RESULTS OF ALBANIA PUBLIC OPINION SURVEY ON RADON RISK PERCEPTION

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Abstract. This study provides information about the population's general health, the risk perception due to radon exposure, and the socio-demographic characteristics of the target age groups through a survey in which participated 152 people. The questionnaire was part of the Public Opinion Survey (STEAM project) in the framework of the IAEA technical cooperation project RER9153: Enhancing the Regional Capacity to Control Long-Term Risks to the Public due to Radon in Dwellings and Workplaces. This survey includes 152 respondents who took part in an Internet through email and WhatsApp application questionnaire conducted from October 2020 to March 2021 in Albania. The purpose of the questionnaire was to investigate what attitudes people had toward their health and toward radon as a possible health risk factor. The results of this survey which was the first social survey focusing on the radon problem and conducted throughout the country can be used as a basis for planning communication strategies and national radon programs. The survey revealed that in Albania people were poorly aware of radon risk perception on their health. Random sampling error did not exceed 5% for the 95% confidence interval calculated according to the sample size based on the desired accuracy with a 95% confidence level.

Keywords: radon, opinion survey, risk perception health effects, natural exposure, STEAM

1. INTRODUCTION

Radon is the single biggest source of radiation exposure to the Albanian population in both homes and workplaces, which is present in all air indoors and outdoors and is the second leading cause of lung cancer after tobacco smoking [1, 2]. Albania has more than two decades of experience in measurement and controlling radon in homes and workplaces.

Previously, reports covering the various aspects of radon measurement and control have been published representing parts of a national strategy to reduce both high individual radon exposures and – overall the level of radon exposure to the population. The fundamental aim is to reduce the individual and overall risks of lung cancer [3, 5]. The geographic location, typology of the building, and living style are some of the factors that influence the increase in radon gas concentrations [4,10]. All population groups are affected by radon exposure but in smokers and children, the health risk is higher for lung cancer [9, 14, 18].

International organizations, such as the International Atomic Energy Agency (IAEA), emphasize the importance of designing and implementing the national radon program aimed to increase public awareness, radon surveys in dwellings, public buildings with high occupancy factors, and workplaces, as well as to assess the health risks due to radon exposure [1,7,15].

A questionnaire was initiated within the framework of the IAEA Technical Cooperation Project RER9153 "Enhancing the Regional Capacity to Control Long-Term Risks to the Public due to Radon in Dwellings and Workplaces".

This survey questionnaire contains several sets of questions that serve as input for the understanding and evaluation of attitudes toward radon risk in different age groups of the public [11, 13]. The problem of low public awareness of radon and the health risk it poses is still typical for many countries where economic incomes are low for a substantial part of the population like Albania [6, 8].

This survey determined the degree to which information on radon was assimilated by respondents.

The survey helped also in assessing respondents' readiness to measure indoor radon concentration in their homes.

Moreover, the perception of the risk level due to radon exposure may vary according to the education degree, of the target group audience [12]. A way to understand and know more about population knowledge on radon health risk is the feedback from the survey questionnaire. The purpose and objectives of the survey were set following the type of survey and the supposed low public awareness of radon risk and its health impact. The purpose of this survey was to study the attitudes of the Albanian population on radon as a risk factor for their health.

2. MATERIALS AND METHODS

2.1. Albania demographic data

From the demographic data based on the results of the Albanian population, INSTAT 2020 referred to (INSTAT 1 January 2020), the total population of

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Albania is 2,845,955. The population aged 18-74 is 2,000,000 inhabitants. The total population consists of 1,420,613 males (49.91%) and 1,425,341 females (50.09%). The population in urban areas is larger than that in rural areas. According to INSTAT, 58.2% of the population lives in urban areas and 41.8% in rural areas. Almost half of the population of Albania is concentrated in Tirana and Durres, where in Tirana city live about 906,166 inhabitants, and in Durres live 290,697 inhabitants.

2.2. Distribution of the questionnaire (survey)

The questionnaire was prepared in "google forms" by the Institute of Applied Nuclear Physics, in collaboration with the Department of Applied and Natural Sciences (Faculty of Professional Studies, "Aleksander Moisiu" University of Durres) and the Department of Physics (Faculty of Natural Sciences), University of Tirana), enabling the distribution of this questionnaire to the target age groups starting from 18 years to over 65 years old The distribution period of the questionnaire started in the first phase (October 2020), initially to students through e-mail addresses. Then the distribution took place in a second phase during March and April 2021, through the "WhatsApp" application to distribute as soon as possible, in what is called the "snowball" effect. The "snowball effect" included mainly students in the age group 18 to 24 years because this age group is more active on social media and mobile applications. During the second phase, the questionnaire was sent to colleagues, friends, and relatives who continued to distribute the questionnaire in snowball mode to their friends and relatives.

