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Characteristic of Pollutant Element and the Side Effect with People Living Environments

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Abstract: Radon could be a natural hot gas while not odor, color or style. It found rocks, soil, concrete and bricks. The measurements of 222Rn concentration in a total of twelve completely different soil samples in kombolcha city were investigated. The concentrations were measured by alpha qualitative analysis detection technique with Corentium digital element detector. Within the general population, element exposure could be an explanation for carcinoma. The aim of a system was to assess the danger of hot element exposure to human health. Knowledge regarding health risks is vital, and efforts may be created to guard against associated health issues. Underneath the surface, there is a much better chance of reducing the impact of element exposure on public health and resulting in more practical interference with a variety of respiratory organ diseases. Many scientific and health organizations, including the World Health Organization, consider element gas to be hepatotoxic to humans. The elements that have the greatest impact on the human environment, with a focus on metastasis diseases. The hot gassy part is found in most building materials, and thus the land on which the buildings are built is created. One of the most important challenges that we have a tendency to face nowadays in the field of pollution is element pollution's thought-about as a hot part emitting continuous radiation throughout its short era. Several researchers have recently expressed an interest in studying the effects of element on human health, as it is regarded as one of the most common indoor air contaminants due to its malignant neoplastic disease properties.

Keywords: Radon, Outdoor, Exposure, Concentration and in Dour

1. Introduction

Radon is a naturally occurring radioactive gas produced as a direct result of the decay of uranium and thorium in soil and rocks [1]. As a naturally occurring radioactive material, radon is present in various concentrations in the air, and it is estimated that radon leads to approximately half of the average annual natural background radiation [2]. The concentration of radon in the rooms is affected by a number of factors, along with radon supply from various sources, the time of year, or the assignment of premises [3]. When radon and its daughters are present in large concentrations in the indoor air indoors, it can pose a serious health hazard. The concentration of radon in the rooms is affected by a number of factors, along with radon supply from various sources, the time of year, or the assignment of premises [4]. As a measure, many national and international agencies are focused on the problems of evaluating the effect of radon on human health and developing protective measures [5]. The objective of this work was to develop and test a method of assessing the impact of radon on human health and the risks associated with that as well [6]. To evaluate the risk of radon exposure, a tentative procedure was developed [7]. The main health risk associated with long-term, elevated radon exposure is an increased risk of developing lung cancer, which depends on radon concentration and dose. To evaluate the risk of radon exposure, a tentative procedure was developed [8]. Although radon also forms in the soil and rock upon which a house is built, exhalation from building materials is another potential cause of radon in the indoor environment [9].

2. Literature Review

2.1. Property of Radon

Natural sources of radioactivity are too responsible for the large radiation exposure, and radon typically contributes up to 50% of the background radiation. Radon is a naturally active odorless, tasteless, and colorless radioactive gas which occurs naturally all over the earth from naturally occurring [10]. Radon is a chemically inert gas which is highly soluble in water and emits radiation with a half-life of 3.8 days. Because of its environmental exposures, 226Ra is dangerous in large quantities of drinking water. Radon is an important radioactive element which is emitted directly by the decay of available uranium and radium in the ground. It is well known that large radiation can lead to cancer. Nevertheless, high radiation exposure can be used to treat cancer [11]. The main source of radon in the air is uranium decay products in soil and rocks. As a factor, radon densities are studied in the air, houses, soil, water, and structural materials. Because of constant air circulation, the density of radon gas in open areas is significantly small. This wasn't the case in enclosed areas, as air circulation is lowered, especially as winter months, and therefore the radon level is high. People spend the most of their time indoor, and measuring the level of radon in the houses is important. Indoor radon levels are dependent on the amount of natural uranium deposited in the soil and rocks beneath the building, the level of radium in the building's structural materials, the water used in the building, the ventilation of the building, and the season [12].

