Title: An evaluation of the educational requirements to practise Radiography in the European Union

Introduction

Radiographers are professionals practising worldwide\textsuperscript{1}, however their training and practice varies as a result of different national traditions\textsuperscript{2,3}. Three traditional educational models influenced structural organisation and values of higher education across Europe, these are the Humboldtian, Napoleonic and Anglo-Saxon models. They vary in several aspects including professionalising versus research-driven programmes; or strongly regulated curricula versus freedom of contents being taught\textsuperscript{3}.

These educational traditions were spread across Europe, however, in each country, changes were made to the model in order to cater for national needs\textsuperscript{2}, creating a variety of different educational systems and diversity in professional identity. Although there is political pressure to standardise education across the EU (e.g. the Bologna process, ERASMUS programmes, recognition of qualification between EU countries) to facilitate the free market of professionals\textsuperscript{2,4–6}, there is still no European regulation for radiographers\textsuperscript{4}. This leads to different national regulations and consequently different education of these professionals as a consequence of specific national needs\textsuperscript{1,7,8}.

Aims

Despite these differences, in the context of EU legislation, a graduate should be able to practise the profession in another EU country as long as certain criteria are achieved\textsuperscript{4}. These criteria are dependent on national regulations\textsuperscript{4}. In view of this, the aim of the study is to understand the differences in regulation of these professions at national level across the EU with regards to academic requisites to practise the profession and discuss the implication of the results in the recognition of qualifications between member-states.

Literature Review

Literature on regulation of radiography and publications discussing radiography educational programmes are scarce\textsuperscript{7,9,10}. In view of this, the main source of information was grey literature including legislation (national and EU level), reports, guidelines, documents issued by professional associations amongst others.

Professional Title and Identity

The choice of the title of “radiographer” in this work is due to the fact that the research team is established in countries where this is the official title for these professionals. Each regulated profession is identified by their title, which will identify the individuals that feature certain characteristics, including: knowledge, autonomy and authority\textsuperscript{11–14} and society recognises the holder of the title as rightful to practise a determined role/tasks when they hold a recognised credential\textsuperscript{12,15,16}. Since the EU recognition of qualifications allows incoming professionals to use the title of the destination country\textsuperscript{4}, it is legally acknowledging that the incoming individuals have the same characteristics as those trained in the country.

Literature discussing titles is mainly published by professional associations, who identify different titles: “Diagnostic Radiographer” and “Therapy Radiographer”\textsuperscript{17}, “Radiation Therapist” (RTT)\textsuperscript{18} or “Nuclear Medicine Technologist”\textsuperscript{19}. Further titles are identified by worldwide associations (e.g. “Radiological Technologist”\textsuperscript{1–20}. The titles vary across the EU, with some countries identifying more than one title for different specialisms\textsuperscript{17}. 

1
The European Commission (EC) established a Regulated Profession Database (RPD) which aggregates these professions under the generic title of “Radiographer / Radiotherapist”\(^2\), distinguishing only the “Nuclear Medicine Technologist”\(^2\). The RPD identifies the professions that are regulated at national level, the main characteristics of the profession, the competent authority for the profession and a contact point responsible for recognition of qualifications.

Professional identity is understood as the integration of education and training into personal attitudes\(^2\) where three components are identified: “self-labelling as a professional” that is influenced by the individual’s perception of the profession, “integration of skills and attitudes as a professional” that depends on the education provided, and “a perception of context in a professional community”\(^2\). All these components might be different from country to country depending on how the profession and education is regulated.

**Mutual recognition of qualification in the EU**

The criteria to achieve recognition of qualifications through the 2005/36/EC directive includes that the profession must be regulated in both countries (home country and host country) and the education level can be a maximum of one level lower than the destination country – Article 13 (1.b). The levels are defined as follows (Article 11)\(^4\):

- Level 1: General primary or secondary school
- Level 2: Technical or professional secondary course
- Level 3: Post-secondary course of at least 1 year
- Level 4: Post-secondary course of at least 3 years
- Level 5: Post-secondary course of at least 4 years

Article 7 (4) of 2005/36/EC directive also states that for professions with an impact on the population health or safety, the professional qualifications of the applicant must comply with the requisites to practise in the host country\(^4\).

