THE USE OF DATA FROM THE STEPS SURVEY 2021 ON SMOKERS IN THE RADON-SMOKING-LUNG CANCER STUDY

Liuba CORETCHI, Ala OVERCENCO, Aurelia ABABII

National Agency for Public Health, Chisinau, Republic of Moldova

Corresponding author: Ala Overcenco, e-mail: ala.overcenco@ansp.gov.md

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Introduction. Radon exposure and tobacco smoking are the two primary risk factors for lung cancer, the second most prevalent cancer in the Republic of Moldova. According to the findings from the National Population Study STEPS 2021, three out of every ten individuals were current tobacco smokers. The inclusion of the number of smokers in the study is necessary but challenging due to the varying scales of the initial data, requiring the use of a specialized method for data adjustment.

Aim. Description of the method of proportional extrapolation of data on smokers and its application to assess the relationship between radon exposure, smoking, and lung cancer.

Material and methods. Data on lung cancer morbidity from 2012 to 2020 (per 100,000 people), results from the national survey on radon measurements conducted using RADTRAK2 detectors between 2018 and 2021, and the number of tobacco smokers from the STEPS 2021 survey (involving 4,097 interviewees, aged 18 to 69 years, of both genders, residing in both urban and rural areas) were utilized. Proportional extrapolation calculations were performed in MS Access 2010.

Results. According to the World Health Organization (WHO), radon is responsible for causing lung cancer in a range of 3% to 14% of all cases. This variation depends on the average level of radon concentration in a country and the prevalence of smoking. It is well-established that the risk of lung cancer for smokers is significantly higher than for non-smokers. To evaluate the interaction between radon and smoking in relation to lung cancer morbidity, a mathematical tool using proportional extrapolation of initial data on tobacco smokers was developed. However, there are challenges when it comes to merging the STEPS 2021 data on the number of tobacco smokers, which is available only for the entire country, with regional radon measurement data and lung cancer morbidity rates for the assessment. The mathematical ratio (proportion) between the total population numbers in each age group, gender, and place of residence, and the population numbers in the same categories by regions was calculated. Based on these ratios, the numbers of smokers by region in the country and their standardized values were also determined. These extrapolated data by regions enabled the development of a spatial distribution of smokers and their assessment in a statistical sense. An analysis of the normality of the variables' distribution was conducted using the Shapiro-Wilks and Kolmogorov-Smirnov tests. It was found that only the total number of smokers did not follow a normal distribution ($p \leq 0.05$) with a reliability of 95%, while the other indices, such as radon concentration and lung cancer morbidity, had significance values of ≥ 0.05, which confirms that these variables follow a normal distribution. This analysis highlights the heterogeneity of the variables, which necessitates the use of appropriate qualitative tools for further studying their interactions, such as cluster analysis.

Conclusions. The proportional extrapolation of the number of smokers is essential for statistical processing and analysis in the radon-smoking-lung cancer study. It should be noted that the results may be considered more of a qualitative assessment of the number of smokers due to the uncertainties regarding the representativeness of the available data.