2.2. The Risk Factor of Radon

One of the biological effects of radon is that radiation energy dissipates when it moves through the organism's body [13]. It may just ionize or arouse the atoms or molecules of matter in the biological system, causing direct cell damage and cancer as with lung cancer [14]. When radon and its daughters are present in high concentrations in the indoor air of inhabited dwellings, it can cause severe health hazard [15]. The dose sourced from the presence of 222 Rn in the air is linked to the inhalation of its short-lived daughters, which are deposited in the respiratory organs: two of them (218 Po and 214 Po), if deeply inhaled, emit alpha particles in direct contact with the bronchial and pulmonary epithelium [16]. Mining, mining, manufacturing, and service work are among the traditional high-risk professions with a high prevalence of occupational lung diseases [17]. The linkage between radon exposure and lung cancer risk is described separately for occupational exposure in underground miners and residential exposure in the general population. Underground miners were at risk of lung cancer. Epidemiological studies on the risk of lung cancer of underground miners have been published since the 1960s [18]. Radon progeny concentrations are generally expressed in terms of "working level" in studies of radon-exposed underground miners [19]. Although radon is chemically inert and electrically uncharged as formed, the resulting atoms, known as radon progeny, are electrically charged and can attach to tiny dust particles in indoor air [20]. These dust particles can easily be inhaled and can adhere to the lining of the lungs. The deposited atoms decay, or change, by emitting a type of radiation such as alpha radiation, which has the ability to damage lung cells. Although radon is chemically inert and electrically uncharged as it is formed, the resulting atoms, known as radon progeny, are electrically charged and can attach themselves to tiny dust particles in indoor air [21]. The DNA of these lung cells can be harmed by alpha radiation. This DNA damage is the most latest in a sequence of events that cause cancer. Alpha radiation only travels a short distance within the body [22]. As a reason, as all alpha radiations from radon progeny decay cannot reach cells in other organs, lung cancer is likely is the only potentially serious cancer risk posed by radon in indoor air [23]. Because of the harmful effects of radon gas accumulation in the indoor, a large number of radon investigation studies have been conducted, especially for dwellings [24]. Despite the fact that students spend a great amount of time in schools, there are not enough radon investigations for schools all over the world. The objective of this study is the correlation between radon concentrations in hospitals and communities in the same region and to assess the indoor total radon concentration dwelling school correction factor for radon investigation studies in related issue [25]. Radon exposure causes lung cancer, and its effect on the digestive tract causes gastro-enteric cancers [26]. Exposure to radon and its pollutants can increase cancer risk. Radon inhalation is considered to be the world's second leading cause of lung cancer. The 222Rn can enter the home as well as river water, even if one takes a shower or uses water for household tasks. As radon and its radioactive decay products are absorbed into the bloodstream, the radiation emitted by radon and its radioactive decay products are exposed to sensitive cells in the stomach and other organs [27].

2.3. Regulation on Indoor Radon and Outdoor

The condition level depends on the total annual average radon concentration that can be observed in a house. If radon measurements indicate that this level has been exceeded, prompt intervention to reduce pollutant concentration is strongly advised [28]. Many factors can affect indoor radon and thorn levels, such as radium and thorium content, emanation factor, soil porosity, building construction, and ventilation. The radon exhalation rate is critical for determining the radiation damage caused by various materials [29]. Radon levels in the air can be evaluated in indoor, outdoor, and underground mining environments. Indoor radon and its residues could even come from a variety of parts of the world. The internal sources include building materials, water, basement air, and soil. The main external source is the air [30]. Reduced radon generation and mobility in soils, and cracks in floor slabs and other pores within building foundations, higher mite indoor radon levels [31]. Changes in ventilation rate, as well as temperature and pressure differences, are the main factors causing differences in indoor radon concentration levels. The air exchange rate between indoor and outdoor environments was indeed affected by the ventilation rates [32]. When radon is trapped indoors, it can build up to dangerous levels, especially during temperature changes or when homes are not ventilated (natural or artificially). Both active and passive techniques have been developed to monitor emission levels [33]. Survey work and the assessment of radon concentrations over long time scales are usually considered suitable for passive or integrated techniques. Active techniques and short-term measurements (on daily and hourly time scales) are less difficult and expensive [34]. In large-scale radon surveys, radon gas is measured instead of its progenies [35].

3. Material and Method

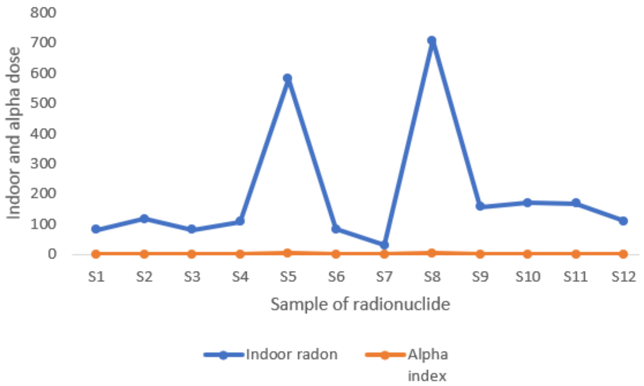

Figure 1. *Dose risk comparison of Alpha index and indoor radon.*

The radon detection and measurement method are based on radon alpha particle counting. For radon measurements, the alpha spectroscopy detection method or a coronium digital radon detector have been used. Twelve soil samples were collected at random from various locations within the study area, with each sample being collected to an average depth of 30 cm below the surface. We took soil samples or exposed them to an LR-115 plastic track detector, which is fastened on the inside of the can's mouth and faces the sample to register alpha radiation. The detector would record all of the tracks of alpha particles produced by radon decay as a whole. This device clearly identifies the amount of alpha index, inhaled, and indoor dose.

