

STUDY PROTOCOL

Study protocol for ELIXIR: an evaluation of learning and exposure to the undergraduate Interventional Radiology curriculum

Filzah Hanis Osman¹, Jasmine Sze Ern Koe¹, Elisa S.W. Lau¹, Dhikshitha Nagaraj¹, Helen Hoi-Lam Ng¹, Alexander Ng^{2,3}, Aqua Asif^{3,4}, Raman Uberoi⁵, Vinson Wai-Shun Chan^{1,3} and Tze Min Wah^{6,*}

¹School of Medicine, Faculty of Medicine and Health, University of Leeds, Leeds LS2 9JT, UK, ²UCL Medical School, University College London, London WC1E 6DE, UK, ³British Urology Researchers in Surgical Training (BURST), London W1W 7TS, UK, ⁴Leicester Medical School, University of Leicester, Leicester LE1 7HA, UK, ⁵Department of Radiology, John Radcliffe Hospital, Oxford OX3 9BQ, UK and ⁶Division of Diagnostic and Interventional Radiology, Institute of Oncology, St. James's University Hospital, Leeds LS9 7TF, UK

*Correspondence address. Department of Diagnostic and Interventional Radiology, Institute of Oncology, St. James's University Hospital, Leeds Teaching Hospitals NHS Trust, Leeds LS9 7TF, UK. Tel: +441132066043; E-mail: tze.wah@nhs.net

Abstract

Background: Despite the initiation of a suggested undergraduate curriculum for Interventional Radiology (IR) by the British Society of Interventional Radiology, there is still a lack of exposure to IR amongst medical students and junior doctors. It is unclear how much of the proposed curriculum is implemented in the undergraduate curricula of the respective medical schools in the UK. **Methods and Materials:** This is a cross-sectional study that aims to evaluate the level of awareness of IR as a subspecialty amongst medical students in the UK. All final year students from the 34 UK medical universities that award primary medical qualifications are eligible for the study. A student representative from each university will be recruited through a social media drive to distribute a survey. The online questionnaire is divided into five different sections; (i) Particulars, (ii) Basic knowledge on IR, (iii) Medical School Curriculum and Exposure, (iv) Career Prospects and (v) Satisfaction with Medical School Curriculum, with the intent of gauging their exposure and understanding of IR throughout the years of medical school and assessing their perceptions of IR as a potential career choice.

INTRODUCTION

Interventional Radiology (IR) is a rapidly growing subspecialty, due to the high and increasing demand for image-guided minimally invasive procedures in both acute and elective settings. However, the current demand for IR outweighs supply, due primarily to the lack of interventional radiologists. In their latest UK workforce report, the Royal College of Radiologists (RCR) reported a shortage of 36% for the number of IR consultant posts,

indicating high vacancy rates for IR consultants across the UK [1]. The main contributing factor to this is the limited availability of sufficiently trained candidates [2].

Despite the introduction of a suggested curriculum for medical schools, several studies have highlighted the underrepresentation of IR in the curricula of medical schools in the UK [3–5]. A questionnaire performed in 26 European countries by the European Society of Radiology demonstrated the lack of time

Received: September 15, 2021. Accepted: September 26, 2021

Published by Oxford University Press and JSCR Publishing Ltd. © The Author(s) 2021.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted reuse, distribution, and reproduction in any medium, provided the original work is properly cited.

allocated for the teaching of IR, where the average number of teaching hours for IR (5.3 h) was less than radiological anatomy (17.5 h) and radiological techniques (13.7 h) [6]. A study conducted by Atiiga *et al.* in 2017 [4] that consisted of 220 respondents across two medical schools in UK revealed minimal exposure to IR on the current undergraduate curriculum. In total, 81.4% of students reported that no IR-related lectures were provided during their time spent in medical school. The findings of their study highlighted the lack of exposure to this subspecialty. Not only has this been a problem in Europe, a survey amongst medical students in Saudi also found that majority of their participants lacked awareness on IR [7]. Moreover, the inadequate exposure to IR during medical school was highlighted as one of the key causes of students not considering IR as a career [7]. Therefore, there is a need for more exposure to IR in medical schools. Suggestions on further plans include having a standard undergraduate IR curriculum and more contribution from interventional radiologists themselves [7].

