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Data Article

Data on assessment excess lifetime cancer risk and risk of lung cancer from inhalation of Radon 222 in radiotherapy centers in Tehran, Iran



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ABSTRACT

The purpose of the data was to determine excess lifetime cancer risk (ELCR) and risk of lung cancer from inhalation of radon in radiotherapy staff at Tehran radiotherapy Centers in 2015. The concentration of radon gas was extracted from a study done at Tehran radiotherapy centers, and then ELCR and risk of lung cancer were calculated in all centers by standard equations. The excess lifetime cancer risk and risk of lung cancer were 1.89 and 8.46 cases per 100,000 people in radiotherapy centers in Tehran City. The data indicate that the excess lifetime cancer risk and risk of lung cancer in radiotherapy centers are lower than the standard values which presented by UNSCEAR 2000.

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Specifications table

Subject area

Radiation biology and radiation protection.

More specific subject area

Excess lifetime cancer risk and risk of lung cancer from inhalation of radon-222

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Type of data	Tables, graph.
How data was acquired	The concentration of radon gas was extracted from a study done at Tehran radiotherapy centers [3], then the excess lifetime cancer risk and risk of lung cancer were calculated in all centers using standard equations [5,6].
Data format	Analyzed.
Experimental factors	The concentrations of radon gas were analyzed according to the standards to calculate excess lifetime cancer risk and risk of lung cancer from inhalation of radon-222.
Experimental features	Excess lifetime cancer risk and risk of lung cancer from inhalation of radon-222 were determined.
Data source location	Tehran city, Iran.
Data accessibility	The data are available with this article

Value of the data

- Data showed that the excess lifetime cancer risk and risk of lung cancer in radiotherapy centers are lower than the standard values which presented by UNSCEAR 2000. That means the possible hazards from radon concentration are low compared to UNSCEAR 2000.
- Data can be used to demonstrate that the risk of lung cancer is greater than excess lifetime cancer risk in radiotherapy centers in Tehran City i.e., for the current population radon concentration should also be considered a potentially significant cause of lung cancer which is exposed through contamination of indoor air by radon from surrounding materials.
- The data can be used to compare ELCR and the risk of lung cancer with other studies in radiotherapy centers.

1. Data

The excess lifetime cancer risk and risk of lung cancer were calculated in eight radiotherapy centers in Tehran (Table 1). The ELCR and the risk of lung cancer were compared with UNSCEAR 2000 range (Diagram 1). According to the UNSCEAR 2000 the annual effective dose for radiation workers by Radon-222 and Radon-220 is different from to 0.1 to 1.15 mSv [1,2]. In this data, the mean annual effective dose is equal to 0.48 mSv.

2. Experimental design, materials, and methods

The concentration of Radon-222 was extracted from a study, which was carried out at eight radiotherapy centers in Tehran, Iran [3]. Then, the excess lifetime cancer risk and risk of lung cancer were calculated.

2.1. Assessing the excess lifetime cancer risk

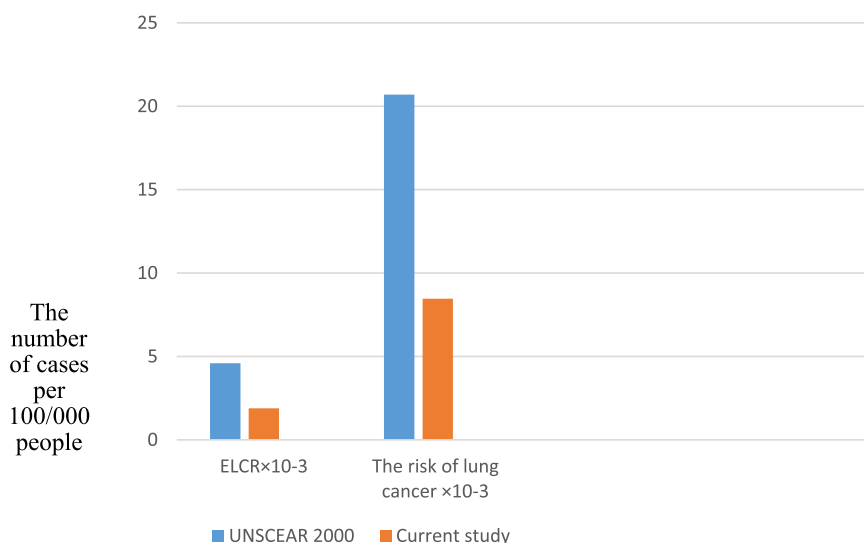
To calculate the excess lifetime cancer risk due to gamma-ray radiation the following equation was used [4–6]:

$$\text{ELCR} = \text{AED} \times \text{DL} \times \text{RF} \quad (1)$$

ELCR = Excess Lifetime Cancer Risk per 100/000 people, E = Annual effective dose in msv, DL = Average lifespan (year) = 70/1 years [7]. RF = fatal cancer risk per Sievert, risk factor (Sv^{-1}) = 0/057 Sv^{-1} . [8]

Table 1The excess lifetime cancer risk (ELCR) and risk of lung cancer ($\times 10^{-3}$).

Radiotherapy centers	Mean effective dose (mSv)	Standard deviation	ELCR $\times 10^{-3}$	The risk of lung cancer per 100/000 people ($\times 10^{-3}$)
1	0.09	0.07	0.359	0.162
2	0.21	0.06	0.839	0.378
3	0.23	0.16	0.919	0.414
4	0.43	0.06	1.718	0.774
5	0.23	0.21	0.919	0.414
6	1.28	0.83	5.114	2.304
7	1.04	0.49	4.155	1.872
8	0.28	0.08	1.118	0.504
Total	3.79	0.35	15.08	6.79

**Diagram 1.** The comparison between ELCR and risk of lung cancer ($\times 10^{-3}$) in the current study with 95% confidence intervals (CI) and the UNSCEAR 2000 value.

2.2. Calculating the risk of lung cancer

The probability of annual lung cancer cases per million people (CPPP) caused by effective dose received from Radon-222 was assessed by Eq. (2) [9–11].

$$\text{CPPP} = \text{ERn} \times 18 \quad (2)$$

ERn = Effective dose received by the Radon 222.

Transparency document. Supporting information

Transparency data associated with this article can be found in the online version at <https://doi.org/10.1016/j.dib.2018.09.005>.

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