Education, training, and professional issues of radiographers in six European countries: a comparative review

Andreas G. Prentakis1, Antonis P. Stefanoyiannis1, Kostas Georgiadis1, Louise Coleman2, Shane J. Foley3, Daniela Herlig4, Photis Kollas5, Anna Kowalik6, Jolanta Tomczak7 and Sofia N. Chatziioannou1

Abstract

Radiographers constitute an important part of a multidisciplinary radiation-based imaging and therapy chain. However, is there a common framework for assuring high education, training, and subsequent practice of profession among European countries? A study was conducted, based on a questionnaire that consisted of three parts, concerning education and training (Part A), national registry (Part B), and professional issues (Part C). Analysis of the collected data suggested that a common policy is generally followed in the countries investigated; however, differences were not negligible. A common framework of educational programmes among European countries could form the basis for overall standardisation at national and international level.

Keywords: radiographer, education, training, practice, continuing professional development

Introduction

The use of ionising radiation in everyday clinical practice has flourished for more than 3 decades.1 Advances in technology offer several benefits to the patients, having as a prerequisite a sufficient education and training level of the involved personnel.2 Most radiation-based diagnostic examinations and therapeutic practices require multidisciplinary collaboration. Radiographers belong to a team of professionals who work together to ensure that the corresponding medical procedures are carried out effectively and safely. A radiographer has the flexibility to work in a variety of fields, including radiology, nuclear medicine, and radiotherapy departments. A standardised level of education and training is expected to enhance effectiveness, in accordance with European directives.3 Furthermore, professional mobility is a fundamental goal of current European policies. Such policies aim at the establishment of a professional qualifications framework and a European Qualification Framework for Lifelong Learning.4–6

This study aims at the structured classification of information concerning the education and training of radiographers in different, geographically spread European countries, as well as the subsequent clinical practice of the profession. Data analysis is expected to reach conclusions regarding the minimum educational and training requirements and the professional role of radiographers in each country.7

Methods

Based on the general structure of similar studies regarding medical physicists and nuclear medicine physicians, a questionnaire has been electronically sent to...
21 registered professional societies. The questionnaire was written in English and consisted of three parts with 15 questions in total. In addition, it was forwarded to radiographers who were national delegates, to ensure responses were as accurate and as reliable as possible.

Part A (entitled “Education and training”) examined the required type and level of degree (University or not), the duration of a certified study programme, and the temporal contribution of practical training. Part B (entitled “National Registry”) pertained to the existence of a national registry of radiographers, the role of continuing professional development (CPD), and the possibility of acquiring a postgraduate degree within national boundaries. Finally, in Part C (entitled “Professional issues”), each country representative was asked about the necessity of holding a professional license, the prospect of specialisation of radiographers, and the mandatory physical presence of other health care professionals during the accomplishment of certain aspects of their duties.

The educational and training systems vary among countries investigated, but a common categorisation to post-secondary and tertiary or university level was used. Educational systems were also chronologically classified as undergraduate and postgraduate. Simple descriptive statistics were used to summarise the results.

Results

Six countries responded (Cyprus, Greece, Ireland, Poland, Switzerland, and the United Kingdom), which amounts to a 29% response rate.

Part A: Education and training

Part A is analysed in Tables 1 and 2. In all countries, a nationally approved education and training programme exists with a mandatory study duration of 2–4 years. Apart from Cyprus, every country offers a Bachelor of Science (BSc) degree (3–4 years duration). However, an alternative to acquiring a non-tertiary degree is offered in Cyprus, Greece, Poland, and the United Kingdom, by attending a post-secondary school for 1–3 years. Practical clinical training duration is 20–50% of the whole study duration in all countries. Furthermore, Greece offers the opportunity to work as a radiographer by completing a 2-year programme without clinical practice (post-secondary education level), after being certified for sufficient knowledge.

### Table 1. Issues regarding the educational programme of radiographers

| Part A: Education and training | Required degree to practise the profession and corresponding educational level | Study duration in years | Theoretical and clinical time distribution |
|-------------------------------|--------------------------------------------------------------------------------|-------------------------|------------------------------------------|
| Cyprus                        | BSc or non-university level                                                    | 3                       | 80 and 20%                               |
| Greece                        | BSc or post-secondary level                                                    | 4 (public school) or 2 (private school) | 55 and 45% (no clinical training for post-secondary level) |
| Ireland                       | BSc (level 8)                                                                  | 4                       | 70 and 30%                               |
| Poland                        | BSc or non-university level (2 years of study at medical school)               | 2 (studying at medical school, after national exams) or 3 (BSc) | 50 and 50%                               |
| Switzerland                   | Tertiary level or BSc                                                          | 3                       | 50 and 50%                               |
| The United Kingdom            | BSc (Hons) or PG Diploma/MSc. Assistant practitioner – Foundation degree       | 1–2 (as an assistant practitioner) or 3–4 for BSc (Hons) | 50 and 50%                               |

