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Menezes, Luana Possamai; Sarturi, Fernanda; Franco, Gianfábio Pimentel

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RESEARCH

THE TEAM OF NURSING AND RADIOLOGICAL HAZARDS

A EQUIPE DE ENFERMAGEM E OS RISCOS RADIOLÓGICOS

EL PERSONAL DE ENFERMERÍA Y LOS RIESGOS RADIOLÓGICOS

Luana Possamai Menezes¹, Fernanda Sarturi², Gianfábio Pimentel Franco³

ABSTRACT

Objective: To describe the characteristics of personal and professional profile of the nursing staff of the radiology industry. **Methods:** This is a field research with a quantitative approach, performed in a public hospital in Rio Grande do Sul, with ten employees of the nursing team. Data collection was by a questionnaire and data were tabulated and organized into charts and tables, based according to the literature on topic. **Results:** The subjects were female, 50% aged between 40-49 years, 60% married, 60% nursing assistants at the institution for more than three years and remain in the sector radiological more than three hours / day, 50% make use of PPE and 80% know the health risks, especially, sterility and cancer. **Conclusion:** The Continuing Education can be a tool to be used by nursing staff to avoid unsafe practices against ionizing radiation. **Descriptors:** Nursing, Occupational health, Radiology, Ionizing radiation.

RESUMO

Objetivo: Descrever as características do perfil pessoal e profissional da equipe de enfermagem do setor radiológico. **Métodos:** Trata-se de uma pesquisa de campo com abordagem quantitativa, realizada em um Hospital Público do Rio Grande do Sul, com dez trabalhadores da equipe de enfermagem. A coleta dos dados foi por um questionário e os dados foram organizados e tabulados em gráficos e tabelas, fundamentados conforme a literatura pertinente à temática. **Resultados:** Os sujeitos eram do sexo feminino, 50% com faixa etária entre 40 a 49 anos, 60% casadas, 60% auxiliares de enfermagem na instituição a mais de três anos e permanecem no setor radiológico mais de três horas/dia, 50% fazem uso dos EPIs e 80% conhecem os riscos à saúde, principalmente, esterilidade e câncer. **Conclusão:** A Educação Permanente pode ser uma ferramenta a ser utilizada pela equipe de enfermagem para evitar práticas não seguras frente às radiações ionizantes. **Descritores:** Enfermagem, Saúde do trabalhador, Radiologia, Radiação ionizante.

RESUMEN

Objetivo: Describir las características del perfil personal y profesional del personal de enfermería de la industria de la radiología. **Métodos:** Se trata de una investigación de campo con un enfoque cuantitativo, realizado en un hospital público de Río Grande do Sul, con diez empleados del equipo de enfermería. La recolección de datos fue un cuestionario y los datos fueron tabulados y organizados en cuadros y tablas, basado de acuerdo a la literatura sobre el tema. **Resultados:** Los sujetos del sexo femenino, 50% con edades comprendidas entre 40-49 años, 60% casados, 60% auxiliares de enfermería en la institución por más de tres años y permanecer en el sector radiológico más de tres horas al día. **Conclusión:** La educación permanente puede ser una herramienta para ser utilizada por el personal de enfermería para evitar prácticas no seguras contra radiaciones ionizantes. **Descriptor:** Enfermería, Salud ocupacional, Radiología, Radiación ionizante.

¹Nurse. Master of the graduate program in nursing at the Federal University of Rio Grande do Sul, Brazil. CAPES. Rua Rio Branco 1131/303, Bairro Centro, Palmeira das Missões/RS.CEP: 98.300-000 Cell: (55) 99569978. E-mail: luana.possamai.menezes@hotmail.com.²Nurse. Master's degree in Nursing from the Federal University of Santa Maria. Lecturer in the undergraduate degree in nursing from UFSM-CESNORS. E-mail: fernandasarturi@yahoo.com.br.