**Educational structures in Europe**

The European Federation of Radiography Societies (EFRS) survey of education institutions\(^2\) brought to light differences in education across Europe. Results were obtained from 46 institutions (public and private) from 21 countries (18 EU member estates). Most institutions offer a bachelor degree but a variety of combinations of specialisms were found in the survey: from single specialization to different combinations of diagnostic, therapeutic and nuclear medicine. The duration of the programmes varied from 3 to 4 years with most respondents identifying a corresponding 60 ECTS (European Credit Transfer and Accumulation System) per year with a range of 25 to 30 hours’ workload per ECTS. Although the results showed a lack of homogeneity regarding curricula structure, an increase in the use of European Qualifications Framework (EQF) recommendations by the educational institutions was observed in comparison with the Higher Education Network for Radiography in Europe (HENRE) survey\(^2\). An even greater difference can be found worldwide, as revealed by the survey undertaken by the International Society of Radiographers and Radiological Technologists (ISRRT)\(^1\). The European Society for Radiotherapy and Oncology (ESTRO) also identified educational differences for the Radiation Therapist (RTT) based on the results of questionnaires circulated for the development of the benchmark document\(^2\) and core curriculum\(^2\) for these professionals. In addition, ESTRO is currently conducting a survey on education for all Radiotherapy professions. However, none of these studies focused on the regulation of radiography across the EU.
European Qualifications Framework (EQF)

The Recommendation of the European Parliament and of the Council on the establishment of the European Qualifications Framework for lifelong learning defines that the learning outcomes to be achieved by the students should be written in terms of Knowledge, Skills and Competencies (KSC) and that the academic level achieved is classified according to the level at which the KSC is developed. The EQF framework, from EQF1 (lower level) to EQF8 (PhD), aims to facilitate recognition of European Union citizens’ education across states, promoting the movement of professionals inside the EU. Although it is a non-binding document, it has been used by educational institutions in their programme design and professional associations in benchmark documents but the use of this framework in regulation of these professionals was never studied.

Methodology

A descriptive cross-sectional, non-experimental, qualitative methodology was used in this study, performed through document analysis. Exhaustive sampling was used where all EU countries were included in the study. All the national “competent authorities” and the “contact points” were included, while the non-EU countries or member-states where the profession is not regulated were excluded. The national competent authorities and contact points were identified through the RPD and contacted (email and letter) and invited to identify the educational requisites to practise these professions in their country. These were deemed appropriate as sources of data since they have a role in collection of information regarding requisites to practise regulated professions, as defined by the EU directive.

When information was available in English or Portuguese, the data was directly collected from official documents since these languages are fluently understood by the researcher. When there was no response, professional associations and/or professionals practising in the country were asked to identify the requisites to practise and official documentation. Since the information in the RPD is submitted and maintained by the member states, the RPD itself was considered as a source of data.

A Framework Approach for the thematic analysis was used, where some of the themes were known beforehand based on the literature review. The analysis of the following sources, submitted by the respondents, was then performed using NVivo software (v. 11.4.0.1062):

- Legislation,
- Official documents from the regulatory bodies,
- Regulated Profession Database and/or
- Email reply with the indication of the requisites to register.

Limitations were identified prior to the data collection: complexity of the subject, outdated information and subjectivity of the replies. To tackle all issues identified a priori, triangulation of sources was used, resulting in the results shown being obtained from at least two sources.

The translation of official documents to English was completed using an online translation tool (Google Translate). Studies show that this tool has high accuracy (62%-74%) in translation of European languages. To compensate for any risk of incorrect translation the results focused on requisites to practise (e.g. academic level, programme duration), which are highly objective parameters, resulting in low risk of misinterpretation of results. This risk was even further minimised by the use of triangulation of sources mentioned above. This also allowed assessment of the quality
of the translations that were shown to be highly reliable, where the data translated always led to the same result when compared with other sources.

Results

Data regarding the title for the professions was collected from the RPD (Table 1) under the generic name of “Radiographer / Radiotherapist”. Most countries submitted the national title in the original language, of which a total of 24 titles are available in English with a total of 14 different English titles. This number is due to a wide variety of original language titles that, when translated, correspond to a variety of English titles. Not all countries submitted an equivalent English title, so the actual number of different titles in Europe might be greater.

