

## **About Radiophobia of the Population in the City of Tashkent**

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**Abstract:** Radiophobia is a complex of neurosomatic mental and physiological disorders, in some cases difficult to treat. These disorders are expressed in fear of sources of ionizing (radiation) and non-ionizing radiation (electromagnets). In order to assess the degree of need for measures to ensure radiation safety of the population during the operation of sources of ionizing radiation in medical institutions, many research works have been carried out. In the city of Tashkent, in the area where 6 large medical and preventive institutions are located using sources of ionizing radiation, measurements of the dose rate of gamma radiation were carried out, which were compared with the value of the gamma background of the city. To identify the radiophobia factor, a survey was conducted among two groups of the adult population. It was revealed that the use of sources of ionizing radiation in medical institutions does not affect the gamma background level in places where the population lives, does not pose any danger and does not require special protective measures.

**Keywords:** radiophobia, source of ionizing radiation, medical institutions, gamma background, gamma radiation dose rate.

**Relevance.** A part of the city's population has radiophobia, which is due to the low level of radiation-hygienic literacy of the population and the lack of information among the population about the radiation situation both in the city as a whole and in the area where medical institutions are located. Ionizing radiation is one of the factors that have a pronounced biological effect. These radiations accompanied the big bang, which began the existence of our Universe about 20 billion years ago. Since that time, radiation has constantly filled outer space, and even the very origin of life on Earth occurred in the presence of background radiation from the environment. The discovery of ionizing radiation and the mastery of the energy of the atomic nucleus involved huge contingents of people in the sphere of contacts with ionizing radiation, which significantly increased the risk of possible negative effects on humans from ionizing radiation. In accordance with the Law of the Republic of Uzbekistan "On Radiation Safety" (1) "Citizens have the right to complete and objective information about the radiation state of the environment, as well as about the doses of radiation they received." In the context of the widespread use of sources of ionizing radiation, this provision is of great importance, since the significance of sources of ionizing radiation for radiation safety is not always correctly assessed by the population due to the proximity of objects that use sources of ionizing radiation. In the Republic of Uzbekistan, radiation alertness of the population is most often due to insufficient information about the use of sources of ionizing radiation in medical institutions. And this is not accidental, since the main part of the sources of ionizing radiation in the Republic of Uzbekistan is actually used in medical institutions. According to various studies, the use of such sources does not pose a danger to the population (2,3,4,5). However, in the republic there is no systematic analysis of the radiation situation in the areas of deployment of the relevant medical institutions, there is no analysis of its significance for the formation of radiation doses to the population, and there is no information

provided to the population about the radiation situation on the territory of the republic. This creates conditions for the emergence of radiophobia among the population, the validity of which is highly questionable. These circumstances were the basis for carrying out this work.

**Purpose of the study.** The purpose of the study was to assess the degree of need for measures to ensure radiation safety of the population during the operation of sources of ionizing radiation in medical institutions in the city of Tashkent.

**Materials and methods of research.** Based on the analysis of materials from the Tashkent City Center for Sanitary and Epidemiological Welfare, treatment and preventive institutions were identified that use the most powerful sources of ionizing radiation or the largest number of them. These facilities include 3 oncological institutions and 3 scientific centers located in the city of Tashkent: the Republican Oncological Research Center (RORC), the city oncological dispensary (GOD), the regional oncological dispensary (OblOD), the Republican Research Institute of Traumatology and Orthopedics (RNIITO), Republican Center for Emergency Medical Care (RCEMP). In the area where the specified objects are located, points are designated for measuring the dose rate of gamma radiation: in the area where sources of ionizing radiation are located - in the corresponding projection on the territory of medical institutions, on the border of the territory, at a distance of 50, 100 m from the territory and on the territory of the nearest residential arrays or streets with residential buildings. Instrumental studies were carried out at each point with two types of instruments: dosimeters DRG-107Ts (mR/h) and DKS-AT 11-21. To identify the radiophobia factor, a survey was conducted by questioning two groups of adults living in the area where one of the most significant observation objects is located - the Russian Cancer Research Center. The first group of people included 18 people (technical workers of the Russian Cancer Research Center, that is, watchmen, plumbers, nurses, janitors, etc.) who live in a nearby residential area and know that the Russian Cancer Research Center uses sources of ionizing radiation; the second group (15 people) included people living in the same area, but not knowing about the use of ionizing radiation sources in the neighboring Russian Cancer Research Center. Considering the fact that a targeted survey will cause unnecessary wariness of the population regarding the negative impact of the radiation factor, we abandoned the traditional filling out of survey questionnaires. The survey of people was carried out through direct interviews with the exclusion of questions directly related to the possible danger to them from sources of ionizing radiation. The results of the survey were compiled immediately after the conversation, but without the participation of the respondents.

