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Original Article

Interventional Radiology Awareness among the Final-Year Medical Students in Riyadh

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Abstract

Objective: Interventional radiology (IR) is experiencing massive growth in the medical scene as new interventions are being introduced continuously to contribute to patient care. However, IR does not go without its fair share of challenges. Personnel shortages, turf wars, and a vague understanding of the role of IR in the hospital setting by medical students are a few. The latter could negatively impact the recruitment of young prospects and contribute to further personnel shortage. To combat this, we aimed to assess the final-year medical students' awareness of IR. **Methods:** This was a cross-sectional, self-administered questionnaire study. Our target population was all final-year medical students at university-based medical schools. Surveys were sent to 822 students, and a total of 719 final-year medical students responded (87.5%). The survey was distributed anonymously during November and December 2018. The survey consists of 21-closed and open-ended questions. **Results:** The vast majority of the respondents felt that their knowledge of IR was poor (83%), while a few reported that they had a good grasp of IR (16%). Half of the respondents believe that an Interventional Radiologist (IRs) must complete training in radiology. However, 42% thought that radiology and surgery was the correct route of training for IRs. Seventy-one percent and 73% of the final-year medical students correctly identified that IRs perform uterine artery embolization and lower limb angioplasty, respectively. A majority (68%) of the respondents believe that IRs perform cardiac angioplasty and stenting, whereas 57% believe that they perform femoral-popliteal bypass. **Conclusion:** Our data suggest that knowledge, awareness, and exposure of the final-year medical students to IR are overwhelmingly poor in the region. This can be ameliorated through a number of means, such as directly involving IRs in the medical student curriculum, IR awareness campaigns, and IR symposiums.

Keywords: *Awareness, interventional radiology, medical student, Riyadh*

Introduction

Interventional radiology (IR) is recognized as a broad field that encompasses many minimally invasive, image-guided, diagnostic, and therapeutic procedures. Although the field of IR is expanding at an exponential rate, there exists a glaring ambiguity about the role of the Interventional Radiologist (IRs) in the medical field. This, in part, is due to the overlap between IR and other specialties for procedures and administrative tasks. This confusion may sway medical students away from the field of IR, directly impacting the recruitment of young graduates.

Along with the ambiguity that surrounds the field, there is a paucity of studies in the medical literature on the awareness of medical students toward IR, especially in the Middle Eastern region. Only a handful of studies have been published regarding this subject.[1,2] The growth and overall longevity of any medical specialty are heavily reliant on the recruitment of medical graduates who hold interest in these respected fields. This rule also applies to IR, and without the interest and knowledge of medical graduates toward IR, it could lose many of its possessed interventions to other subspecialties. It is of vast importance to conduct large-scale awareness studies to combat this. For this reason, we assessed IR awareness and interest of the final-year medical students at five university-based medical schools in the Riyadh region.

Methods

This was a cross-sectional, self-administered questionnaire study. Our target population was all final-year medical students at university-based medical schools in Riyadh region, Saudi Arabia. A valid survey used previously in Canadian and

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European studies was used.[3,4] It consists of 21 closed- and open-ended questions [Appendix]. The survey was distributed anonymously during March and April 2018.

The targeted universities were Imam Muhammad ibn Saud Islamic University, King Saud University, King Saud bin Abdulaziz University for Health Sciences, Princess Nourah Bint Abdul Rahman University, and Alfaisal University. Eight hundred and twenty-two surveys were sent, and a total of 719 final-year medical students (87.5%) responded. The questionnaire sent assessed the student's overall awareness and general knowledge of IR. Students were asked to rate their knowledge of IR compared to other specialties, list three IR procedures, whether they would consider a career in the field, and a series of "yes" and "no" questions pertaining to the procedures that are performed by IR. Students were also asked which one of these procedures where they most familiar with vertebroplasty, radiofrequency ablation of tumors, percutaneous nephrostomy, and image-guided tumor biopsy. Participants were asked what they thought is the correct route to IR if they were interested in an IR elective and their thoughts of future career prospects for IR. Ethical approval was obtained through the Institutional Review Board at King Abdullah International Medical Research Center (KAIMRC). Data were sent to KAIMRC and were analyzed by a senior statistician using the (SAS institute Inc., SAS Campus Drive, Cary, North Carolina 27513, USA).