Table 1 – Name of regulated professions associated with the generic name of “Radiographer / Radiotherapist” and “Nuclear Medicine Technician”

<table>
<thead>
<tr>
<th>Country</th>
<th>Name of Regulated Profession</th>
<th>Translation into English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>Radiologietechnologin / Radiologietechnologe</td>
<td>Radiological technologist (EN)</td>
</tr>
<tr>
<td></td>
<td>Röntgenassistent/in</td>
<td>Radiology assistant (EN)</td>
</tr>
<tr>
<td>Belgium</td>
<td>Technologie en imagerie médicale / Technoloog medische beeldvorming</td>
<td>undefined</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>Рентгенов лаборант</td>
<td>Medical X-ray technician (EN)</td>
</tr>
<tr>
<td>Croatia</td>
<td>Radiološki tehnikar/Prvostupnik Radiološke tehnologije</td>
<td>Radiology Technician/Radiology Technician (bachelor degree)</td>
</tr>
<tr>
<td>Cyprus</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>Radiologický asistent</td>
<td>Radiographer/Radiotherapist (EN)</td>
</tr>
<tr>
<td>Denmark</td>
<td>Radiograf</td>
<td>Radiographer (EN)</td>
</tr>
<tr>
<td>Estonia</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Finland</td>
<td>Röntgenhoitaja / Röntgenskötare</td>
<td>Radiographer (EN)</td>
</tr>
<tr>
<td>France</td>
<td>Manipulateur d’électroradiologie médicale</td>
<td>Radiologist Assistant (EN)</td>
</tr>
<tr>
<td>Germany</td>
<td>Med.- tech. Radiologieassistent(in)</td>
<td>undefined</td>
</tr>
<tr>
<td>Greece</td>
<td>Technologos Radiologias - aktinologias (TEI)</td>
<td>undefined</td>
</tr>
<tr>
<td>Hungary</td>
<td>Képalkotó diagnosztikai analitikus</td>
<td>Imaging diagnostic analyst (EN)</td>
</tr>
<tr>
<td></td>
<td>Képi diagnosztikai, nukleáris medicina és sugárterápiás asszisztens</td>
<td>Visual diagnostic, nuclear medicine and Radiotherapy assistant (EN)</td>
</tr>
<tr>
<td></td>
<td>Radiográfus</td>
<td>Radiographer (EN)</td>
</tr>
<tr>
<td></td>
<td>Gyakorló képi diagnosztikai, nukleáris medicina és sugárterápiás asszisztens</td>
<td>Practising diagnostic medical imaging, nuclear medicine and radiation therapy technician (EN)</td>
</tr>
<tr>
<td>Ireland</td>
<td>Diagnostic Radiographer</td>
<td>Diagnostic Radiographer</td>
</tr>
<tr>
<td></td>
<td>Radiation Therapist</td>
<td>Radiation Therapist</td>
</tr>
<tr>
<td>Italy</td>
<td>Tecnico sanitario di Radiologia medica</td>
<td>undefined</td>
</tr>
<tr>
<td>Latvia</td>
<td>Radiografer</td>
<td>Radiographer (EN)</td>
</tr>
<tr>
<td></td>
<td>Radiologa asistent</td>
<td>Radiologist's assistant (EN)</td>
</tr>
<tr>
<td>Lithuania</td>
<td>Radiologijos bakalauras</td>
<td>Radiology Technologist</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>Assitant technique medical de Radiologie</td>
<td>undefined</td>
</tr>
<tr>
<td>Country</td>
<td>Title</td>
<td>English Translation</td>
</tr>
<tr>
<td>-----------------</td>
<td>----------------------------------------------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Malta</td>
<td>Radiographer</td>
<td>Radiographer</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Radiotherapeutisch laborant/Radiodiagnostisch laborant</td>
<td>Radiographer/Radiotherapist (EN)</td>
</tr>
<tr>
<td>Poland</td>
<td>Technik elektroradiolog</td>
<td>Electroradiology technician (EN)</td>
</tr>
<tr>
<td>Portugal</td>
<td>Técnico de Radiología</td>
<td>Radiographer (EN)</td>
</tr>
<tr>
<td></td>
<td>Técnico de Radioterapia</td>
<td>Radiation therapist (EN)</td>
</tr>
<tr>
<td></td>
<td>Técnico de Medicina Nuclear*</td>
<td>Nuclear medicine technologist (EN)</td>
</tr>
<tr>
<td>Romania**</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Slovakia</td>
<td>Rádiologický technik</td>
<td>Radiological technician (EN)</td>
</tr>
<tr>
<td>Slovenia</td>
<td>Radiološki inženir</td>
<td>Radiographer (EN)</td>
</tr>
<tr>
<td>Spain</td>
<td>Técnico superior en imagen para el diagnóstico</td>
<td>undefined</td>
</tr>
<tr>
<td></td>
<td>Técnico superior en Radioterapia</td>
<td>undefined</td>
</tr>
<tr>
<td></td>
<td>Técnico especialista de medicina nuclear*</td>
<td>undefined</td>
</tr>
<tr>
<td>Sweden</td>
<td>Röntgensjuksköterska</td>
<td>Radiographer (EN)</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>Radiographer</td>
<td>Radiographer</td>
</tr>
<tr>
<td></td>
<td>* under the generic name of “Nuclear medicine technologist”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>** Not a regulated profession</td>
<td></td>
</tr>
</tbody>
</table>