$$T_e=[T-\lambda_{Rn}^{-1}\,(1-e^{\lambda_{Rn}T})] \quad (1)$$

The inhaled dose value was calculated (mSv.y^{-1}) by the following scientific formula:

$$D_{in} = nC_{Rn} \quad (2)$$

Where C_{Rn} is radon concentration in different dose level aspect. Excess alpha radiation from building materials is caused by radon inhalation. The alpha index is used to assess the track density, radon concentration, radium concentration, dissolved radon concentration, and alpha index for the samples under concern.

$$I_\alpha = \frac{C_{Ra}}{200Kg^{-1}} \quad (3)$$

Where C_{Ra} is radon concentration with alpha index.

4. Result and Discussion

In this study, we measured the radon levels in the indoor environment of some soil samples collected in Kombolcha, Ethiopia. When the dose value of indoor dose was compared to the alpha index, the dose value of indoor dose was greater.

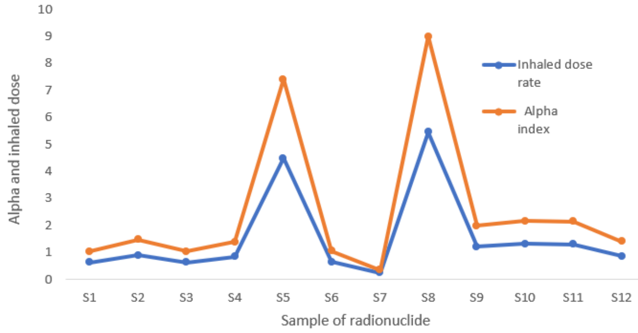

Figure 2. *Evaluation dose of Inhaled indoor and alpha index.*

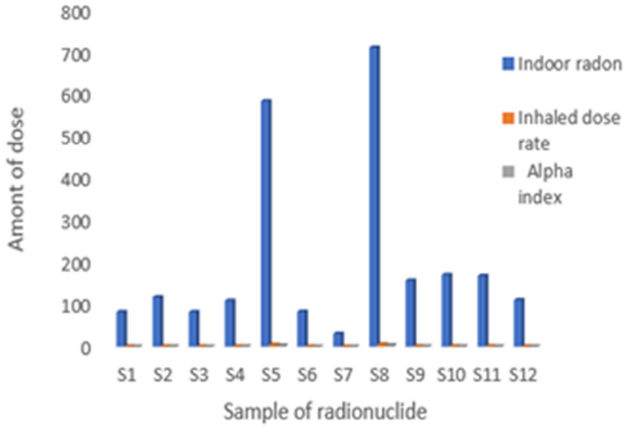

Figure 3. *Comparison of dose risk of alpha index, indoor and inhaled radon gas.*

When we seen the concentration of indoor radon dose were very high with compared that of alpha index and inhaled radon dose. This show above graph result that it health risk caused in every one living in that area. The calculated indoor inhalation dose exceeds the recommended value too though. The indoor inhalation dose is higher than the inhalation dose acquired from soil samples. The high value of indoor inhalation dose may be due to the effect of construction materials, subsurface natural radon concentration, and community living style.

5. Conclusion

The presented study was to identify amount of radon dose in different index and findings that have assessed the risk of lung cancer caused by indoor radon, using relevant technical studies. The association between lung cancer and radon exposure is undeniable. When we found that radon is the second leading cause of lung cancer in smokers. The population approach, that also leads to health risk assessment in particular situations, could also be effective in raising public awareness about the associated health risk. Radon exposure was a very good cause of lung cancer in a range of different people. The information on radon health risks is vital, and efforts are being made to reduce the associated health problems. In natural conditions, the largest dose of radon and its decay products will be delivered to the lung by the decay products rather than radon gas. This suggests that the largest impact on the risk of lung cancer from inhaled radon decay products is appropriate when considering the radiological impact of radon and its decay products. Nonetheless, evidence indicates that the dose to the skin's basal layers may be as high as, raising the risk of skin cancer. Indoor radon ingested in drinking water can also pose a significant risk of stomach cancer to a small number of people unless measures are taken.

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