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Porównanie kwalifikacji, umiejętności i uprawnień zawodowych elektroradiologów w Polsce i w wybranych krajach Unii Europejskie

Streszczenie powyżej 2000 znaków

Wstęp. Porównywalność kwalifikacji, umiejętności oraz uprawnień zawodowych stanowi poważny problem współczesnego rynku pracy. Odzwierciedleniem tego jest sytuacja zawodowa elektroradiologów.

Cel. Przedstawienie i porównanie umiejętności, kwalifikacji oraz uprawnień zawodowych elektroradiologów uzyskanych podczas studiów I i II stopnia w Polsce i w wybranych krajach Unii Europejskiej.

Materiał i metoda. Informacje umieszczone w publikacji pochodzą z wiadomości otrzymanych od uczelni nauczających na kierunku elektroradiologia oraz z wyszukiwarki internetowej PubMed.

Wyniki. Elektroradiolog posiada złożone umiejętności praktyczne i wiedzę teoretyczną w zakresie wykonywania zabiegów diagnostycznych i terapeutycznych z wykorzystaniem promieniowania jonizującego, pierwiastków promieniotwórczych oraz pola magnetycznego. Jest przygotowany do udziału w postępowaniu diagnostycznym i terapeutycznym na prawach członka zespołu oraz do samodzielnego udzielania świadczeń w określonym zakresie.

Dyskusja. Brak ustawy o zawodzie elektroradiologia w Polsce powoduje nie tylko problemy w zdefiniowaniu uprawnień magistra elektroradiologii, ale także trudności w jednolitym rozdziale pomiędzy uprawnieniami licencjata elektroradiologii oraz technika elektroradiologii (uzyskiwanego po ukończeniu 2-letniego studium medycznego). W pozostałych krajach Unii Europejskiej, każdy poziom nauczania ma jednoznacznie rozdzielone uprawnienia zawodowe.

Wnioski. Umiejętności uzyskane przez studentów I i II stopnia w Polsce i w wybranych krajach Unii Europejskiej są porównywalne pod względem czynności praktyczno-motorycznych oraz operacji manualnych. Brak uregulowania uprawnień zawodowych absolwentów studiów II stopnia w Polsce uniemożliwia porównanie z kwalifikacjami zawodowymi absolwentów w innych krajach Unii Europejskiej. Nadawanie absolwentom studiów II stopnia w Polsce uprawnień zawodowych różniących się od nadawanych w pozostałych krajach Unii Europejskiej może spowodować problemy w uznawaniu uprawnień zawodowych zgodnie z dyrektywą 2005/36 EC – Uznawanie kwalifikacji i uprawnień zawodowych

Słowa kluczowe: elektroradiologia, kwalifikacje, umiejętności, uprawnienia zawodowe.

The comparison of qualifications, skills and professional competences between radiologic technologists in Poland and selected EU countries

Abstract powyżej 2000 znaków

Introduction. Comparability of qualifications, skills and professional competence is a serious problem of the modern labour market. This is reflected in employment status of radiation technology graduates.

Aim. To present and compare the skills, qualifications and professional qualifications obtained during the first and the second degree course of radiologic technologists in Poland and selected European Union countries.

Materials and methods. The information placed in the publication comes from the Universities offering courses in diagnostic and therapeutic radiography and the Web Search PubMed.

Results. Radiographer has practical skills and theoretical knowledge in performing diagnostic and therapeutic procedures with application of ionizing radiation, radioactive elements and the magnetic field. Radiographer is prepared to participate in the diagnosis and therapy as a full team member or can individually perform specified procedures.

Discussion. Lack of regulations on the profession of radiologic technologist in Poland causes not only problems in defining the qualifications of professionally qualified radiation technology graduates holding master's degree but also the difficulties in differentiation between the qualifications of the graduates holding bachelor's degree and those of technician-radiographers (obtained after completing a 2-year post-secondary medical course). In other European Union countries each level of education has clearly separated professional qualifications.

Conclusion. The skills gained by students of the first and second cycle degree studies in Poland and in selected European Union countries are comparable in terms of practical-motor skills and manual operations. Lack of regulations of the professional competences of graduates of the second level degree courses in Poland makes the comparison of the professional qualifications of graduates in other European Union countries impossible. Professional qualifications of graduates of the second cycle degree course in radiography in Poland that differ from the other European Union countries can cause problems in the recognition of professional qualifications in accordance with Directive 2005/36 EC - Recognition of qualifications and professional licenses.

