



Journal Homepage: - [www.journalijar.com](http://www.journalijar.com)

## INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/18183

DOI URL: <http://dx.doi.org/10.21474/IJAR01/18183>



### RESEARCH ARTICLE

#### BRIDGING THE GAP: UNDERSTANDING MEDICAL STUDENTS' AND INTERNS' PERCEPTIONS OF RADIOLOGY AS A CAREER CHOICE AT TAIF UNIVERSITY, SAUDI ARABIA

Yahea Al Zahrani

Associate Professor of Radiology, Internal Medicine Department, Faculty of Medicine, Taif University, Saudi Arabia.

#### Manuscript Info

##### Manuscript History

Received: 16 November 2023

Final Accepted: 21 December 2023

Published: January 2024

##### Key words:-

Radiology, Preference, Future Career, Medical Students, Saudi Arabia

#### Abstract

**Background:** Radiology is a fundamental pillar of modern medicine, providing essential diagnostic and treatment guidance. Despite its importance, radiology faces challenges in attracting medical students as a career option.

**Objective:** To identify factors influencing medical students' and interns' perceptions of radiology as a specialty.

**Methods:** A cross-sectional study was conducted among Taif University medical 6th-year medical students and interns using a self-administered questionnaire including items to explore participants' knowledge, perceptions, and interest in radiology as a potential career path.

**Results:** The study included 216 students and interns with a response rate of 91.9%. Males constituted 79.2% of them. Only a minority (18.5%) considered radiology as their future career aspiration. Exposure to radiology lectures during medical school was the most appealing factor (37%). Significant deterrents included concerns about losing clinical skills (45.8%), occupational hazards (41.2%), lack of recognition (40.7%), and limited patient contact (39.8%). The absence of patient interactions was the primary reason for disinterest in radiology (29.2%). Males were more likely than female students to choose radiology as a future career (20.5% vs. 11.1%),  $p < 0.001$ . Also, participants with a higher level of knowledge about the radiology specialty were more likely than those with limited or no knowledge about it (33.3% vs. 25.2 and 7.7%, respectively),  $p = 0.002$ .

**Conclusion:** More than half of the medical students and interns surveyed expressed doubts about pursuing radiology. Male participants were more likely than female participants to be interested in radiology. To address this, introducing early and comprehensive diagnostic imaging education throughout the undergraduate years and incorporating theoretical and practical approaches could attract more medical students and interns to the field of radiology.

Copy Right, IJAR, 2024., All rights reserved.

**Corresponding Author:- Yahea Al Zahrani**

Address:- Associate Professor of Radiology, Internal Medicine Department, Faculty of Medicine, Taif University, Saudi Arabia.

**Introduction:-**

The selection of a residency program is a pivotal decision for medical students and interns, profoundly impacting their career paths and personal lives [1]. The intricate and multifaceted nature of this decision-making process involves a multitude of influencing factors [2]. Understanding these factors is essential for enhancing the compatibility between medical students and interns and their chosen programs, mitigating the attrition rate, and elevating the quality of care provided [1].

Extensive research has been conducted globally, encompassing studies in Saudi Arabia, the USA, Canada, and Japan, to delve into the factors influencing medical students' and interns' specialty choices. A notable study identified program location and the availability of sub-specialty training as significant determinants in residency program selection [3]. Similarly, other studies have highlighted the importance of research opportunities, program reputation, and work-life balance in influencing selection [4, 5]. Furthermore, a study revealed that the quality of life, the cost of living, and the availability of recreational activities in the residency program location were significant factors in the selection process [6]. Lifestyle considerations have emerged as increasingly important factors influencing potential residents' career decisions [7, 8]. Moreover, the availability of mentors, social support, and opportunities to work in rural or underserved areas were found to be critical influences in the selection process. Additionally, a study found that exposure to various medical specialties, a supportive work environment, and the potential for financial stability were critical factors in the selection process [9].

While research investigating the factors influencing the choice of radiology as a career among medical students and interns is limited in Saudi Arabia, a prior study conducted among radiologists identified four key motivations: intrinsic interest in diagnostic radiology, work-life balance, diverse practice opportunities, and predictable work hours [10]. Interestingly, a significantly higher proportion of female radiologists (60%) compared to male radiologists (43%) considered work hours to be a major factor in their decision to enter the radiology field. These findings align with the understanding that women may require more flexible work arrangements during child-bearing years [11].