The titles include a combination of keywords related to radiation professions (e.g. radiology, radiation) with role-defining keywords (e.g. therapist, technician, technologist). Thirteen of these entrances include the term “Radiographer” either alone, with variants (e.g. “diagnostic radiographer”) or together with other titles (e.g. “Radiographer/Radiotherapist”).

Since RPD does not identify a generic name for Radiography Assistants, three countries included these in the same category. Radiography Assistant’s role may vary from country to country, however, in the UK, their role is to perform “clinical imaging examinations or treatment procedures in concert with, and under the supervision of, registered Radiographers” (p. 2) 35.

Only Romania does not have the profession regulated and is therefore not being considered in the data analysis. This means that 96% of the 28 EU member states have radiography regulated. Two countries (Cyprus and Estonia) did not submit information in the RPD, however, it was confirmed by their competent authorities that the professions were regulated at national level.

Thematic analysis was performed and the following themes were identified:

- Presence/absence of mandatory registration
- Specialisms included in the regulated professions
- Required programme duration
- Number of ECTS
- Academic level:
  - According to European Qualification Framework (EQF)
  - According to 2005/36/EC directive
- Subjects required to be covered in the educational programme:
  - Presence/Absence of a list of subjects
• Other country-specific academic requirements identified through thematic analysis

It is important to note that not all countries submitted enough information to triangulate sources for each theme. Only themes that could be identified in at least two sources of data were included in the results. The triangulation ensures rigour of the data collection and allows the researchers to have high confidence in the results, since results are not dependent on a single interpretation of the text, but confirmed in another source. The type of data collected is also very objective, limiting researchers’ bias.

**Mandatory registration**

Twenty-six countries submitted sufficient information to identify if professionals are required to register with a regulatory body to practise. Although most respondents (81%) require registration to practise, 15% do not have mandatory registration (Austria, Estonia, Poland and Slovenia) and 4% (The Netherlands) has optional registration (Graph 1). Depending on national legislation the registration might be done with a regulatory body (responsible for the regulation or approval of a particular area), a statutory body (oversees a particular area) or with a professional body (oversee the activities of a particular profession).

![Graph 1 - Requirement to register in a regulatory body prior to practising radiography.](image)

**Specialisms under regulated professions**

In Graph 2, it can be seen that most countries (19 EU countries - 83% of respondents) regulate a single profession that includes all the specialisms. Three countries (8%) regulate two professions (Cyprus and Ireland), separating diagnostic and therapy and two other countries (8%) regulate a third profession corresponding to nuclear medicine (Spain and Portugal). Three countries did not provide enough information to assess the specialisms.
Thematic analysis indicated that the specialisms in education can be different from the professions regulated, for example, in Portugal where although three separate professions are regulated, diagnostic, radiotherapy and nuclear medicine have been covered in one single programme since 2014. The UK, on the other hand, has two distinct course programmes for diagnostic and therapeutic radiography but these professionals fall under the same professional title.