Results

The vast majority of respondents felt that their knowledge of IR was poor (83%), while a few reported that they had a good grasp of IR (16%) [Figure 1]. Most final-year medical students would not consider a career in IR (53%), while 19% would, and 26% are still unsure. Only 19% had previously completed a radiology elective rotation. Of the respondents who felt that they would not consider a career in IR, "I do not find it interesting" (42%), "I do not know enough about it" (36%), and "I do not want to sit in a dark room" (19%) were the leading rationales behind the decision.

A total of 51% of respondents have not seen patients treated by IR, whereas 49% reported they had. Regarding training, half of the respondents believe that an IRs must complete training in radiology. However, 42% thought that radiology and surgery was the correct route of training for an IRs [Figure 2]. Our data show that 23% and 17% of the respondents chose lectures from IRs and self-directed research as to what has provided them with the most information about IR, respectively. Most final-year medical students (57%) would be interested in partaking in a 2-week IR elective if it is offered during the 3-month surgery rotation in the internship.

Seventy-one percent and 73% of the final-year medical students correctly identified that IRs performs uterine artery embolization and lower limb angioplasty, respectively. A majority (68%) of the respondents believe that IRs performs cardiac angioplasty and stenting, whereas 57% believe that they perform femoral-popliteal bypass [Figure 3]. Image-guided tumor biopsy and vertebroplasty were the most and least familiar procedures to final-year medical students, respectively. When asked about IR career prospects, the majority (70%) of the participants think that IRs have good career prospects; however, 30% think that IRs do not have good career prospects [Figure 4].

Discussion

Interventional radiology was recognized as a subspecialty of radiology by the American Board of Medical Specialties (ABMS) in 1994. One year of fellowship training in IR was deemed adequate and is known as the "classic pathway." However, after the exponential growth of IR and its rise in the medical scene, a more dedicated training pathway was required. Subsequently, the IR

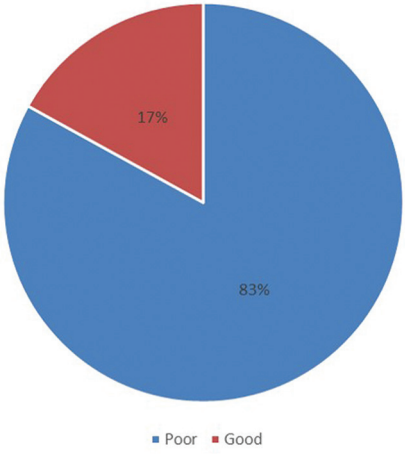

Figure 1: How respondents rated their knowledge of interventional radiology?

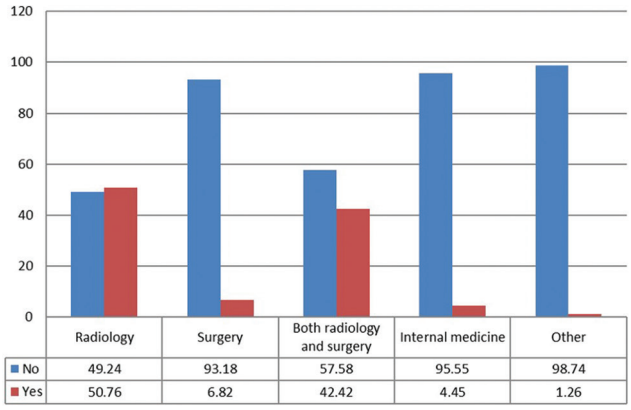

Figure 2: What respondents felt the correct training path to interventional radiology was?

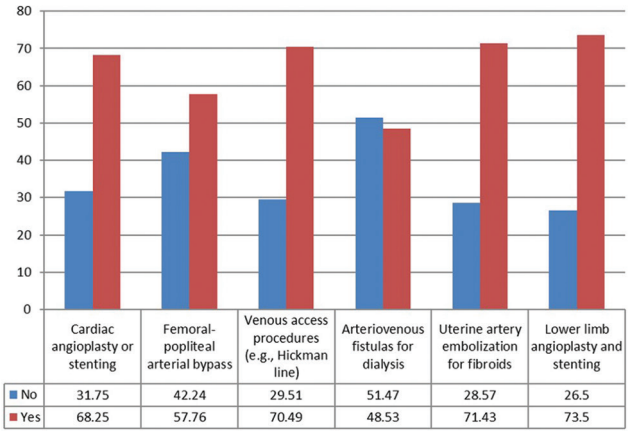

Figure 3: Which of these procedures' respondents believed are performed by interventional radiologists?