The Kingdom of Saudi Arabia faces a growing demand for highly skilled radiologists across its various regions. To address this critical healthcare need, the Kingdom has witnessed a commendable expansion of well-structured radiology residency and fellowship programs over the past decade to address the shortage of radiologists [12]. This study investigated the perceptions of medical students and interns at Taif University, Saudi Arabia, regarding radiology as a career choice.

**Subjects and Methods:-****Study design**

A cross-sectional study was conducted at the Faculty of Medicine, Taif University, Saudi Arabia, to explore medical students' and interns' knowledge, perceptions, and interest in diagnostic radiology as a potential career path.

**Study participants**

All medical students enrolled in the 6<sup>th</sup> year and interns at Taif University during January 2022 were eligible to participate in the study (n=406).

**Sample size and sampling technique**

Using the online Raosoft sample size calculator with the assumptions of margins of error of 3%, 95% confidence interval, and 15.4% as a rate of interest of Saudi medical students in Radiology as a future career [13], accordingly, the calculated required minimum size was 235 students. A convenience non-random sampling technique was performed to select students and interns.

**Data collection**

A structured questionnaire was developed based on a previously published study [14] and tailored to the local context. The questionnaire assessed the demographic characteristics (age, gender, year of study), knowledge of radiology (understanding of the role of radiologists, familiarity with common radiological procedures), perceived benefits of a radiology career (intellectual challenges, technological advancements, patient impact), perceived drawbacks of a radiology career (limited patient interaction, potential loss of clinical skills, occupational hazards), and interest in pursuing a radiology career. The questionnaire was distributed electronically to all eligible

participants. Two reminder emails were sent to non-respondents. Participants were given six months to complete the questionnaire.

**Ethical approval**

Ethical approval for the study was obtained from the Institutional Review Board of Taif University (No. 42-0094), dated 25<sup>th</sup> January 2022.

**Data Analysis**

Data were entered into Microsoft Excel (Microsoft Corporation, Redmond, WA) and then transferred to IBM SPSS Statistics for Windows, Version 23.0 (IBM Corp, Armonk, NY) for analysis. Descriptive statistics were used to summarize categorical variables. Chi-square tests were used to assess associations between variables. A p-value of less than 0.05 was considered statistically significant for all tests.

**Results:-**

Out of 235 medical students and interns invited to participate, 216 responded (91.9%). Their gender distribution was 20.8% females and 79.2% males. More than half of the participants (56.5%) were in their 6<sup>th</sup> year of medical school. Table 1

**Knowledge of medical students about radiology:**

When asked about their knowledge of radiology, 107 (49.5%) participants claimed that they knew as much as other specialties, 90 (41.7%) said they barely knew about it, and 13 (6.0%) claimed they had never heard about it.

Regarding their exposure to radiology in the preclinical years, 89 (41.2%) participants said minor parts of their lectures included radiology, 65 (30.1%) said they had one or two dedicated rounds about radiology, 32 (14.8%) said they had several clinical rounds and dedicated lectures about radiology and 30 (13.9%) never recalled having exposed to any radiology sessions.

When asked about their exposure to radiology in their clinical years, 72 (33.3%) of the participants said they had one or two dedicated rounds about radiology, another 70 (32.4%) said they had several clinical rounds and dedicated lectures, 39 (18.1%) said radiology was included in a minor part of their lectures and 35 (16.2%) never recalled having exposed to any radiology sessions in their clinical years.

**Opinions of medical students about radiology:**

Most of the participants (21.8%) expressed an initial interest in radiology during their clinical years at medical school. Others developed their interest during their preclinical years (17.6%) or even before attending medical school (6.9%). Interestingly, only a small percentage of participants (17.1%) indicated radiology as their future career path. Among them, 1.4% considered radiology as their top career choice, while 23.1% were undecided. However, over 50% of the participants expressed doubts about pursuing radiology as a career.