2.3. Socio-demographic data of survey participants

In both phases, from the online survey conducted in some target groups starting from 18 years to over 65 years old were collected 152 responses. The questionnaire was preliminarily translated from English into Albanian and adapted. In addition, we carried out a pilot study to refine the wording of the questions. Participation in the survey was voluntary. This survey includes 152 responses from this 63.8 % female and 36.2 male. The age groups of the respondents in percentage are: 47.5% of the student age group 18-24 years old; 43.5% of age group 25−44-year-olds; 6 % of 45−64-year-old and 3 % do not prefer to respond. In terms of respondents' education, 67.1% completed university, and 21.7 completed high school, regardless of education 66% of respondents had less than average income. Most of the respondents which comprise 38.2 % of them live in high-rise apartments. This percentage constitutes the largest number of respondents, continuing with 20% in a row house. The survey included different sex, age, and region of residents in Albania. Sampling error is calculated based on determining sample size as described in reference [9]. There are numerous approaches, incorporating several different formulas, for calculating the sample size for categorical data. For sample size calculation, the following formula was used:

$$n = \frac{p(100-p)z^2}{E^2}$$

where:
n is the required sample size
P is the percentage occurrence of a state or condition
E is the percentage maximum error required
Z is the value corresponding to the level of confidence required.

Random sampling error didn't exceed 5 % for a 95 % confidence interval [9].

3. RESULTS AND DISCUSSION

The evaluation of the questionnaire starts with the questions "How do you think your health is in general?" and "How do you think the health of Albanians in general is?" Most of the respondents (50 %) assessed their health as "good" and (36%) as "very good". On average, respondents tended to evaluate their health better than the health of other Albanian citizens (Table 1). Also, Table 1 shows that the respondents answered that the health of the Albanian population is "poor" and "fair" both together constituting (37.5%) of responses.

Table 1. Respondents' answers on their health and Albanian population health (%)

Answer options	You would say that your health in general is	You would say that the health of Albanians in general is
Poor	0	21.7
Fair	4	15.8
Good	50	47.4
Very good	36	0.6
Excellent	8	0.7
I don't know	0	9.2
I would prefer not to answer	2	4.6

The above results are due to the fact that the survey is dominated by two young age groups, 18-24 years old 47.5% and 25-44 years old 43.5%. In their judgment, the respondents think that the health of the population in Albania is "good".

For the question "Which risk factors can most affect your health?", respondents were free to name at least three factors (without predefined options), the following groups of risk factors were identified, presented in Table 2.

As seen in Table 2, the main factor that surveyors think has the most impact on their health is the environmental one, which is related to the state of the environment (air pollution, environmental pollution, floods, etc.). The environmental factor was considered a risk factor by 33 % of respondents.

The second factor thought by the respondents that affect health, according to the data in Table 2, is the economic factor (living and working environment and lifestyle), which is directly related to the average annual income of Albanian households.

The economic factor was considered a risk factor by 54% of respondents.

The distributions of answers to the questions about awareness of risk factors for personal health and for the health of the Albanian population were not the same.

The impact on Albanians' health comes mainly due to living and working environment as shown in Table 2.

Table 2. Respondents' answers on their awareness of risk factors for Albanian residents (%)

Answer options	What risk factors do you think can affect your health most	What risk factors do you think can affect the health of Albanians most
Natural environment	33	15
Technological risks	3	1
Living and working environment	29	47
Social environment (lifestyle)	25	21
Health conditions and genetics	7	6
Others	3	10

The level of knowledge about radon and the health risk that comes from radon exposure turned out to be quite low. Respondents' answers to each of the questions are reflected in Table 3.

To the question "How much would you say you know about radon?", out of all survey responses, 46% of them had no knowledge at all or some about radon, while the rest 53% of them had knowledge (quite a bit and a lot) about radon.

To the question "How much do you think you know about the health risk due to radon exposure?" Out of all survey responses, 56% of them had no knowledge at all, a little and some knowledge about the risk arising from radon exposure, and the rest 43% of them had knowledge about the risk arising from radon exposure and 1 % didn't prefer to answer the question.

Table 3. Respondents' answers on knowledge about radon and health risk due to radon (%)

Answer options	How much would you say you know about radon (%)	How much would you say you know about the health risk due to radon exposure (%)
Nothing	11	13
Only a little	16	26
Something	19	17
Quite a bit	31	25
A lot	22	18
I would prefer not to answer	1	1

The level of knowledge about radon and the knowledge of health risks was at comparable level. From the answers obtained from these two questions, it is understood that knowledge about radon as well as the perception or attention to the health risk that comes from radon exposure is low. The fact that most of the respondents have higher education is worrying because this group was expected to have more knowledge about radon.