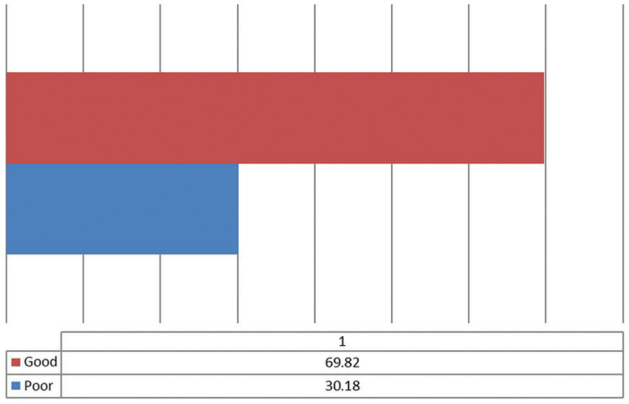

Figure 4: What do respondents feel about interventional radiology career prospects?

residency pathway was approved by the ABMS in 2012, and it represented a major milestone for the history of IR.[5] Unfortunately, this achievement in specialty status has not translated well into medical school curricula. Most medical schools in the United States allocate little time for IR.[6] In Saudi Arabia, all medical schools have no exposure to IR unless it is in the form of an elective rotation.

In the present study, 83% of the respondents felt that their knowledge of IR was poor. This finding is no different to similar studies conducted locally and in other countries.[5-11] This could be strongly attributed to the little exposure that medical students have IR during medical school. Only 19% would consider IR as a career option in this present study. This finding is in concordance with European,[6,11] Canadian,[5] and local studies.[1,2] Commander *et al*. compared one medial school that offered a radiology course to another that does not offer a radiology course.[8] Fifty-four percent and 38% of medical students from the former and latter medical schools would consider IR as a career, respectively. This shows that the sooner medical students are exposed to IR, the more likely they would end up choosing IR as their career choice. Lack of interest and lack of knowledge are the top rationales as to why medical students would not consider IR as a career choice in this present study.

Half of the final-year medical students in this present study have identified radiology as the correct training path to IR. However, 42% felt that IRs must train both radiology and surgery. O'Malley and Athreya found that only 13% of medical students incorrectly chose both radiology and surgery.[5] In the study by de Gregorio *et al*., almost all medical students (95%) have chosen both radiology and surgery.[7] These findings directly correlate to the respective medical schools. Most medical schools allocate non-IRs to introduce IR to medical students. This may give the false impression that IR requires surgical and radiological training as opposed to exclusive radiological training.

Lectures from IRs, above other means, have given respondents of this present study, the most information pertaining to IR (23%). Similarly, the final-year medical students of Southwestern Saudi Arabia have also chosen lectures from IRs as the prime means of gaining IR knowledge (67%).[1] However, medical students from awareness studies conducted in Canada and England have found radiology electives to be the major source of their IR knowledge.[5,11] Medical students have shown enthusiasm about learning more about IR as 57% of the participants are willing to partake in a 2-week IR elective during their surgical rotation. Almost all (98%) of preclinical and clinical medical students from Spain are willing to delve deeper into IR.[7]

Integrating IR into the gross anatomy course of preclinical medical students seems to be a highly effective method of increasing awareness, exposure, and generating interest in IR.[12] According to DePietro *et al*., 73% of the preclinical students had reported little to no knowledge of IR. This had decreased by 27% after integrating IR into the anatomy course. Another effective method at raising awareness and interest in IR, which has garnered much attention and popularity in the United States, is medical student IR symposiums.[13,14]

Both regional IR societies, the Saudi Interventional Radiology Society (SIRS) and the Pan Arab Interventional Radiology Society (PAIRS), have made efforts to combat the current level of medical student IR awareness. The Third Annual SIRS Conference held in January 2019 had a dedicated section for medical students. A series of didactic presentations and case-based discussions were the focus. PAIRS committee members based on Egypt have launched a Middle Eastern IR awareness program under the banner of "#IAM_PAIRS" that hopes to target medical students of all levels to raise IR awareness.

The first edition of "IR curriculum for medical students" was developed by the Cardiovascular and Interventional Radiology Society of Europe and published in 2012.[15] It

has seen a major update in 2019.[16] The document serves as a platform to raise the awareness of the ever-increasing role of IR in hospital medicine and to provide guidance on the learning outcomes required to prepare medical students for their role during residency years.