For those who participated in an elective radiology rotation (29 out of a total of 216 “13.4%”), 27.6% reported a decreased interest in radiology. In comparison, 37.9% stated no change in their interest, and only 13.8% experienced an increased interest. Additionally, 20.7% indicated the need for more rotations to make an informed decision.

Regarding the perceived interest in radiology, 37.5% of participants considered it interesting only in the context of its relevance to other areas of medicine, while the same number found it a dull but important subject. Furthermore, 13% viewed radiology as intrinsically interesting, while 12% deemed it worthless.

When asked about the impact of radiology on other areas of medicine, most participants (41.7%) agreed that it holds greater importance than physical examination, 28.2% considered it equally important, and 16.2% acknowledged its occasional influence on patient care.

Many participants (29%) were discouraged by the lack of patient interaction in radiology, while others (20%) felt they hadn't been exposed to the field early enough, and some (18%) worried about the difficulty.

The factors that attracted medical students and interns to radiology included enjoying looking at and interpreting images (43.5%), learning pathologies throughout all ages and organ systems (37%), potential lifestyle (29.6%),

enjoying performing minimally invasive procedures and patient care (27.3%) and limited direct patient contact (26.9%).

Anticipated disadvantages of radiology included concern about losing medical skills (45.8%), concern about occupational factors like headaches, eye strain, and back pain (41.2%), and perception that radiologists' work is not recognized (40.7%). (Table 2)

#### **Factors enhancing interest in radiology:**

The most frequent factors that drew the medical students and interns to radiology were radiology lectures in their medical school (37%), 20.4% because of their medical mentor, and 19.4% because of their family members. Table 3

Table 4 shows that males were more likely than female students to choose radiology as a future career (20.5% vs. 11.1%),  $p < 0.001$ . Also, more knowledgeable about radiology participants were more likely than those to choose radiology as a future career (33.3% vs. 25.2 and 7.7%, respectively),  $p = 0.002$ . There was no significant difference between 6th-year medical students and interns in this regard.

#### **Discussion:-**

In this study, we investigated the opinions of the 6th-year medical students and interns at Taif University in Taif, in the Western region of Saudi Arabia, regarding choosing radiology as their future career. We examined the factors that could have influenced their opinions. Suppose the most crucial factors deterring medical students from pursuing a career in radiology are accurately identified. In that case, it can aid in developing an action plan to address and counteract these factors accordingly [15].

Our findings revealed that 18.5% of medical students and interns considered radiology as their future career, 23.1% were undecided, and over 50% had doubts about pursuing a career in radiology. These findings align with those of a study conducted by Alnajjar et al. in Saudi Arabia in 2019, which reported that 16.1% of medical students are considering radiology as a future career and only 14.4% are considering a career in interventional radiology [16].

Overall, the results of our study mirror the factors mentioned in other studies, particularly when it comes to the most common reason for choosing radiology, which is its intellectual component and puzzle-like nature. Another common factor influencing career choice in radiology was the influence of medical mentors (both radiologists and non-radiologists) [17, 18].

Several previous studies conducted to identify the underlying reasons for choosing radiology as a future career have identified four common factors: interest in diagnostic radiology, radiologists' quality of life in terms of minimal patient contact and reduced workload, diversity of radiology-related practices and fixed working hours [1, 13, 19].

Some authors have also observed a gender discrepancy in the choice of radiology as a career, reporting that more female doctors consider total work hours to be the primary reason for their decision to enter the radiology field [11]. However, a study conducted in Saudi Arabia to examine the factors influencing the gender-based choice of radiology as a specialty among medical students found no significant gender differences in terms of considering radiology as a future specialty and concluded that only misconceptions significantly impact students' perceptions of radiology [13]. Conversely, consistent with established literature, our findings indicated a higher interest in radiology among male students (20.5%) than female students (11.1%). Potential radiation exposure and perceived lack of direct patient interaction are salient factors that could explain the lower preference of female students in the present study [20, 21].

Not surprisingly, more knowledgeable students and interns were more likely to choose radiology as a future career in their present study. Thus, educating medical students and interns about the specialty and its benefits is essential in their decision to choose.