The RCRs' Undergraduate Radiology Curriculum recommends that medical schools should integrate clinical radiology into undergraduate teaching [8]. It also suggests that UK medical schools may further branch out to subspecialist training based on local expertise and interests. However, it is unclear how many of UK medical schools expand this to include teaching of IR as a subspecialty. Additionally, the delivery of teaching content differs across medical schools. Teaching is usually delivered through various means such as lectures, tutorials, problem-based learning and placements.

Following the acknowledgment of IR's subspecialty status in the UK in 2010, British Society of Interventional Radiology (BSIR) released an undergraduate curriculum for IR (Appendix A), highlighting the need for integrated teaching in medical schools [9]. The curriculum focuses on basic or common procedures that are likely to be encountered as a foundation year doctor.

The BSIR curriculum is largely based on the following core topics:

- The anatomy and physiology relevant to interventional procedures
- The basic principles underpinning IR techniques
- IR in the management of specific clinical scenarios
- Issues of patient preparation, consent and potential complications

The BSIR curriculum is an adoption of Cardiovascular and Interventional Radiological Society of Europe with the aim of providing guidance on the learning outcomes necessary to prepare medical students for their roles as junior doctors [10]. Whilst these curricula were introduced by the professional training bodies, to our knowledge, there is no evaluation of the uptake of the curricula in medical schools.

This study, primarily targeting the experiences of UK medical students, emphasizes on students' experiences with regards to the BSIR curriculum used by the majority of UK medical schools. Previous studies in other specialties have proven to be successful in evaluating undergraduate curricula in a similar manner [11]. Therefore, this study aims to assess the overall exposure level of medical students to IR in their medical school curricula. Secondly, we aim to assess the level of medical students' awareness in the field of IR and their perceptions of IR as a potential career choice.

METHODS AND ANALYSIS

Study design

This is a cross-sectional study to evaluate the awareness of IR amongst undergraduate medical students in the UK. An online survey (Appendix B) is designed using the platform *Jisc Online Surveys*, which will be sent out to final year students across 34 UK medical schools (Appendix C) and the survey aims to engage and recruit as many undergraduate medical students from each medical school. The survey comprises questions that will gauge their understanding and exposure of IR throughout the years as well as their perceptions regarding IR as a future career choice. Each survey is anticipated to be completed within 10 min.

Study population

Final year students studying in UK medical schools in the Academic year 2021–22, awarding primary medical qualifications are eligible for this study. Any medical students from other years, and those studying outside the UK will be excluded.

Study outcomes

Primary outcome.

- The level of exposure of medical students to IR in medical school will be measured by the coverage of undergraduate curriculum, which is proposed by the BSIR. The prevalence of coverage of various topics outlined in the curriculum will be evaluated as well.

Secondary outcomes.

- The proportion of BSIR undergraduate topics covered in medical schools, measured by the coverage of specific topics from the curriculum. The number and type of theory-based teaching sessions, clinical skills teaching and clinical attachments will also be evaluated as part of proportion of undergraduate topics covered and engagement of IR in medical schools.
- The proportion of students interested in IR as a career based on exposure, measured by the proportion of students hoping to pursue a career in IR.
- The difference in the views of male and female medical students on IR. The factors that would affect one's choice to choose IR as a potential career choice will be evaluated quantitatively.

Data collection, management and analysis

Data collection. A national social media drive will be performed to recruit a student representative from each of the 34 UK medical universities on platforms such as Twitter, Instagram and WhatsApp. The leads will obtain their medical school curriculum and recruit at least 25 final year medical students to participate in the study. It is estimated, in order to make an accurate estimation of students' varied experiences during medical school, about 10% of the final year graduates should be invited to complete the survey. In 2021, 7270 medical students qualified as doctors, as such, at least 727 final year medical students shall be recruited to complete the survey [12]; however, this study sets out to recruit as many final year medical students as possible to complete the survey.

Data quality. The quality of the data such as data completeness and accuracy will be assessed after data collection, where appropriate data will be included in the study.

Data management. A data manager/lead will be appointed for ELIXIR. The data manager's role is to monitor user accounts, ensure data quality is maintained, communicate with sites with regards to quality control, respond to data requests and answer queries from sites and produce data reports. They should modify and help design the database.

Data analysis. The raw proportions of the study results will be presented in the form of percentages, where Likert scales were used, bar charts will be used to outline the frequency of responses, where integers were collected, medians and interquartile ranges will be calculated and illustrated using violin plots.