Key words: diagnostic and therapeutic radiography, qualifications, skills, professional competence.

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INTRODUCTION

The globalising labour market, especially in EU countries employees to hold comparable professional qualifications. Comparability, in turn, is not possible until commonly accepted standards are adopted. Such standards are defined as a level of qualification requirements acceptable for employers, employees and other key stakeholders in the areas of economy and labour market [1]. Professional qualifications of radiologic technologists in Poland and selected European Union countries were compared in this paper in terms of the ISCED (International Standard Classification of Education) level 5, i.e. an academic degree awarded by institutions of tertiary education. The paper also identifies professional skills required from radiologic technologists for effective performance of their duties. Professional qualifications are defined by the extent to which those requirements are met. Professional competences are understood as a formal entitlement to do the work of a radiation technologist, including performing particular procedures.

The authors seek to draw a distinction between skills, qualifications and competences of radiologic technologists. The distinction which is difficult to make in Poland due to the lack of legal regulations for this profession and a consequent application of a generalised designation of '*technik elektroradiolog*' (in the Polish system '*technik*' is a title awarded to graduates of secondary technical schools) to all representatives of this professional group.

AIM

To present and compare professional qualifications of radiologists awarded at 1st and 2nd level studies in Poland and selected EU countries.

To show differences between qualifications, skills and competences acquired by radiation technology graduates in selected EU countries.

MATERIAL AND METHODS

The subject matter of this paper falls in the common ground between sociological and social sciences. It is, therefore, impossible to define the method of material collection that allowed this comparative analysis. It seems to be most comparable to that of document analysis. While rapid development of radiation technology has brought about an increased interest in this course of study, publications dealing with this area are still scarce. Most of the information used in this report was received from higher education institutions offering courses in radiation technology. Some details on radiographers' qualifications, skills and competences were also obtained via PubMed web browser. Qualifications of Polish radiologic technologists were compared with those set in the UK and France.

RESULTS

To present qualifications, skills and professional competences of radiation technology graduates in Poland.

1. Skills of first level graduates.

A graduate should have a general knowledge of medical and physical sciences and thorough knowledge of radiation technology. He or she should be able to perform diagnostic and therapeutic procedures related to the operation of equipment used for radiology, radiotherapy, nuclear medicine and electromedicine (electrocardiography, electroencephalography, electromyography, audiology, respiratory system physiology, etc.); understand the methods of generating information carriers (diagnostics) or tissue destruction agents (radiotherapy), structure of equipment used and effects of ionising radiation or other information carrier on the human body; predict and prevent effects of inappropriate use of medical equipment during diagnostic or therapeutic processes. Graduates should be mentally and physically predisposed to work with patients. They should have a foreign language skill at the B2 proficiency level by the Common European Framework of Reference for Languages and be able to use specialist terminology of medical and physical sciences. They should be prepared to work in radiology, radiotherapy and nuclear medicine units; ECG, EEG, EMG, audiology, clinical physiology laboratories offering full range of procedures; radiological protection authorities, and be able to cooperate with physicians of different specialities, medical physicists and medical engineers. Being aware of the responsibility for patients' health, they should perform their duties with utmost care, in accordance with professional standards, best practices and applicable laws. Graduates should be prepared to take second level studies [2].

2. Qualifications of first level graduates.

First level graduates should be able to use the knowledge of medical sciences; communicate with patients; cooperate in a therapeutic team; prepare a work-place and medical equipment and machines for scheduled therapeutic procedures; plan work based on referrals and assessment of patient health status; obtain patient information necessary to perform diagnostic examinations and therapeutic procedures; inform patients on methods of examination; position patients for examination; keep documentation; select methods and techniques adequate for X-ray examination; process chemical and physical radiograms and fluorograms; conduct ongoing assessment of X-ray examination; follow the rules of radiation protection; utilise vascular examination equipment, participate in ultrasound examination, use a scanner; perform examinations in a CT lab; perform isotopic examinations (scintigraphy); perform densitometry of the skeleton, electrocardiography, spirometry, EEG, audimetry; deliver an appropriate technique of radiotherapy; secure a patient and the environment in the case of a failure of medical equipment and machinery; provide first aid; comply with health and safety, fire prevention and environmental protection rules; adjust one's work-place according to the requirements of ergonomics; use various sources of information in order to improve one's professional skills; follow the rules of professional ethics; follow the rules of law related to the performance of professional duties; follow the rules of law related to business activity [3].