In our study, the factors contributing to medical students' and interns' decisions not to pursue a career in radiology varied. Still, the most intriguing finding was the perception that radiologists receive no recognition and are constantly engaged in a varied but thankless job (40.7%). This was by far the most common factor, along with the perceived difficulty of radiology (18.5%). Another common factor was the lack of early exposure (19.9%),

contributing to a lack of interest as people tend to gravitate toward what they are familiar with. Additionally, the stereotype that radiologists are technicians and not actual doctors is a common misconception (15.7%) [22].

Our findings indicate that medical students and interns with a deeper understanding of radiology are more inclined to pursue it as a specialty. This could be attributed to their exposure to information about radiology's benefits and future prospects. Conversely, students and interns who lack interest in radiology often fail to recognize its significance in patient diagnosis and treatment. This lack of awareness stems from the fact that radiology is not adequately covered as a distinct subject in medical school curricula, with minimal emphasis placed on its importance [23].

To the best of our knowledge, there is very limited literature on medical students' and interns' knowledge of radiology as a specialty in our region. This lack of knowledge may be preventing them from considering the specialty. The most common misconceptions about radiology as a specialty are that radiologists do not interact with patients (29.2%), there is insufficient early exposure (19.9%), it is too difficult (18.5%), and radiologists are technologists rather than actual doctors (15.7%). These misconceptions significantly impact the choice of radiology as a career option. Other Saudi studies also mentioned these barriers [1, 13].

The present study has limitations, including its conduction in only one setting, which could impact the generalizability of the findings. Also, its cross-sectional design is considered a limitation. However, its conduction in 6th-year medical students and interns is considered a strength point as they are close to choosing their future careers.

### Conclusion:-

We investigated the opinions of the 6th-year medical students and interns regarding choosing radiology as their future career. Our findings revealed that over half of the participants had doubts about pursuing a career in radiology. The males and more knowledgeable participants were more likely to choose radiology as a future career than their counterparts.

The study suggests that introducing medical students and interns to diagnostic imaging fundamentals early in their undergraduate years with system-based and case-based learning throughout the pre-clinical and clinical years could address these concerns and encourage more medical students and interns to consider radiology.

**Table 1:-** Demographic data of the respondents (n=2016).

Variables	Number (%)
<b>Gender</b>	
Male	171 (79.2)
Female	45 (20.8)
<b>Academic level</b>	
6th-year medical students	122 (56.5)
Interns	94 (43.5)

**Table 2:-** Knowledge, exposure, and opinions of medical students about Radiology.

Variables	Number (%)
<b>How much do you know about the radiology specialty?</b>	
Never heard	13 (6.0)
Barely know	90 (41.7)
Know the Same as other specialties	107 (49.5)
Know more than other specialties	6 (2.8)
<b>How much radiology have you been exposed to in the preclinical years of medical school?</b>	
Minor Discussion	89 (41.2)
One or Two Dedicated Rounds	65 (30.1)
Several Clinical Rounds and Dedicated Lectures	32 (14.8)
No Exposure	30 (13.9)
<b>How much radiology have you been exposed to in the clinical years of medical school?</b>	

Minor Coverage	39 (18.1)
One or Two Dedicated Rounds	72 (33.3)
Several Clinical Rounds and Dedicated Lectures	70 (32.4)
No Exposure	35 (16.2)
<b>Did you take or plan to take radiology as an elective rotation?</b>	
No	149 (69.0)
May be	38 (17.6)
Yes	29 (13.4)
<b>If yes, how has this changed your opinion about radiology?</b>	
Less interested	8 (27.6)
Same as before	11 (37.9)
Need more rotation	6 (20.7)
More interested	4 (13.8)
<b>How interesting is the radiology?</b>	
It is worthless to me	26 (12.0)
It is dull but important	81 (37.5)
It is interesting only as it relates to other areas of medicine	81 (37.5)
It is interesting in its own right	28 (13.0)
<b>How do you think radiology impacts other areas of medicine?</b>	
Minimal impact	30 (13.9)
Occasionally changes patient care	35 (16.2)
Just as important as physical examination	61 (28.2)
More important than physical examination	90 (41.7)
<b>Reasons for insufficient interest in radiology</b>	
Too difficult	40 (18.5)
Radiologist is technologist	34 (15.7)
Not enough exposure early on	43 (19.9)
Every specialist should interpret their own images	21 (9.7)
Residency is too difficult to get in	15 (6.9)
No patient interaction	63 (29.3)
<b>When did you first develop an interest in radiology?</b>	
Before medical school	15 (6.9)
Medical school preclinical years	38 (17.6)
Medical school clinical years	47 (21.8)
During internship.	7 (3.2)
Not interested at all	109 (50.5)
<b>Are you considering radiology as a future career?</b>	
Not a chance	55 (25.5)
Probably not	71 (32.9)
Unsure	50 (23.1)
I'm considering it.	37 (17.1)
It's my top choice.	3 (1.4)
<b>Factors attracting medical students and interns to radiology as a future career. *</b>	
Intellectual component (learn pathologies throughout all ages and organ systems)	80 (37.0)
Imaging component (enjoy looking at/interpreting images)	95 (43.5)
Procedure component (enjoy performing minimally invasive procedures and patient care)	59 (27.3)
Associated research opportunities	24 (11.1)
Potential income	47 (21.8)
Potential lifestyle	64 (29.6)