Authorship

Individuals in the core committee who have contributed significantly to the study will be included in the main authorship line. Medical school leads who have recruited at least 25 participants will be given a certificate and awarded the status of Collaborative author, which will be published as PubMed indexed collaborators. The greater the number of participants recruited, the higher the medical school representative will appear in the collaborator author list. The top recruiters amongst all medical school leads shall be included in the main authorship line. Participants of the survey will also be rewarded a certificate upon completion of the survey.

SUPPLEMENTARY MATERIAL

Supplementary material is available at JSPRM Journal online.

AUTHOR CONTRIBUTIONS

F.H.O., J.S.E.K., E.S.W.L., D.N., H.H.L.N., V.W.S.C. and T.M.W. contributed to the conception and design of the study. F.H.O., J.S.E.K., E.S.W.L., D.N. drafted the manuscript. Alexander Ng, Aqua Asif, Raman Uberoi, V.W.S.C. and T.M.W. revised the manuscript critically for important intellectual content. V.W.S.C. and T.M.W. supervised the study process. All authors approved for the manuscript to be published.

ETHICS AND DISSEMINATION OF RESULTS

According to the Health Research Authority toolkit, this audit does not require an NHS Research Ethics Committee review. All participant details will be kept anonymous, and this project does not involve any non-identifiable data. We aim to present our work at national and international conferences pertaining to radiology, IR and medical education. We also aim to publish our results in the *Clinical Radiology* journal of The Royal College of Radiologists.

ACKNOWLEDGMENTS

We would like to thank the authors of the LEARN study (urological tEaching in bRitish medical schools Nationally) from the

BURST (British Urology Research in Surgical Training) research collaborative for sharing their methodology and allowing us to adapt from it.

CONFLICT OF INTEREST DECLARATION

T.M.W. is a recipient of a Research grant from Boston Scientific and Education grant/Honorarium from Angiodynamics.

REFERENCES

1. The Royal College of Radiologists. *Clinical Radiology - UK Workforce Census 2020 Report*. https://www.rcr.ac.uk/system/files/publication/field_publication_files/clinical-radiology-uk-workforce-census-2020-report.pdf (7 May 2021, date last accessed).
2. Royal College of Radiologist. *Provision of Interventional Radiology Services*, 2nd edn. 2019. https://www.rcr.ac.uk/system/files/publication/field_publication_files/bfcr198-provision-interventional-radiology-services-second-ed.pdf (7 May 2021, date last accessed).
3. Xu Y, Pervez A, Theodoulou I, Zhong J, Lam S, Gkioussias V, et al. Future interventional radiologists and where to find them—insights from five UK Interventional Radiology symposia for junior doctors and medical students. *Cardiovasc Intervent Radiol* 2021;**44**:300–7.
4. Atiiga PA, Drozd M, Veettil R. Awareness, knowledge, and interest in interventional radiology among final year medical students in England. *Clin Radiol* 2017;**72**: 795.e7–e12.
5. Alsafi Z, Bhrugubanda V, Ramachandran S, Alsafi A, Hamady M. Is it time for a specific undergraduate interventional radiology curriculum? *Cardiovasc Intervent Radiol* 2017;**40**: 1062–9.
6. European Society of Radiology (ESR). Undergraduate education in radiology. A white paper by the European Society of Radiology. *Insights Imaging* 2011;**2**:363–74.
7. 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 Med J* 2019;**34**:420–6.
8. The Royal College of Radiologists. *Undergraduate Radiology Curriculum*, 2nd edn. https://www.rcr.ac.uk/sites/default/files/documents/undergraduate_radiology_curriculum_second_edition_2017.pdf (7 May 2021, date last accessed).
9. British Society of Interventional Radiology. *UK Undergraduate Curriculum for Interventional Radiology*. 2014. https://www.bsir.org/media/resources/UK_Undergraduate_Curriculum_for_IR_2014.pdf (6 May 2021, date last accessed).
10. Cardiovascular and Interventional Radiology Society of Europe. *Interventional Radiology Curriculum for Medical Students*. 2019. https://www.cirse.org/wp-content/uploads/2019/03/cirse_IRcurriculum_medical_students_2019_web-1.pdf. (7 May 2021, date last accessed).
11. Ng A, Cambridge W, Jayaraajan K, Lam CM, Light A, Asif A, et al. Study launch: urological tEaching in bRitish medical schools Nationally (LEARN). *BJU Int* 2020;**126**:311–2.
12. General Medical Council. *GMC Data Explorer* 2021. <https://data.gmc-uk.org/gmcdata/home/#/reports/Undergraduate%20training/Stats/report> (11 September 2021, date last accessed).