3. Professional competences of first level graduates.

Professional competences of first level graduates correspond to the qualifications and skills acquired at bachelor's degree studies (*studia licencjackie*)

4. Skills of second level graduates.

Second level graduates have professional skills acquired at first level studies and are able to make use of the knowledge of medical sciences and various other sources to improve their professional skills; communicate (with patients and other members of medical staff who make up the diagnostic and therapeutic team); find and remove reasons for irregularities in a diagnostic examination or therapeutic procedure; plan and deliver (single-handedly or in cooperation with a physician) radiotherapy, plan work based on a referral or assessment of patient health status; act as an expert or advisor in the radiation technology; supervise work of first level radiation technology graduates in the areas of ECG, EEG, EMG, EOG, radiation protection, nuclear medicine, neuroradiology or interventional radiology; participate in education of post-secondary and first level radiography graduates by running exercise and practical activities; set algorithms for dose calculation and optimise the radiotherapy process; operate IT networks managing data in X-ray diagnostics, teleradiology and radiotherapy, select adequate methods and techniques to perform diagnostic examinations and therapeutic procedures; read and analyse imaging examination results; make basic quality control tests for interventional radiology, CT, MRI, nuclear medicine and radiotherapy [4].

5. Qualifications of second level graduates.

Second level graduates have professional qualifications acquired at first level studies. There are no legal regulations concerning second level graduates.

6. Professional competences of second level graduates.

Second level graduates have professional competences acquired at first level studies. Professional competences of second level graduates have not been regulated by the Ministry of Health, with available legal definitions limited to the competences of *technik elektrokardiolog*, i.e. a graduate of a post-secondary medical college. What is more, the profession of a radiologic technologist (for holders of bachelor's or master's degree) has not as yet been submitted for classification as a new job/speciality pursuant to the Ministry of Labour and Social Policy Regulation on Classification of Jobs and Specialities for the purpose of the Labour Market and on Application thereof (Journal of Laws 2010 No. 82 item 537), and pursuant to Article 36(8) of the Act of 20 April 2004 on Promotion of Employment and on Labour Market Institutions (Journal of Laws No. 99, item 1001, as amended), where the classification of jobs and specialities for the purpose of the labour market and the scope of its application are determined by the minister competent for labour policy.

Qualifications, skills and professional competences of radiation technology graduates in other European Union countries.

1. Skills of first level graduates.

A person employed as a radiologic technologist should be characterised by the capability of logical and analytical reasoning, reliability and precision. Of great importance are also interpersonal skills and abilities to listen, explain, reassure and win trust of patients. Finally, a rapid development of technology requires a professional in this area to be a fast learner interested in scientific novelties. Main duties in imaging diagnostics include preparing an examination, introducing the procedure and talking to a patient, performing a radiological examination, and submitting results to a radiologist physician. In radiotherapy, radiologic technologists are responsible for equipment set-up and irradiation of target cells. Apart from that, their duties include: provision the institution administration with details of examination, verification of referrals, introduction of patients to the method and aim of examination, preparation and administration of contrast, proper positioning and of patients and set-up of X-ray units, performance of standard radiologic examinations, performance of specialist examinations (MRI, examination during digestion) at the presence of radiologist physician, keeping register of examinations, order keeping (rooms, desks, tables, tapes, gloves, coats), maintenance of equipment and machine quality control, product management, compliance with radiation protection regulations for patients and personnel, keeping record of patients/accidents in the interest of patients and services (France). [5,6].

2. Qualifications of first level graduates.

Graduates of first level studies are qualified to operate specialist equipment used in radiology, nuclear medicine, and electromedicine; speak a foreign language and a specialist language of medical and physical sciences; have a general knowledge of medical and physical sciences and a thorough knowledge of radiation technology. They can also handle teletherapy machines, image processors and simulators [7]. Radiologic technologists are qualified to select and perform immobilisations, calculate doses in treatment planing and operate HDR brachytherapy units (UK) [8,9].

3. Professional competences of first level graduates.

Professional competences of first level graduates correspond to the qualifications and skills acquired at bachelor degree studies. Additionally, holders of bachelor degree in radiation technology can specialise in a selected discipline of radiation technology through training courses.