Job market	37 (17.1)
Limited direct patient contact	58 (26.9)
<b>What is the most important disadvantage you will expect in radiology? *</b>	
Nobody knows about your work	88 (40.7)
Limit direct patient contact	86 (39.8)
No need to prescribe medication	38 (17.6)
Occupational factors (Headache, eye strain, and back pain)	89 (41.2)
Forget medical skills (history, physical examination)	99 (45.8)

**Table 3:-** Frequency of factors that draw students to radiology.

Variable	N (%)
Family member	42 (19.4)
Medical mentor (radiologist or not radiologist)	44 (20.4)
Radiology lecture in medical school	80 (37.0)
Senior medical students	16 (7.4)
Radiology elective rotation	12 (5.6)
Other courses during medical school (surgery, medicine, other)	31 (14.4)
Research	14 (6.5)
Strong personal interest	5 (2.3)

\*Not mutually exclusive (i.e. sum exceeded 100%)

**Table 4:-** Factors associated with choosing radiology as a future career among the participants.

	Considering radiology as a career			p-value*
	No N=126 N (%)	Unsure N=50 N (%)	Yes N=40 N (%)	
<b>Gender</b>				
Male (n=171)	88 (51.5)	48 (28.1)	35 (20.5)	<0.001
Female (n=45)	38 (84.4)	2 (4.4)	5 (11.1)	
<b>Academic level</b>				
6 <sup>th</sup> (n=122)	75 (61.5)	24 (19.7)	23 (18.9)	0.376
Intern (n=94)	51 (54.3)	26 (27.7)	17 (18.1)	
<b>Knowledge level about radiology specialty</b>				
Never heard (n=13)	12 (92.3)	0 (0.0)	1 (7.7)	0.002
Barely (n=90)	49 (54.4)	31 (34.4)	10 (11.1)	
Same as others (n=107)	61 (57.0)	19 (17.8)	27 (25.2)	
More than others (n=6)	4 (66.7)	0 (0.0)	2 (33.3)	

\*Chi-square test

**Reference:-**

- Alaqeel SA, Alhammad BK, Basuhail SM, Alderaan KM, Alhawamdeh AT, Alquhayz MF, Alzunaidi AM, Alrashed FA. Investigating factors that influence residency program selection among medical students. BMC Medical Education. 2023 Aug 29;23(1):615.
- Phillips Jr RL, George BC, Holmboe ES, Bazemore AW, Westfall JM, Bitton A. Measuring graduate medical education outcomes to honor the social contract. Academic Medicine. 2022 May;97(5):643.
- Aagaard EM, Julian K, Dedier J, Soloman I, Tillisch J, Perez-Stable EJ. Factors affecting medical students' selection of an internal medicine residency program. Journal of the National Medical Association. 2005 Sep;97(9):1264.
- Rosenthal S, Howard B, Schluskel YR, Lazarus CJ, Wong JG, Moutier C, Savoia M, Trooskin S, Wagoner N. Does medical student membership in the gold humanism honor society influence selection for residency?. Journal of Surgical Education. 2009 Nov 1;66(6):308-13.
- Prystowsky MB, Cadoff E, Lo Y, Hebert TM, Steinberg JJ. Prioritizing the interview in selecting resident applicants: behavioral interviews to determine goodness of fit. Academic pathology. 2021 Oct 25;8:23742895211052885.