Discussion

This study revealed that there is a similar study duration among the countries investigated. However, a BSc-level...
degree is not offered in all countries. The establishment of the radiographers’ degree to university level is expected to improve the quality of the services provided, even if extension of study duration is required. This upgrade could aim essentially to deal with current weaknesses of each country's educational system. For example, the undergraduate cycle is proposed to last not less than 3 years.5

Each educational programme incorporates part of practical clinical training. Students’ training in a clinical environment is highly encouraged. The mean duration of practice in certified hospitals of these six countries exceeds 40% of the whole educational programme with a median value of 50%. An official threshold of practice duration should be defined following consensus of the corresponding national professional societies. Hospitals should be accredited for this role by official bodies, in order to offer high standards of training. Trainees should preferably practise in all modalities in these hospitals, under the supervision of certified personnel. Successful completion of clinical training should be objectively quantified by means of trainees’ active involvement in a minimum number of various radiation-based procedures currently applied in agreement with European guidelines concerning medical specialties.6

Most countries investigated have already established a license for many specialties, including that of radiographers. An accredited license to work as a radiographer is expected to further protect public health, since acquiring such a certification will assure possession of certain qualifications and skills.

Among the countries investigated, only the United Kingdom and Ireland have applied a fully organised registry of radiographers, with an incorporated CPD scheme. Such an approach should set an example for the other countries, so that professionals are able to remain up-to-date in the field. The CPD system offers the motivation to acquire new knowledge, to develop new skills of patient management, and assure provision of high quality of services.

In all countries, a radiographer is able to work in most imaging and therapeutic modalities. The freedom of choice is considered beneficial to the employee, because it provides the opportunity to work in many fields, therefore, expanding job skills and improving overall professional performance. Moreover, radiographers’ ability to work in different modalities facilitates the department's workflow, in cases of special needs.

In general, radiographers are not allowed to work in ultrasound departments (with the exception of Ireland and the United Kingdom), mainly because ultrasound diagnosis is considered to be the preserve of the medical staff. In addition, drug administration is considered to be a medical intervention; hence, qualified personnel should be available during this procedure if needed.

This study should be interpreted in light of certain limitations. First, the number of countries that responded was relatively low (almost 30% response rate). This may be attributed to the strict time frame (1 month) that was set to the countries’ representatives, in order to assure that the recorded status for all countries corresponded to the same time period. In similar future studies, the response rate may be remedied by setting a less strict time frame for
data collection and/or forwarding the questionnaire to more than one representative per country. In addition, the study could be further expanded by forwarding a similar questionnaire to countries of other continents, properly adjusted to account for possible terminology differences. Second, the exact content of education and training programmes was not examined, along with the possible requirements for completion of the specialty, apart from time-related thresholds. In future studies, data could be collected concerning a more detailed view of educational programmes. As an example, active participation to a predefined number of diagnostic or therapeutic procedures and/or carrying out research could be considered as an essential ingredient for completion of training.16

Conclusions

A questionnaire consisting of 15 questions was prepared and utilised, in order to organise the structured classification of data concerning education and training of radiographers, as well as the subsequent practice of the profession, in six European countries. The study demonstrated that a common policy is generally followed in the countries investigated despite the presence of a few differences. Suggestions are made to include standardisation of the educational level, the accreditation of clinical training, with active involvement of radiographers in a minimum number of procedures and the adoption of CPD systems and national registries renewal mechanisms. Expansion of this survey to a greater number of countries is expected to confirm the similarities and differences noted, providing the basis for the overall standardisation of educational programmes at national and international level.

Conflict of interest and funding

The authors declare that they have no conflicts of interest concerning this article.