4. Skills of second level graduates.

Second level graduates have all the skills of first level graduates and additionally are able to perform USG examination, manage medium and lower level medical personnel, plan radiotherapy, verify treatment plans, mark structures

relevant for the treatment process [7]; are familiar with the rules of palliative health care and able to use them with terminal patients (UK) [9,10].

5. Qualifications of second level graduates.

Graduates of second level course in radiation technology should be able to make imaging examinations using a wide range of high class equipment and techniques involving not only traditional application of X-ray units, but also USG, MRI and radioactive markers (nuclear medicine). Radiologic technologists are also responsible for the preparation and delivery of radiotherapy (irradiation simulation, planning dose distribution in target volume including simulation, determination of OAR margins, tumour irradiation using external beam or radioactive sources placed inside the body – brachytherapy) [9,11]. In treatment involving nuclear medicine, radiologic technologists play a vital role in protecting patient against radiation exposure (including by regular quality controls of activity meters and gamma cameras) [12]. After completing appropriate training courses, they can also describe results of imaging examinations [13].

6. Professional competences of second level graduates.

Professional competences of second level graduates correspond to qualifications and skills acquired at master degree studies. Additionally, holders of master degree in radiation technology can specialise in a selected discipline of radiation technology through training courses.

DISCUSSION

First level graduates in Poland and selected European Union countries acquire comparable skills in the course of their studies. If we were to harmonise a profile of a radiation technology graduate in our selected countries, it would be a person of multiple skills and comprehensive theoretical knowledge of diagnostic and therapeutic procedures involving ionising radiation, radioactive elements and magnetic field. He or she is prepared to participate in diagnostic and therapeutic procedures as a team member and to provide a certain range of services on his or her own.

Professional competences acquired in the presented countries on completion of first level radiation technology course are very similar to one another. In general, radiation technologists' professional duties include control and operation of electromedical equipment, performance of specific examinations and procedures in the area of broadly comprehended imaging (RTG, MRI, mammography, vascular examination, isotope diagnostics, etc.) and electromedical (ECG, EEG, audiometry, spirometry) diagnostics, cooperation in archiving and processing received diagnostic data, as well as delivery of prescribed radiotherapy.

Skills gained at second level studies in Poland and the selected countries are also comparable (except for USG examination, which is not included Polish training programmes). A master degree graduate may be characterised as a professional who can plan their work based on referrals and assessment of patient's health status, supervise work of post-secondary and first level radiation technology graduates in the area X-ray diagnostics, radiotherapy, electrophysiology, radiation protection nuclear medicine, neuroradiology, interventional radiology; participate in the training of post-secondary and first level graduates by conducting exercise and practical activities; set algorithms for dose calculation and optimises radiotherapy methods, select adequate methods and techniques to perform diagnostic examinations and therapeutic procedures.

The inability to compare qualifications and professional competences of second level graduates is due to the fact that competences of master degree graduates in radiation technology are yet to be legally regulated in Poland, even though first graduates completed their courses in 2011. It is a social problem, because people with a an academic degree higher than bachelor (*licencjat*) in radiation technology are not granted any seniority rights to distinguish them from the rest of the professional group, which may in time lead to the loss of motivation to continue education. In Poland, there are no possibilities for specialisation within the area of radiation technology, whereas radiologic technologists in other EU countries are offered opportunities to specialise in radiology, radiotherapy or nuclear medicine [9]. Skills acquired during two-year master studies permit radiologic technologists to cooperate on partner basis with physicians in diagnostic examinations and therapeutic procedures [12]. In the UK, graduates of second level studies, owing to the qualifications they are awarded, can work as assistants to radiologist or radiotherapist physicians and describe imaging examinations after completing an additional training course. Radiologic technologists are also responsible for USG examinations in UK, Austria, Spain, the Netherlands, Ireland and many other countries. In Poland, some attempts were made at the beginning of the 1980s to delegate basic USG examinations to radiologic technologists to be eventually suspended. The lack of legal regulations regarding graduates of second level studies or placing them on the level equal to that of first level studies may lead to problems in recognition of Polish diplomas in other European countries. Pursuant to the Directive 2005/36/EC on the recognition of professional qualifications, applicants seeking to have their professional qualifications in radiotherapy/radiography recognised in a Member State other than the one in which they have obtained their professional qualifications, are bound to submit an appropriate form along with supporting documents confirming their qualifications to a relevant Ministry of Health, which decides on the recognition of the right to pursue the profession. Automatic recognition of professional qualifications in another Member State is not permitted. If qualifications are found to be incomparable, a receiving country is entitled not to award the right to exercise the profession or to allow an adaptation period concluded with an aptitude test held in a receiving country [7,14]. It should also be borne in mind that the absence of an act regulating the professional status of radiologic technologists does not only make it difficult to define competences of master's degree graduates (*magister*) in radiation technology, but also causes difficulties in a consistent distribution of competences between bachelor degree holders (*licencjat*) and graduates of two-year post-secondary courses in radiation technology (*technik*

elektroradiolog). In all other EU countries, each level of education is attributed a clearly defined extent of professional competences.