6. Gill H, McLeod S, Duerksen K, Szafran O. Factors influencing medical students' choice of family medicine: effects of rural versus urban background. *Canadian Family Physician*. 2012 Nov 1;58(11):e649-57.
7. Abioye IA, Ibrahim NA, Odesanya MO, Wright KO. The future of trauma care in a developing country: interest of medical students and interns in surgery and surgical specialties. *International Journal of Surgery*. 2012 Jan 1;10(4):209-12.
8. Peel JK, Schlachta CM, Alkhamesi NA. A systematic review of the factors affecting choice of surgery as a career. *Canadian Journal of Surgery*. 2018 Feb;61(1):58.
9. Levaillant M, Levaillant L, Lerolle N, Vallet B, Hamel-Broza JF. Factors influencing medical students' choice of specialization: A gender based systematic review. *EClinicalMedicine*. 2020 Nov 1;28.
10. Potterton VK, Ruan S, Sunshine JH, Applegate K, Cypel Y, Forman HP. Why don't female medical students choose diagnostic radiology? A review of the current literature. *Journal of the American College of Radiology*. 2004 Aug 1;1(8):583-90.
11. Chertoff JD, Bird CE, Amick BC. Career paths in diagnostic radiology: scope and effect of part-time work. *Radiology*. 2001 Nov;221(2):485-94.
12. Saudi Commission for Health Specialties. Diagnostic Radiology Board, 2022. Availableat: <https://scfhs.org.sa/sites/default/files/2022-02/DIAGNOSTIC%20RADIOLOGY-%20new%20cover2021.pdf>
13. Abduljabbar AH, Alnajjar SF, Alshamrani H, Bashamakh LF, Alshehri HZ, Alqulayti WM, Wazzan MA. The influence of gender on the choice of radiology as a specialty among medical students in Saudi Arabia: cross-sectional study. *Interactive Journal of Medical Research*. 2020 Apr 28;9(2):e14666.
14. Weissman C, Zisk-Rony RY, Schroeder JE, Weiss YG, Avidan A, Elchalal U, Tandeter H. Medical specialty considerations by medical students early in their clinical experience. *Israel journal of health policy research*. 2012 Dec;1(1):1-0.
15. Arleo EK, Bluth E, Francavilla M, Straus CM, Reddy S, Recht M. Surveying fourth-year medical students regarding the choice of diagnostic radiology as a specialty. *Journal of the American College of Radiology*. 2016 Feb 1;13(2):188-95.
16. 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 Medical Journal*. 2019 Sep;34(5):420.
17. Kazerooni EA, Blane CE, Schlesinger AE, Vydareny KH. Medical students' attitudes toward radiology: comparison of matriculating and graduating students. *Academic radiology*. 1997 Jul 1;4(8):601-7.
18. Kraft M, Sayfie A, Klein K, Gruppen L, Quint L. Introducing first-year medical students to radiology: implementation and impact.
19. Potterton VK, Ruan S, Sunshine JH, Applegate K, Cypel Y, Forman HP. Why don't female medical students choose diagnostic radiology? A review of the current literature. *Journal of the American College of Radiology*. 2004 Aug 1;1(8):583-90.
20. Zener R, Lee SY, Visscher KL, Ricketts M, Speer S, Wiseman D. Women in radiology: exploring the gender disparity. *Journal of the American College of Radiology*. 2016 Mar 1;13(3):344-50.
21. Taylor CS, Weatherly B, Farley EP, Clemons MP, Watts J, Vijayakumar V. Generating medical student interest in the field of radiology. *Journal of the American College of Radiology*. 2018 Feb 1;15(2):340-2.
22. Teo LL, Venkatesh SK, Goh PS, Chong VF. A survey of local preclinical and clinical medical students' attitudes towards radiology. *Annals Academy of Medicine Singapore*. 2010 Sep 1;39(9):692.
23. Chew C, O'Dwyer PJ, Sandilands E. Radiology for medical students: Do we teach enough? A national study. *The British Journal of Radiology*. 2021 Mar 1;94(1119):20201308.