Programme duration

The required programme duration was assessed in 23 EU member states and it varies from 2 to 4 year programmes. The most common requirement (57% of respondents) is a three-year programme, while Spain is the only country requiring a two-year programme (4%) (Graph 3). It is important to note that although Germany has a 3 year programme, it occurs at EQF4 level (Secondary Education). Although the respondents did not identify the course length in Poland, it is possible to say that it is lower than 3 years duration as it is an EQF level 5 programme (higher education short course).
The number of ECTS was identified as a requirement in only 14 member states (50%). Most respondents (36%) require 240 ECTS (Graph 4). Lithuania requires a minimum of 120 ECTS, although they also require a three-year programme, which according to EQF recommendations, corresponds to 180 ECTS.

**Graph 3 – Education programme duration requirements across EU**

**European Credit Transfer and Accumulation System (ECTS)**

The number of ECTS was identified as a requirement in only 14 member states (50%). Most respondents (36%) require 240 ECTS (Graph 4). Lithuania requires a minimum of 120 ECTS, although they also require a three-year programme, which according to EQF recommendations, corresponds to 180 ECTS.
Graph 4 – Required number of ECTS to practise radiography.

*Academic Level*

The academic level was studied using two classifications: the EQF and the 2005/36/EC classifications. EQF data was mainly found in documents submitted by the respondents, while the 2005/36/EC level was collected from the RPD.

It was possible to collect enough information to assess the academic level in 26 countries. Out of these, the majority (69%) require HE programmes with at least three years duration but less than four years (level 4) followed by HE with a duration of 4 years or longer (Level 5) (19%) (Graph 5).

Only 12% of the programmes require lower qualifications than bachelor degrees: 8% are Level 3 requiring HE short courses of more than 1 and less than 3 years’ duration (Poland and Spain) and 4% are Level 2 requiring a technical/professional secondary course to practise (Germany).
Graph 5 – Academic level according to 2005/36/EC classification level.

With regard to the EQF level, the vast majority (88%) achieve a level 6, 8% have an EQF level 5 (Poland and Spain) while only Germany requires an EQF level 4 (Graph 6). Academic Levels 4 and 5 of the directive correspond to an EQF level 6 (Bachelor degree), demonstrating that the results for both classifications are in agreement.

Graph 6 - Academic level according to EQF levels
Estonia, requires a minimum of EQF6 to practise most roles of radiography, however, some specialisms (e.g. Radiotherapy and Ultrasound) require a Master’s degree to practise (EQF7). Across Europe, it is common for the employer to require the radiographer to undergo further education to practise certain specialisms, however this was only stipulated in the regulations for Estonia.

Curricula

Curricular information was obtained directly from regulations identified by competent authorities and contact points and since this information could not be assessed elsewhere, it was not possible to triangulate. Thirty-five percent of respondents did not identify the subjects covered in the documentation (Graph 7), nonetheless, the researcher cannot exclude the possibility that this information is available in documents not provided.

Seven countries (26%) identified a list of subjects, for example these requirements are written in terms of study units, generic subjects (e.g. radiation physics, radiobiology, etc.) or knowledge to be covered, while three countries (13%) define educational content in terms of skills: cognitive or practical ability to complete tasks and solve problems$^{30}$.

A total of 26% of respondents identified the competencies required to practise – which reflect responsibility and autonomy$^{30}$ – either by requiring a list of competencies (9%) or by regulating in terms of Knowledge, Skills and Competences (17%) according to EQF recommendations$^{30}$.

Graph 7 – Structure of the subjects to be covered in the educational programmes

It was found that in order to apply for recognition, in most EU countries, the radiographer must submit detailed information of their educational programme (e.g. transcripts) allowing competent authorities to verify that the profession complies with national regulations.
Clinical training

Clinical training was noted as a requirement in documents submitted by 11 countries, however, variances were observed in terms of structure and content of the clinical training requirements. In addition, the requirements regarding clinical practice are not defined in terms of competencies across the EU.