INTRODUCTION

Radiation is the propagation of energy in the form of electromagnetic waves or particles. The electromagnetic wave is a form of energy consisting of electric fields and magnetic fields, variables, and wavering in reciprocally perpendicular planes both, able to spread in space. In a vacuum, its propagation speed is 300,000 km/electromagnetic radiation best known are light, microwaves, radio waves, radar, laser, x-ray and gamma radiation. Radiation in the form of particles with mass, electric charge and magnetic charge more common are the electron beams, beams of protons, Alpha radiation and beta radiation.¹

Depending on the amount of energy, radiation can be described as ionizing or non-ionizing. Non-ionizing radiation have relatively low energy. In fact, non-ionizing radiation are always around us. Electromagnetic waves such as light, heat, and radio waves are common forms of non-ionizing radiation.¹

Ionizing radiation is any particle or electromagnetic radiation, when interacting with matter, removes electrons from atoms or molecules, transforming them into ions, directly or indirectly. Thus, Alpha and beta particles and gamma radiation, emitted by radioactive sources, as well as x-rays, issued by the respective apparatus, are ionizing radiation.¹

The medical specialty called Radiology and diagnostic imaging, which includes performing radiography, mammography, ultrasonography, CT scan, MRI, among others, requires a variety of procedures related to the use of ionizing radiation and the role of workers in nursing. The action of this specialty nursing occurs mainly at the preparation of exams contrasted users (i.e., administration of solutions via several routes), the guidance before and after the exams, in the

preparation of environment and materials to be used.²

In addition, part of the performance of nursing monitoring of some surveys, especially those in which users cannot be alone in the examination room due to their clinical conditions; in the case of polytraumatized patients, children, among others. The monitoring of these tests require that nursing workers are targeted, mainly about their radiological protection, so as to avoid the unnecessary exposure to radiation.²

The effect of ionizing radiation on an individual depends of absorbed dose (high/low), the rate of exposure (acute/chronic) and form of exposure (completely body/in). Any absorbed dose, including doses from natural radiation can induce cancer or destroy cells. The issue is likely to damage, likely precursor of cancer mutations and number of dead cells. The higher dose rates and doses absorbed, the greater the likelihood of damage, mutations and cancer precursor cell death.³

Because the nursing act increasingly with ionizing radiation-emitting technologies in its work process, is imperious qualification. ³ this field of professional activity tends to increase more and more and the professionals in this area need to prepare to act safely in these specialties.

As a tool for protecting the health of workers, the Ministry of health has the Regulatory Standard (NR) No. 32, which establishes the basic guidelines for the implementation of measures to protect workers ' safety of health services, as well as those engaged in promoting activities and health care in General.⁴ This legislation provides for the care to be taken by professionals who work in areas that are sources of ionizing radiation, including radiological sector, that is the place of performance of the x-rays and CT scans, covering care as: remain in these areas the shortest time possible to complete the procedure; have

knowledge of the radiological risks associated with their work; be trained initially and continuously in radiological protection; use the personal protective equipment (PPE) suitable for the minimization of risks; be under individual monitoring of doses of ionizing radiation, in cases where the exposure is occupational.⁴

The same standard also exposes the radiological protection services, which must be fitted with equipment for individual monitoring of workers: and area; individual protection and environmental measurements of ionizing radiation specific to working practices.

Considering the above, this research is justified by the concern for the health of workers in nursing, as well as by the few studies related to the subject, in order to contribute to the construction of knowledge on the subject.

The aim of this study was to characterize the personal and professional profile of the employees of the nursing staff of a public Hospital Radiology Department of Rio Grande do Sul.

METHODOLOGY

It is a field research, exploratory, descriptive, quantitative approach. The subjects of this study were ten employees of the nursing staff, including nurses, nurses and nursing auxiliaries, industry-focused x-ray of a public Hospital in Rio Grande do Sul, Brazil. The data collection took place in the months of August and September 2011, by means of a questionnaire with open and closed questions with dichotomous questions, multiple choice, and tricotomicas mixed.