The problem of competence distribution begins with the title of *technik elektroradiologii*, which is inadequate to qualifications obtained. The title is awarded to graduates of post-secondary schools who passed their professional qualification exam without having to hold a certificate of secondary education (*matura*), thus reaching the ISCED level 4, while the titles of *licencjat* or *magister* are awarded to persons completing their higher studies, i.e. achieving ISCED level 5. Despite evident differences in education level, the whole professional group is covered by the same title of *technik elektroradiologii*, which has also been used in the Ministry of National Education and Sports Regulation of 21 January 2005. With no legal distinction made between the levels of qualifications, graduates of post-secondary medical colleges and graduates of higher studies are at dispute as to their professional competences.

Furthermore, the Ministry of Labour and Social Policy Regulation of 27 April 2010 on Classification of Jobs and Specialities for the purpose of the Labour Market and Application thereof includes only the profession of *technik elektroradiologii* under reference no. 321103, in the section Operators of medical equipment, item 3211, where it is assigned level 3 of professional qualification. Not being included in the official classification, radiologic technologists holding bachelor's or master's degrees are not categorised as a separate job for the purposes of employment exchange, professional training, data collection for labour and continuous learning policies, research, analyses, forecasts or other studies regarding the labour market [15]. The above confirms the problem of radiologic technologists' qualifications and competences not being properly distributed in Poland. As long as the term *elektrokardiolog* (denoting tertiary education) is not provided for in a Ministry of Labour and Social Policy regulation, graduates of tertiary studies with the fifth level of qualification will continue to work as *technicy elektroradiologii*.

Another problem is the discrepancy between radiation technology students' expectations with regard to job opportunities and the reality they encounter. In most cases, graduates of higher studies expect their future job to rely mainly on the qualifications they have acquired and to offer them prospects of professional development. Unfortunately, the reality of the Polish health service and the above-mentioned lack of legal regulation prevent radiologic technologists to make a full use of their qualifications. The work mostly involves the operation of medical equipment, not always of high quality. Only few of them are offered opportunities to cooperate in teams where they are involved all the way through the development of treatment planning. This largely depends on how confident a physician is in radiographer's skills and how his or her work is looked upon by other team members. Unfortunately, this work is all too often thought to boil down to "pressing a button".

Certainly, Polish health care system can be adapted in this respect to the European standards. But then the question is how long radiologic technologists in Poland have to wait for those changes to enter into force and what they should do until that happens.

Radiation technology has been taught in Poland since 2002, first as a specialisation, then, since 2009, as a main course of study. This makes a big time difference compared to other European countries where radiography programmes have been taught for over ten years, thus offering a possibility to draw on the examples of more experienced educational institutions as regards the award of competences and methods of teaching. Those models should constitute a significant reference for defining qualifications and competences of second level students in Poland.

CONCLUSION

1. Skills acquired by first and second level students in Poland and the selected European Union countries are comparable in terms of practical activities and manual operations.

2. First level graduates in Poland and the selected European Union countries have comparable professional qualification allowing them to do the job of radiologic technologist.

3. The lack of legal regulation with regard to professional qualifications of second level graduates in Poland prevents comparison with qualifications of graduates in other EU countries.

4. The situation where professional competences of radiologic technologists, who completed their master's studies, are not legally regulated may in the longer run lead to the loss of motivation to further education.

5. Awarding second level graduates in Poland with professional competences which are different than those awarded in the other EU countries may cause problems in recognition of professional qualifications pursuant to the Directive 2005/36/EC on the recognition of professional qualifications.

6. A professional title which is inadequate to qualifications received causes problems in the distribution of competences between post-secondary, first level tertiary and second level tertiary radiation technology graduates.

7. The pattern of qualifications awarded in the countries that have longer experience in teaching radiation technology programmes may represent a significant reference for defining qualifications and competences of second level students in Poland.

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