Conclusion

A few limitations exist in this present study. All cross-sectional, questionnaire-based studies are liable to response bias. Therefore, respondents who hold an interest in IR may have overpopulated this study. However, and as mentioned earlier, this is not the case as only 19% of the final-year medical students were willing to consider a career in IR. We feel that the sample size is representative of the population; however, they are the only representative of the Riyadh region. A national, large-scale awareness study is more likely to portray accurate awareness statistics. One limitation of this present study is our target population. We focused only on the final-year medical students. There exists a mandatory, preresidency, internship year in Saudi Arabia after the final year of the medical school. On completion of the student's internship, one must choose their career choice. Assessing both final-year medical students and interns, as done previously by Alshumrani, could have yielded a fascinating insight into the awareness of IR. In conclusion, our data suggest that IR awareness, knowledge, and exposure among final-year medical students in the Riyadh region are overwhelmingly poor. However, students are more than willing to learn more and participate in IR during their medical training. This can be ameliorated through a number of means, such as the incorporation of IR within medical student curriculums and also involving IRs as part of the teaching faculty.

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Conflicts of interest

There are no conflicts of interest.

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Appendix

1. Demographics
   - Male
   - Female

2. How would you rate your knowledge of interventional radiology as compared to other subjects?
   - Excellent
   - Good
   - Adequate
   - Poor
   - No knowledge

3. How do you rate your knowledge of radiology in general compared to other subjects?
   - Excellent
   - Good
   - Adequate
   - Poor
   - No knowledge

4. Have you completed, or do you plan to complete an elective rotation in Radiology (diagnostic or interventional)?
   - Yes
   - No
   - Not sure

5. Would you consider a career in diagnostic radiology?
   - Yes
   - No
   - Not sure

6. Would you consider a career in interventional radiology?
   - Yes
   - No
   - Not sure

7. If you answered No or Not sure to the previous question, please choose the most appropriate reason why.
   - I do not find it interesting
   - I do not know enough about it
   - The life style is not for me d. Radiation exposure
   - Other (please specify): _____

8. Have you seen patients who were treated by an interventional radiologist?
   - Yes
   - No
   - Not sure

9. Please list 3 interventional radiology procedures that you are aware of:

   _____
   _____
   _____

10. An interventional radiologist must complete training in:
    - Radiology
    - Surgery
    - Both radiology and surgery
    - Internal medicine
    - Other (please specify): _____

11. Interventional radiologists have outpatient clinics.
    - True
    - False

12. Interventional radiologists do ward rounds in the hospital.
    True
    False

13. Interventional radiologists do not treat patients at all.
    True
    False

14. What has provided you with the most information about interventional radiology?
    Radiology elective rotation
    Lectures from interventional radiologist
    Problem-based learning tutorials
    Self-directed research
    Ward rounds in the hospital
    Multidisciplinary meetings
    I have had no exposure to interventional radiology
    Other (please specify): _____

15. Do you think a mandatory radiology course during medical school would be beneficial?
    Yes
    No
    Not sure

16. Would you be interested in doing a 2-week interventional radiology elective if it is offered during the 3-month surgery rotation in internship?
    Yes
    No
    Not sure

17. An Interventional Radiologist performs the following procedures:
    Cardiac angioplasty or stenting Yes____ No____
    Femoral-popliteal arterial bypass Yes____ No____
    Venous access procedures (e.g., Hickman line) Yes____ No____
    Arteriovenous fistulas for dialysis Yes____ No____
    Uterine artery embolization for fibroids Yes____ No____
    Lower limb angioplasty and stenting Yes____ No____

18. Are you familiar with the following procedures?
    Vertebroplasty Yes____ No____
    Radiofrequency ablation of tumors Yes____ No____
    Endovascular repair of aortic aneurysms Yes____ No____
    Percutaneous nephrostomy Yes____ No____
    Image-guided tumor biopsy Yes____ No____

19. Are you familiar with the procedure called ‘angioplasty’? Yes____ No____

20. If you answer yes to the previous question, where did you gain that exposure?
    Cardiologist Yes____ No____
    Vascular surgeon Yes____ No____
    Interventional Radiologist Yes____ No____
    Others (please specify)_____

21. What do you think about the career prospects for interventional radiologists?
    Excellent
    Good
    Adequate
    Poor
    No knowledge