All ethical and legal principles were respected, as approved by the Ethics Committee and research, under the CAEE No.0216.0.243.000-11. After signing the informed consent, the data collection. For data analysis, these were organized and tabulated in charts and tables, with the aid of the program *Microsoft Office Excel 2007*. The data R. pesq.: cuid. fundam. online 2013. abr./jun. 5(2):3580-87

were justified as pertinent to the thematic literature.

DISCUSSION AND RESULTS

Participated in 83% of research workers of the nursing staff, nurses, technicians and nursing assistants, since 17% of workers did not accept to participate in the study. Then follow the results pertaining to the personal profile (table 1) and the Professional Profile (table 2), the latter also covers the description of results related to occupational safety in the field of Radiology.

Table 1. Personal Profile.

Respondents	Sex	Age	Marital State	Number of children
1	(F)	53	Married	3
2	(F)	63	Maiden	1
3	(F)	50	Married	0
4	(F)	42	Married	2
5	(F)	48	Married	> 3
6	(F)	49	Married	0
7	(F)	55	Separated	2
8	(F)	48	Maiden	0
9	(F)	46	Married	2
10	(F)	50	Maiden	0

It turns out, in table 1, that 100% of the subjects of the research are female and that their ages are 50% between 40 to 49 years; 40% of 50 to 59 years and 10% between 60 and 69 years. As regards the marital state, 60% are married, 30% are single and 10%, separated. As for the number of children, 40% of them have no son; 30% have two children; 10%, a son; 10%, three children and other 10% have more than three children.

In table 2, it is observed that, with regard to occupation, 20% are nurses, 20% are nursing techniques and 60% are nursing assistants. With respect to working time in the institution, 100% working in the hospital for more than three years, playing the service in the morning and afternoon shifts.

On the results of the work in the field of Radiology, have that: the length of stay of professionals in the radiologic sector is more than

three hours to 100% of the participants. The time of exposure to ionizing radiation for 60% of participants exceeds three hours; 30% are exposed only 15 minutes and 10% did not respond.

Table 2. Professional Profile.

Respondents	1-current Occupation in nursing staff	2-Time working in the hospital	3-work shift
1	Nurse	> 3 years	Daytime
2	Nurse	> 3 years	Daytime
3	Nursing technique	> 3 years	Daytime
4	Nursing Assistant	> 3 years	Daytime
5	Nursing Assistant	> 3 years	Daytime
6	Nursing Assistant	> 3 years	Daytime
7	Nursing Assistant	> 3 years	Daytime
8	Nursing Assistant	> 3 years	Daytime
9	Nursing Assistant	> 3 years	Daytime
10	Nursing technique	> 3 years	Daytime

On the use of PPE, 50% responded that make use of such equipment to enter the radiology sector; 40% answered that they do not use and 10% did not respond.

With regard to knowledge about health risks and related diseases from exposure to ionizing radiation, 80% answered that they have this knowledge, describing the sterility and cancer as main effects and 20% did not know answer. On the knowledge of what Ppe should be used in the exposure to ionizing radiation, 50% of participants in the survey answered to know what are the needed (dosimeter and a lead coat). On the other hand, other 50% did not know answer.

With respect to conducting periodic examinations for the health of these workers, 100% of them replied that they, being the most common laboratory tests (complete blood count, urinalysis, qualitative examination) and dosage of radiation by the dosimeter.

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When questioned about the realization of trainings or permanent education related to occupational hazards susceptible to ionizing radiation in the sector, 50% responded that they did or do. On the other hand, the other 50% have responded not having done or not done. As for the realization of trainings or permanent Education professionals about the use of EPIs for direct exposure to ionizing radiation, 60% answered that they have made or make and 40% replied that they did or did not do. On the need to carry out trainings or permanent education with the pros for clarification on the exposure to ionizing radiation, 90% of respondents claim that it is necessary and important to be held, the others believe that this is not essential.