Some countries identify areas of specialism where clinical placement occurs, e.g. in Belgium, an internship is required in five areas: radiology, ultrasound, MRI, intervention procedures in medical imaging and in vivo nuclear medicine. Radiotherapy is not contemplated, although the reply from the competent authority indicated that staff are able to practise this role. Furthermore, specialisms included in “radiology” are not detailed. No specification of time or workload is defined in the legislation. On the other hand, France and Italy clearly define the specialism and procedures, which the student must practise respectively.

The format in which the workload of the clinical training is defined also varies between EU countries. Examples of different ways of describing the clinical training workload requirements are presented in Table 2.

<table>
<thead>
<tr>
<th>Country</th>
<th>Minimum workload requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td>90 ECTS for clinical placements (all areas)</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>600 hours in each of the specialisms</td>
</tr>
<tr>
<td>France</td>
<td>6 weeks in radiotherapy</td>
</tr>
<tr>
<td>Italy</td>
<td>15 external beam radiotherapy treatments</td>
</tr>
<tr>
<td>UK</td>
<td>not specified – as long as clinical training is in line with standards of proficiency(^{36})</td>
</tr>
<tr>
<td>Portugal</td>
<td>Legislation does not specify the minimum workload</td>
</tr>
</tbody>
</table>

Table 2 – Examples of requirements regarding clinical training workload

In summary, the format used to define the curricula and the workload of clinical training varies from country to country in the EU.

Other requirements

Demographic information for the radiographer, proof of fitness to practise (e.g. medical certificate) and proof of trustworthiness (e.g. police conduct certificate) are common requirements to register when the registration is mandatory.

In addition, mastering of the language of the host country is a common requirement to register and practise as a radiographer. Although this was not included in the original 2005/36/EC directive, this requisite was added in an amendment in 2013\(^{37}\).

Although most countries do not specify the presence of a final exam in the legislation, a final exam as part of the education programme can be done in some countries (e.g. France), while in other countries this exam is performed by an external entity, independent from the educational organisation (e.g. Germany or Poland).

Discussion

As identified in the literature,\(^{1,18-21}\) there are a variety of titles at national level, reflecting the national variations of the professions. Although European professional organisations define titles for the radiographer with the intention of harmonisation, these have different titles according to the specialisms that they represent. It is important to note that these do not have a binding power as
opposed to the protected titles of each country. The lack of an international homogenous title, might reflect a lack of homogeneity in terms of body of knowledge, levels of autonomy and authority across the EU, is an indication that there might be, in fact, several professions. The only official indication of the relationship between these national titles is the RPD that aggregates most of the professions under the same generic name of “Radiographer / Radiotherapist”²¹, although it also includes different branches of the professions as well as radiography assistants, reflecting some lack of reliability.

Lack of registration is an issue that may compromise the process of recognition of qualifications since the host country commonly requests proof of registration in the home country, however this can be compensated by other means: e.g. proof of experience⁴.

The lack of uniformity in the specialisms covered may compromise movement in both directions. Since the subjects covered by the applicant must comply with the requisites to practise, if the training was performed in a single specialism, the applicants might be refused registration since the other specialisms were not covered. This issue might be solved with partial recognition but this must be set in place by the individual countries³⁶. On the other hand, it is likely that courses covering all specialisms might not cover all subjects for each branch of radiography when compared to courses that focus on one specialism or might need to compromise on the depth due to similar course durations to cover all specialisms.

Although programme length is not a requirement affecting recognition of qualifications, it influences two criteria: 1) academic level, where a higher education course can be classified in different levels depending on the length and 2) professional qualifications, since the amount or depth of the subjects covered depends on the time allocated.

Regarding academic level, the 2005/36/EC directive establishes that the applicant should have a maximum of one level below the destination country education. Considering the results obtained, only three countries establish an education level that compromises the free movement, regarding this criteria. The EQF academic level is not mentioned in the 2005/36/EC directive, however there is a relationship between EQF and 2005/36/EC directive (Table 3).