References

1. McCall I. The future role of radiology in healthcare. Insights Imaging 2010;1:2–11.
2. Chan S. The importance of strategy for the evolving field of radiology. Radiology 2002;224:639–48.
3. Council of the European Union, European Parliament. Directive 2005/36/EC of the European Parliament and of the Council of 7 September 2005 on the recognition of professional qualifications. OJ 2005/L255:22–142.
4. European Commission. European Commission upholds free movement of people. European Commission press release database [Updated October 2015]. 2014. Available at: http://europa.eu/rapid/press-release_MEMO-14-9_en.htm, accessed November 2015.
5. Bologna Follow-up Group. From Berlin to Bergen. European Higher Education Area. 2005. Available at: http://www.ehea.info/Uploads/Related EU activities/Report-from-BerlintoBergen-May-2005.pdf, accessed November 2015.
6. European Parliament and Council. Recommendation 2008/C 111/01 on the establishment of the European Qualifications Framework for Lifelong Learning. OJ 2008/C111:1–7.
7. Law M, Pongnapang N, Katsifarakis D, Cowling S. Radiography Education Framework. July 2014. International Society of Radiographers and Radiological Technologists; 2014. Available at: http://www.isrtr.org/isrtr/Education_Standards.asp, accessed November, 2015.
8. Lass P. Nuclear medicine technologists’ training in different countries – a comparison. Nucl Med Rev Cent East Eur 2001;4:65–8.
9. Dondi M, Kashyap R, Paez D, Pascual T, Zaknun J, Bastos FM, et al. Trends in nuclear medicine in developing countries. J Nucl Med 2001;52:16–23.
10. Stefanoyiannis AP, Christofides S, Psichis K, Geoghegan DS, Gerogiannis I, Round WH, et al. The Education and training of clinical medical physicists in 25 European, 2 North American and 2 Australasian countries: similarities and differences. Phys Med 2012;28:183–90.
11. Stefanoyiannis AP, Prigent A, Bakalis S, Koutsikos J, Arslan N, Roach P, et al. Structured intercomparison of nuclear medicine physicians’ education and training programs in 12 EANM member-affiliated member countries. Médecine Nucléaire 2014;38:456–468.
12. Torfae T, Abate M, Fu Y. Perceptions of a continuing professional development portfolio model to enhance the scholarship of teaching and learning. J Pharm Pract 2004;27:131–7.
13. European Commission. The structure of the European education systems 2014/15: schematic diagrams. Education, Audiovisual and Culture Executive Agency; 2014. Available at: http://ec.europa.eu/education/eurydice/documents/facts_and_figures/education_structures_EN.pdf, accessed November 2015.

Table 4. Professional issues of radiographers

| Part C: Professional issues | License for radiographers (legal requirement, accreditation path, official body involved) | Ability to work on any modality | Legal requirement for carrying out duties under supervision |
|-----------------------------|------------------------------------------------------------------------------------------|---------------------------------|-----------------------------------------------------------|
| Cyprus                      | License accredited by the official body responsible for radiographers                     | Yes (except ultrasound)         | No                                                        |
| Greece                      | License accredited by the Ministry of Health                                             | Yes (except ultrasound)         | Yes                                                       |
| Ireland                     | License is certified by CORU, the State Regulator for Health and Social Care Professions  | Working in radiotherapy is possible after successful completion of a different educational pathway. Radiographers can work on any other modality | No                                                        |
| Poland                      | License is accredited by the Ministries of Education and Health to professionals holding BSc and/or MSc degrees | Yes (except ultrasound)         | Yes                                                       |
| Switzerland                 | License is accredited by National Authority of Vocational Education and Technology         | Yes (except ultrasound)         | Yes                                                       |
| The United Kingdom          | Licenses are certified by CoR and HCPC                                                 | In any department (further education and training may be required) | No                                                        |
14. Eudaldo T, Olsen K. The European Federation of Organisations for Medical Physics. Policy statement No. 12: the present status of medical physics education and training in Europe. New perspectives and EFOMP recommendations. Phys Med 2010;26:1–5.

15. Jolly BC, MacDonald MM. Education for practice: the role of practical experience in undergraduate and general clinical training. Med Educ 1989;23:189–95.

16. Prigent A, Huic D, Costa DC. Syllabus for postgraduate specialization in nuclear medicine – 2011/2012 update: nuclear medicine training in the European Union. Eur J Nucl Med Mol Imaging 2012;39:739–43.

17. Craft A. Continuing professional development – a practical guide for teachers and schools (2nd ed.). London: Taylor & Francis Group; 2004.

18. Round WH. Continuing professional development systems for medical physicists: a global survey and analysis. Phys Med 2012; 29:261–72.

19. Solberg IB, Isaksson K, Aasland O, Gude T, Moum T, Vaglum P, et al. The impact of change in a doctor's job position: a five-year cohort study of job satisfaction among Norwegian doctors. BMC Health Serv Res 2012;12:41.