This fact is also present in the other questions as in the case of the question "Radon is a problem in the area where you live"? and the question "Testing for radon is easy"?

Figure 1 and Figure 2 show that out of survey responses, 46% of respondents have no information, and they had chosen the response "I don't know".

The same response we have taken for the next question about the testing of radon, where 45% of respondents answered "don't know", how to test radon at home.
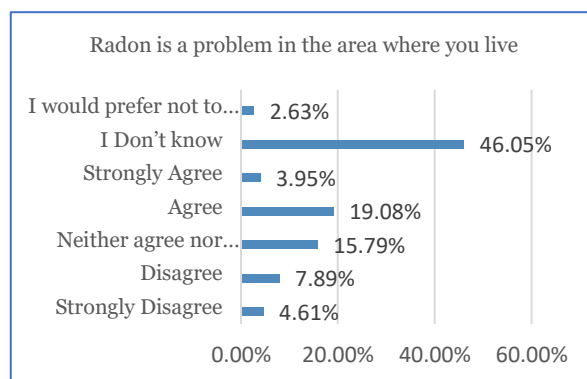

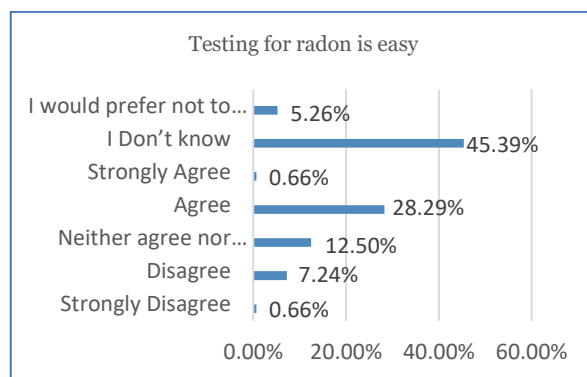Figure 1. Question: Radon is a problem in the area where you live?

Figure 2. Question: Testing for radon is easy?

Another fact of interest that emerged from the survey answers is the answer to the question "To what extent do you trust sources of information about health risks?"
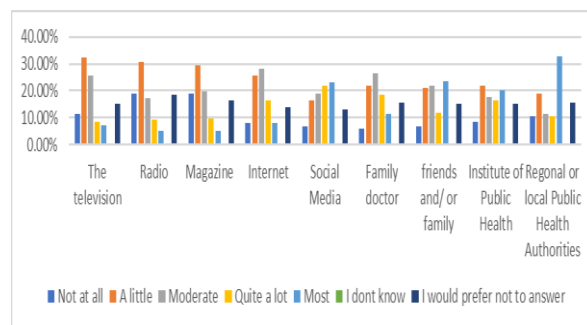

Figure 3. Sources of information in relation to health risks

From the survey data which are presented in Figure 3 the most trusted sources are the Institute of Public Health and the Office of Radiation Protection which are institutions that are directly related to public

health and the least reliable survey are television, radio, newspapers, and the Internet. Sources of information have a key role in disseminating information, but on the other hand, these sources must be safe and trusted. From this survey, it is clear that in Albania a lot of work needs to be done to find the right ways of communication and dissemination of information.

This highlights the main feature of the development and implementation of the radon communication strategy which can be successfully implemented only in case there is close and coordinated interaction between stakeholders. There are no systematic studies in Bulgaria on radon risk perception, but there is radiophobia related to previous incidents and poor communication. Epidemiological studies in Bulgaria have provided convincing evidence of an association between indoor radon exposure and lung cancer even at the relatively low radon levels commonly found in residential buildings [13].

Radiation risk communication is also confounded by the fact that the public's perception of radiation risk differs from that of the experts [17].

4. CONCLUSION

This study provides information about the knowledge and views of the population in Albania about radon and its health risk. The study on the view of the perception of the risk from radon exposure has had the quantitative purpose of population knowledge. The study showed that many people do not have essential information about radon and the health risk from radon exposure. The study highlights the importance of information sources and the seriousness of their dissemination given how radon danger is understood and perceived by residents. From the data of the questionnaire, it is seen that active communication in all possible ways is very necessary including the use of social networks as much as possible. Meanwhile, effective risk communication requires cooperation between various organizations or institutions trusted by the population, such as health and scientific institutions. From the results obtained it is noticed that the most interested age groups in the study are the ages of 18-24 years and 25- 44 years, which shows that this age has the greatest interest in health. An effective method of disseminating information on the risk posed by the presence of radon is the development of open awareness lectures with different target groups, ranging from high schools to universities as well as to those institutions where radon is thought to pose a health risk. At the same time, it should be noted that measuring radon concentration indoors is the only reliable way to identify the presence or absence of risk factors.

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