Nursing is recognized as a profession, exclusively women, 5 as also evidenced in this research, initially, performed the female hegemony that relates its history since.

Complementing this affirmative, we used a literature review study that failed to take into account gender implications in the profession of nursing.⁶ This study States that the profession of nurse in the face there is a predominance of women and the nature of the work, was as a sexual social practice, implying the need for attributes that do not fit in the range of technical expertise, but the qualities perceived as intrinsic to the nature of women.

Exposure to ionizing radiation suffered by users of the service to carry out some tests is sporadic, if compared to the dosage received by health professionals or workers of Radiology, which is more intense because of frequent or constant contact with radiation.

The professionals of the service, as answered in this research forms have everyday physical exposure to these rays, exceeding three hours in specific industry and the same occurs with exposure to radiation itself. This turns into an aggravating to workers ' health, when it turns

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out that not all developed the permanent education or continuing education about the risks of radiation, or that not everyone believes in the importance of protection.

You can complement this idea with the statements of a reflective study², bringing the contention that although the EP be well-founded in theory, have not yet managed to deploy their services in practice teaching and methodological assumptions. This fact is observed in Radiology services and diagnostic imaging, because they have knowledge and specific practices in their work and, though sectors with special features, little emphasis is given to this specific knowledge. It is important to take into consideration that most of the respondents are aware, even if basic or superficial, what are the consequences to the health of workers who suffer radiation doses and the Ppe needed to avoid too much exposure to this agent.

The fact that concerns in this statement is that the number of professionals who have the knowledge is not prevalent, which defines the alleged exposure of a portion of these professionals by ionizing radiation, without due caution and relevance. Between the protective equipment that should be used in direct work with the radiation source are: safety garments affording protection to the torso and safety sleeve for hand protection against ionizing radiation, as well as plumbiferous glass screens.

Furthermore, considering the activities carried out, are recommended Ppe such as gloves, masks and Latex nitrílico aprons for protection against chemical agents used during the preparation of solutions and masks fit for retention of impurities and biological agents that expose a worker during the exams.⁷

In addition, you can use the data obtained from the survey conducted in hemodynamic services of two hospitals in the city of São Paulo. They claim that, even being in a minority negative responses, R. pesq.: cuid. fundam. online 2013. abr./jun. 5(2):3580-87

it is important to note that the lack of one or a set of measures to control exposure to ionizing radiation can result in an increase of the dose received by the medical staff of the hemodynamic services.⁸

The NR 32 brings the care to be taken by professionals who work in areas where there are sources of ionizing radiation, which include: staying in these areas the shortest time possible to complete the procedure; have knowledge of the radiological risks associated with their work; be trained initially and continuously in radiological protection; use appropriate Ppe for the minimization of risks as mentioned above; be under individual monitoring of doses of ionizing radiation, in cases where the exposure is occupational.⁴

As to the claim of the respondents about the time in years or months in radiology, relates this to the effect of exposure to these long-term radiation, which provide long-term also the appearance of signs and symptoms of possible complications to the health of these workers. Is what says a research developed with 16 radiology technicians who worked in three hospitals in the region spanning a State Health Office, situated in the interior of the State of Rio Grande do Sul, which aimed to investigate possible morbidities and occupational hazards to which they were exposed to these workers, as well as refine their knowledge of preventive protection.

The symptoms presented by the technicians in Radiology participants in such research was basically: anorexia at least once a month, covered in 62.5% of the answers; nausea, between 37.5% of surveyed mentioned suffer this feeling once a month; êmese, in 12.5% of respondents, which claimed to have the manifestation of this signal on the same interval of time; diarrhea in 37.5% in the same period; asthenia and fibromyalgia, in 12.5% of surveyed during the month. However, the headache was

one of the symptoms prevalent because the data shows that 12.5% of Radiology technicians to come once a month; 12.5%, twice; 12.5%, five times; 25% mention more than five episodes per month and 25% reported not having headache usually.⁷

To complement the discussions of research conducted on the mentioned diseases developed from exposure to ionizing radiation, the statement of the Ministry of health, which established a way to classify work-related diseases, which are caused by exposure to ionizing radiation, and which were named and coded according to the international classification of diseases (ICD-10).