**Research results and discussion.** Before starting measurements, we collected data on the state of the natural gamma background in the territory of the city of Tashkent in modern conditions, since one of the tasks was to assess the significance of the sources of ionizing radiation used in health care facilities for the value of the gamma background. In addition, the time intervals of the greatest load of ionizing radiation sources were recorded using the method of visual research. The results of measurements of the radiation dose rate on the territory of observation objects in the immediate vicinity of the locations of sources ionizing radiation in 5 out of 6 cases showed that during the period of the highest load of ionizing radiation sources near the premises in the projection zone of the sources, the radiation dose rate was significantly higher than in the rest of the territory. Thus, on the territory of the Russian Cancer Research Center next to the X-ray building, this dose was 0.19  $\mu\text{Sv}/\text{hour}$ , and in the rest of the territory - 0.16  $\mu\text{Sv}/\text{hour}$ ; in the city and regional oncology clinics these doses were, respectively, 0.19 and 0.15  $\mu\text{Sv}/\text{hour}$ , in RNIIE - 0.18 and 0.14  $\mu\text{Sv}/\text{hour}$ , in RNIITO - 0.18 and 0.16  $\mu\text{Sv}/\text{hour}$ , in RNTsEMP - 0.18 and 0.17  $\mu\text{Sv}/\text{hour}$ . However, already at a distance of 50 meters from buildings in which sources of ionizing radiation are located, in no case was it established that the dose rate exceeded the background value. Accordingly, no influence of medical institutions on background indicators was detected at a distance of 100 meters and in the territory of the nearest residential areas. Under these conditions, workers of the Russian Cancer Research Center receive annual doses of external radiation of 1.22-1.43 mSv/year, which corresponds to the external radiation of the population of the city of Tashkent and ensures a relative degree of radiation safety of the

population in accordance with NRB-2006. This suggests that no protective measures are necessary when using sources of ionizing radiation in medical institutions. The safety of the sources of ionizing radiation used in the studied medical institutions for the population is also confirmed by the results of a survey of interviews with two groups of the population. A survey of people who know that the RSRC uses irradiation of patients revealed the fact that among these people there is 100% wariness regarding the danger of radiation sources for the population. However, interviews with the second group of people who were deliberately not asked about the use of radiation sources in the Russian Cancer Research Center showed that despite the rather long (at least 6 years) residence of these people near the Russian Cancer Research Center, they did not name a single complaint that would indicate a negative the influence of sources of ionizing radiation on the health indicators and well-being of respondents: complaints were made mainly by elderly people and most of these complaints are related to increased blood pressure.

**Conclusions.** The use of sources of ionizing radiation in medical institutions, even with their sufficiently high power (oncological institutions), does not affect the amount of gamma background in places where the population lives, does not pose any danger to the population and does not require special protective measures. Some of the city's population have radiophobia, which is caused, on the one hand, by the low level of radiation-hygienic literacy of the population, and on the other hand, by the lack of awareness of the population about the radiation situation both in the city as a whole and in the area where medical institutions are located. It is necessary to strengthen sanitary educational work and organize information for the population about the radiation situation in the city of Tashkent. It is proposed to organize a series of television programs explaining the peculiarities of the biological effect of ionizing radiation, their sources of use in health care facilities and the lack of their influence on the dose rate of the gamma background of the city.

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