

## MANAGEMENT OF OCCUPATIONAL RISKS GENERATED BY EXPOSURE TO IONIZING RADIATION

Liuba CORETCHI<sup>1</sup>, Marina BOGDAN<sup>2</sup>, Serghei CEBANU<sup>3</sup>, Angela RUSNAC<sup>3</sup>,  
Ruslan BALTAGA<sup>3</sup>

<sup>1</sup>National Agency for Public Health, the Republic of Moldova

<sup>2</sup>Nicolae Testemițanu State University of Medicine and Pharmacy, the Republic of Moldova

<sup>3</sup>MIPH Oncological Institute, the Republic of Moldova

Corresponding author: Liuba Corețchi, e-mail: [liuba.koretski@ansp.gov.md](mailto:liuba.koretski@ansp.gov.md)

**Introduction.** Occupational exposure to ionizing radiation (IR) in the medical sector is associated with an increased risk to workers' health, a risk that can be significantly reduced by applying integrated and effective protection and monitoring strategies.

**Purpose of the study.** This study aimed to assess the risks of occupational IR exposure among medical workers to substantiate integrated health protection measures in the workplace.

**Material and methods.** To assess the immune status of personnel professionally exposed to IR, immunophenotyping of T- and B- lymphocyte populations was performed by flow cytometry in 49 subjects - medical personnel from the radiology/medical imaging departments, both women (n=31/63.3%) and men (n=18/36.7%). The mean length of occupational exposure to IR was 20.08 years (range: 4–45 years), and the mean age was  $52.34 \pm 9.91$  years.

**Results.** This study achieved several objectives, namely it examined the legislative framework and national/European norms for the radiological protection of workers; identified the main medical professional categories exposed to ionizing radiation (IR) and performed a quantitative assessment of their health risks, including oncological risk; and studied the incidence and types of health effects associated with occupational IR exposure. Proposals for improving monitoring, education, and health protection strategies for exposed personnel were also developed. Immunophenotyping of the study group yielded the following results (mean  $\pm$  SD): CD45+CD3+ T-lymphocytes,  $71.45 \pm 6.70\%$ ; CD3+CD4+ T-Helpers,  $42.07 \pm 5.32\%$ ; CD3+CD8+ T-Cytotoxics,  $26.44 \pm 7.65\%$ ; immunoregulatory index (II),  $1.84 \pm 0.68$ ; CD3+CD56+ NKT cells,  $8.03 \pm 3.87\%$ ; CD3-CD56+ NK cells,  $16.17 \pm 43.43\%$ ; CD3-CD19+ B-lymphocytes,  $10.74 \pm 2.69\%$ ; and CD3+HLA-DR+ activated T-lymphocytes,  $7.81 \pm 3.08\%$ . Compared to reference values, the study subjects showed an increase in CD3+CD56+ NKT cells and CD3-CD56+ NK cells. NKT cells are crucial for immune regulation and possess direct killing activity; upon activation, they can secrete large quantities of immune-regulating cytokines such as interleukin and interferon. The average II was  $1.84 \pm 0.68$  (range: 0.91–4.95), within the reference range of 1.3–2.2. The structure of morbidity, individual absorbed doses, and laboratory results were also analyzed. Most parameters were comparable to those found in the general population.

**Conclusions.** The good health status of the studied group reflects compliance with radiation protection norms in the relevant departments. This was ensured by technical cooperation projects with the IAEA that provided RP equipment.

**Keywords:** ionizing radiation, occupational exposure, radiation protection.