



An Analysis of the Disciplines focused on Radiation Protection of the Radiology Technologist Courses in Accordance with 7.01 Standard for the Certification of Radiation Protection Supervisor Qualification

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1.Introduction

Undergraduate education courses in technology were recognized in Brazil in the 1990s, a time when the evolution of radiology services also influenced the training process and the practice of professionals, culminating in the creation of a degree in Technology in Radiology in 1991 [1]. From this time onwards, the vision of the technologist in radiology (TR) as a professional with higher-level knowledge that meets new forms of organization and management was intensified [2]. Thus, according to the Ministry of Education (MEC), the TR performs techniques involving knowledge in Radiotherapy, Radiology and Nuclear Medicine (medical areas), Industrial Radiology, Veterinary and Dental Radiology and Tailings, for example, in addition to coordinating and supervising teams in image diagnosis, quality control and radioprotection [3; 4]. However, despite this broad spectrum of action, there are still few postgraduate courses in which RTs can specialize, in order to perform the most varied activities in the nuclear area that they can perform [1]. There is also a low presence of TR acting as Supervisor of Radiation Protection (SPR), in addition to the low bibliography on the performance of TR as SPR [5]. It appears then that, in some areas where the RT works, prior knowledge regarding radiation protection (RP) is necessary.

2.Metodology

In this sense, the objective of this work is to verify the subjects that address the knowledge related to RP in the undergraduate courses in TR offered in the country, according to the 7.01 standard of Qualification Certification to act as Radiationl Protection Supervisor (SPR) [4] The subjects in question are Shielding Calculus, Dosimetry, Statistics, Radiation Physics, Fundamentals of Basic Physics, Waste Management and Transport, Nuclear Instrumentation, Legislation and Standardization, Nuclear Medicine, Radiobiology and Radiation Protection. Therefore, a documental research of the curriculum notes found in all educational institutions (IES) in the country that offer the TR course was carried out, and the presence of subjects related to knowledge involving a RP was analyzed. In this context, the workload and content were not analyzed (given that many of the IES did not provide this data).

3. Results and Discussion

118 IES that offer the TR course were identified. However, of this total, only 79 provide the complete curriculum and the workload on their pages. These 79 HEIs were grouped by regions, which allowed us to analyze the workload of the curriculum as well as the offer of these essential modules for training in RP (Figure 1).



Figure 1: Distribution of HEIs by region. Source: The authors.

The subjects on RP considered are: Shielding Calculus, Dosimetry, Radiation Protection, Statistics, Nuclear Instrumentation, Radiation Physics, Basic Physics Fundamentals, Waste Management and Transport, Radiobiology, Nuclear Medicine and Legislation and Standardization. Next, Table 1 will be presented, which will present the distribution of subjects by region.

Table 1: Distribution of subjects (in %) by region. Source: the authors.

Subject/Region	Midwest (6 IES)	Northeast (29 IES)	North (9 IES)	Southeast (26 IES)	South (9 IES)
Shielding Calculation	0%	41,4%	11,1%	26,9%	22,2%
Dosimetry	33,3%	55,2%	44,4%	46,2%	66,7%
Statistic	50%	48,3%	44,4%	42,3%	66,7%
Radiation Physics	100%	86,2%	100%	96,1%	96,1%
Basic Physics	83,3%	72,4%	44,4%	57,7%	57,7%
Fundamentals Waste and Transport Management	0%	3,4%	0%	7,7%	7,7%
Nuclear Instrumentation	0%	0%	0%	0%	0%
Legislation and Standardization	83,3%	48,3%	55,6%	34,6%	22,2%
Nuclear medicine	100%	96,54%	100%	92,3%	88,9%
Radiobiology	16,7%	27,6%	22,2%	34,6%	55,6%
Radiation Protection	66,7%	93,1%	77,8%	80,8%	66,7%

In general, it is observed that in all regions of the country, the disciplines of Radiation Physics, Radiation Protection and Nuclear Medicine are taught; however, no IES offers Nuclear Instrumentation. Disciplines

such as Shielding Calculation, Legislation and Waste Management, Transport and Radiobiology are those that have the smallest offer, appearing, on average, in 50% of the IES. It is also noted that Radioactive Waste Management and Transport of Radioactive Material is below 12% of the IES, and in the North and Central-West region no HEI teaches this subject.

4. Conclusions

The aim of this study was to evaluate the curriculum profile of subjects related to RP in RT courses offered at IES in Brazil, related to SPR activities, in accordance with standard 7.01. It appears that the offer of disciplines varies from region to region, which can also occur intra-regionally. However, the absence of a certain discipline does not necessarily mean that the content of this discipline is not offered, and may be inserted in another discipline (or even being offered under another name). Thus, the study had limitations, since it did not analyze which skills, attitudes and skills are taught in the researched subjects, as well as the workload and contents, considering that most IES do not provide these data. Therefore, the intention was to carry out an initial survey of the distribution of subjects related to RP in RT courses in the country. Therefore, there is a greater need to offer some disciplines related to RP to comply with the 7.01 standard. It is intended, with studies of this nature, to contribute to the debate about the curricular profile on RT courses in view of the importance of this theme in their professional activity. Finally, it is suggested a standardization regarding the name of the subjects, as well as a standardization on the obligatory nature, content and workload of the subjects offered on PR.

References

- [1] D. M. dos Santos, B. J. Ferreira, N. A. Batista, S. Santos, "A formação para a prática do tecnólogo em radiologia", *INOVAE - Journal of Engineering, Architecture and Technology Innovation*, Volume 4, Número 1, São Paulo (2016).
- [2] L. Bolognesi, M. V. Tetsuge, "Radiologia", *Revista Eletrônica Saúde: Pesquisa e Reflexões*, Volume 2, (2013).
- [3] Brasil. Ministério da Educação – MEC. *Cursos de Educação Profissional Tecnológica de Graduação e Pós-Graduação*, (2019)
- [4] Brasil, CNEN. Norma CNEN NN 7.01. *Certificação da qualificação de supervisores de proteção radiológica*, (2021).
- [5] Brandão, L.; Cipriano, M. V.; Gomes, A.; Alves, A.; Santos, A. , Perspectiva acadêmica da supervisão de proteção radiológica em radioterapia no Brasil, *Revista Rede de Cuidados em Saúde*, 11, 2 (2017).