**Table 3 – Relationship between EQF and 2005/36/EC directive academic level classification**

<table>
<thead>
<tr>
<th></th>
<th>2005/36/EC Directive Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EQF4</td>
<td>Level 2 (Secondary education)</td>
</tr>
<tr>
<td>EQF5</td>
<td>Level 3 (HE &gt;= 1 year)</td>
</tr>
<tr>
<td>EQF6</td>
<td>Level 4 (HE &gt;= 3 years) and 5 (&gt;= 4 years)</td>
</tr>
<tr>
<td>HE = Higher Education</td>
<td></td>
</tr>
</tbody>
</table>

In addition, the academic level has an impact on the curriculum, since at different levels, the depth at which the subjects are covered will not be the same, for example, at EQF5 “Comprehensive, specialised, factual and theoretical knowledge within a field of work or study and an awareness of the boundaries of that knowledge”(p.4) ³⁰ is expected while at EQF6 an “Advanced knowledge of a field of work or study, involving a critical understanding of theories and principles”(p.4) ³⁰ is achieved. As mentioned before, the academic qualifications must be equivalent, since radiography has an implication in the population’s health and safety⁴.

The subjects covered within the educational programmes are the most heterogeneous aspect observed. These requirements are presented using different frameworks (only a few follow EQF
recommendations) in addition to differences in content. Likewise, the requirements regarding clinical placements vary considerably.

Education programmes aim to achieve the requirements at national level, therefore how the subjects/outcomes are regulated influences the curriculum. If the requirements are set up in terms of competencies, the education outcomes must be competency-based; while if the requirements are a list of subjects covered, the programme might aim for the acquisition of knowledge without the development of a competency.

Differences in terms of structure compromises the comparison of the applicant’s education programmes against requirements. To overcome this issue, the countries commonly require the transcripts with details of the curriculum to ensure that there is a match between the education and the requirements. It is however important to remember, that although the EQF guidelines aim to facilitate mobility, this is a non-binding document.

The lack of information available was a limitation of this study, however, this reflects another hindrance to the movement of professionals across the EU, since without information, the radiographers cannot assess if their qualifications are eligible to apply for recognition in another country.

Conclusions

The requirements to practise radiography across the EU are considerably heterogeneous. The disparity is visible in the themes that emerged from the thematic analysis: registration in a professional body, specialisms included in the regulated profession, programme duration and ECTS, academic level and subjects covered.

Differences in education can compromise either the successful recognition of qualifications in the host country due to lack of compliance with the criteria. When recognition is granted, the safety of the patients due to discrepancies in the competencies developed in the training and those practised in the destination country.

The differences observed might compromise the movement of professionals since each country aims to educate students to comply with national regulations. If these regulations are different, then a radiographer educated in one country might not be able to practise in another country. The lack of national regulation of radiography in one EU country (Romania) only compromises the movement to-and-from this country, while variance in academic level impedes movement of professionals who have graduated from three member states (Germany, Poland and Spain) to countries with higher levels of educational requirements. However, this criteria still allows movement to those countries with lower level requirements. Lack of registration at national level can make the process more difficult, however there are means to overcome the issue.

The educational programme curricula are the criteria where national regulation is most heterogeneous across the EU and therefore hinders the movement of professionals, since 2005/36/EC directive establishes that professions affecting health and safety subjects covered in the education must match the destination country requirements. Since not all countries have a competency-based regulation, radiographers may be able to move to these countries, since they comply with the requirements, although there is no certainty that competencies developed are the same, compromising health and safety of the patient.

The programme duration and the workload (in terms of ECTS) are not requirements in the directive, however, they influence the academic level and professional qualifications that are required to
achieve recognition of qualifications. This heterogeneity between countries also compromises the comparison of qualifications across countries and make it difficult to design education programmes/curricula that would comply with the needs of all the member-states.

Although the researchers understand the complexity of the subject, the recommendations from this research are that the profession should be regulated at EU level with definition of the outcomes to be achieved in terms of Knowledge, Skills and Competencies. An agreed entry level, which might be separated for the different specialisms/professions in order to cater for national differences in terms of the specialisms is recommended. A theoretical or practical exam (e.g. provided by an international association) can be used as a tool to allow radiographers to prove the acquisition of knowledge, skills and competencies as described in the 2005/36/EC Directive. The results of this exam can be used in the application for recognition of qualifications and facilitate the movement across European countries.

References


