realistic portrayals of professional practice to facilitate informed career decision-making.

The predominance of female participants in the present study reflects the increasing representation of women in Indian medical colleges. However, no significant gender-based differences were observed in interest toward radiology as a career, suggesting that specialty preference is influenced more by academic exposure and experiential learning than by gender norms. Similar observations have been reported in earlier studies, which indicate that gender disparities in specialty choice are narrowing, particularly in technology-driven fields [11]. The majority of participants originated from non-medical families, which may limit early exposure to medical career pathways and specialty-specific role models. This lack of familial medical background could contribute to incomplete awareness of radiology's evolving clinical and interventional roles, as previously described in studies examining career intentions among healthcare trainees [11,12].

Socioeconomic status emerged as a significant contextual factor, with most participants belonging to upper-income groups. This trend is commonly observed in private medical institutions and may influence students' inclination toward technologically advanced and research-oriented specialties such as radiology. However, despite this socioeconomic advantage, misconceptions regarding radiology's limited patient interaction and the perceived difficulty of postgraduate entrance examinations remained prominent deterrents [13]. These findings suggest that economic capacity alone does not overcome informational and experiential barriers influencing specialty choice.

Consistent with the study results, 65% of students recognized radiology's importance within the undergraduate curriculum, yet only 32.2% ranked it among their preferred career options. Similar patterns have been reported by Smith, who described a phenomenon of "academic appreciation without professional motivation," often linked to restricted clinical exposure and absence of structured mentorship [14]. In the present study, limited interaction with radiologists and inadequate orientation to the specialty likely contributed to students' underestimation of radiology's dynamic and clinically integrated role. Evidence from global studies reinforces the importance of early clinical exposure and mentorship in sustaining interest in imaging-based specialties [15].

Teaching methodology emerged as a critical determinant of student engagement. Demonstration-based and case-integrated teaching approaches were preferred by nearly half of the participants, highlighting the value of applied, context-driven learning in radiology education. Conversely, limited clinical exposure and inadequate faculty interaction were identified as major barriers to effective learning. These findings emphasize the need for curricular designs that prioritize hands-on exposure, patient-linked imaging interpretation, and interactive teaching modalities. The incorporation of simulation-based training, digital PACS access, and interdisciplinary learning environments has been shown to enhance conceptual understanding and foster sustained interest in radiology [16].

Preferences for imaging modalities and subspecialties further illustrate students' attraction to technologically advanced and diagnostically challenging domains. MRI and CT were the most favored modalities, while neuro-radiology and musculoskeletal radiology emerged as leading subspecialty interests. These preferences align with broader trends among contemporary medical learners, who value precision diagnostics, advanced technology, and innovation in clinical practice [17,18]. Such inclinations highlight the potential for targeted exposure to advanced imaging and subspecialty practice to positively influence career interest.

Despite these interests, substantial gaps in understanding radiologists' professional roles were evident. More than half of the students perceived radiologists primarily as diagnosticians, with only one-third recognizing their therapeutic and interventional contributions. Furthermore, a majority viewed radiologists' involvement in treatment decisions as indirect. These misconceptions reflect a persistent perception of radiology as a passive specialty and underscore the need to emphasize multidisciplinary collaboration and interventional radiology during undergraduate training. Global surveys and educational studies have similarly highlighted the importance of showcasing radiology's expanding clinical and procedural scope to medical students [19,20].

Curricular reforms that integrate radiology more visibly into clinical training may address many of the barriers identified in this study. Structured mentorship programs, elective radiology rotations, and exposure to interventional procedures have been advocated as

effective strategies to reshape student perceptions and bridge the gap between academic learning and real-world practice [21]. Enhancing awareness of radiology's evolving technological, procedural, and research dimensions may enable students to make more informed and confident career choices.

Limitations

This study has certain limitations that should be acknowledged. Being conducted in a single private medical college, the findings may not be generalizable to students from public institutions or other regions. The cross-sectional nature of the assessment limits causal inference regarding factors influencing career choice. Data were based on self-reported perceptions, which may be subject to social desirability and recall bias. Additionally, the use of a structured questionnaire may not fully capture nuanced personal motivations underlying specialty preference.

Implications

Despite these limitations, the study provides valuable insights into undergraduate perceptions of radiology and highlights actionable areas for educational reform. Integrating early clinical exposure, applied teaching methodologies, and structured mentorship into undergraduate curricula may enhance understanding of radiology's clinical relevance and interventional scope. These strategies have the potential to align academic appreciation with professional aspiration, ultimately contributing to a well-informed and motivated radiology workforce.

CONCLUSION

This study demonstrates that while undergraduate medical students widely recognize the academic importance of radiology, genuine interest in pursuing it as a career remains limited. Preferences were strongly influenced by quality of academic exposure, teaching methodology, and perceptions of clinical involvement rather than by gender or socioeconomic background alone. Limited clinical exposure, inadequate mentorship, and misconceptions regarding radiologists' patient-facing and interventional roles emerged as major deterrents. Students showed greater interest in technologically advanced imaging modalities and diagnostically complex subspecialties, indicating that targeted exposure to applied and interventional radiology could positively shape career aspirations. Strengthening undergraduate radiology education through early clinical integration, demonstration-based teaching, mentorship programs, and visibility of radiologists' multidisciplinary roles may bridge the gap between curricular appreciation and career intent, enabling more informed specialty choices.

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