As main diseases related to ionizing radiation, we have: malignant neoplasm of nasal cavity and paranasal sinuses; malignant neoplasm of bronchus and lung; malignant neoplasm of bone and articular cartilage of limbs (includes "bone sarcoma"); other malignant neoplasms of skin; leukemia's; other specified disorders of white blood cells: Leukocytosis, leucemóide reaction; conjunctivitis; cataracts; Radio dermatitis;; disorders of skin and connective tissue diseases related to the radiation, unspecified; osteonecrosis: osteonecrosis due to drugs; other secondary osteonecroses; male infertility; acute effects (not specified) of radiation.⁹

From claiming some research regarding routine tests that industry-focused radiological workers exposed to ionizing radiation must perform, include the complete blood count, erythrocyte function exams, exams that evaluate the Leukocyte and platelet function and the platelet count, made not only on the admission to the service, but also, every six months.⁷

When comparing the data obtained in this survey, which was developed with the nursing staff working in the sector, to radiological obtained through a study developed with the technicians in radiology; both reflect the same conclusion regarding the need to develop Continuing Education (EP) or continuous training R. pesq.: cuid. fundam. online 2013. abr./jun. 5(2):3580-87

with the pros about the occupational hazards that exist in this sector. When asked about the need for the practice of EP in your area of professional performance, the answers obtained denounced that most workers admit the value of this strategy.⁷

Thus, the concept elaborated by the Ministry of health on the EP to understand how learning at work, through which the learning and teaching if they incorporate the daily lives of organizations and work.⁹ it is performed from the problems faced in reality and takes into account the knowledge and experiences that people already have. Proposes that the procedures for education of health workers are from the problem of the work process, and believes that the training and development needs to be based on the health needs of individuals and populations. EP processes in health aim the transformation of professional practices and the organization of work.¹⁰

Permanent education grants people that educational activities triggered by the dialogue, critical thinking, questioning, construction and integration of new knowledge related to the realities are experienced at work. She is able to develop new ideas to render necessary transformations in the adaptation and implementation of work/care. Thus, the learning strategies can be used to develop critical thinking and Dialogic, to permit a space of collective participation and do understand the reality of work and promote strategies suitable for the production of new knowledge in pursuit of change.¹¹

Promote the maintenance of the EP in the Middle for professionals who expose themselves to ionizing radiation is extremely important, because it shows that protection does not occur just by providing equipment, but also through control and validation of procedures for protection, both for the health team as for patients.

CONCLUSION

The results obtained in the research made it possible to characterize the personal and professional profile of the employees of the nursing staff of a radiologic sector, as well as made it possible to check the understanding of these professionals regarding the safe exposure to radiation. The result of this research can be set as a reflection of the risk to the health of workers of radiology services.

It is important to understand that even if the hospital have norms that underscore the importance of the use of PPE, as well as other forms of security to health workers, the results showed no positive predominance. This information can be related to several factors, but what really matters is what can be done to change this reality. As much as the team of nursing professionals have knowledge about occupational risks suffered by being exposed to ionizing radiation, the long-term commitment of health of these is inevitable. For this reason, it is important to create mechanisms that enable care to this exhibition.

Therefore, it is understandable that after analysis and discussion of the results obtained by research is the need to develop the permanent education with nursing staff as their security strategy. Because it is through education and the knowledge that the work can be developed with greater safety and responsibility, reflecting on the health of these workers, as well as, can also reflect indirectly in the care and health of patients.

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