Letter to Editor
International Journal of Radiation Research
Comment on the article by Kareem et al. (2025) on radon and heavy metals in Barji village

Dear Editor,

I am writing in response to the article titled *"An investigation of radon and heavy metal detection for cancer patients in Barji village, in the Iraqi Kurdistan region"* by Kareem *et al*., published in *International Journal of Radiation Research* (Vol. 23, No. 1, 2025). The authors are to be acknowledged for their attention to a sensitive and pressing public health issue in a historically impacted region.

While the study offers relevant preliminary environmental data, I would like to respectfully offer several critical observations that may enhance the interpretative value and scientific robustness of the findings:

Absence of control group: No comparison samples were taken from unaffected or low-cancer-incidence regions. A control group-whether from a different village or from non-affected households within the same village-would provide essential context for evaluating whether the radon and heavy metal levels are unusual or environmentally typical.

Lack of longitudinal or seasonal data: The study was cross-sectional and did not account for potential seasonal variation in radon release or heavy metal uptake by plants. Soil properties and environmental exposures fluctuate over time, and temporal data would offer a more reliable risk assessment.

Unclear demographics of affected ındividuals: The article refers to increased cancer cases but does not clarify whether these individuals were directly exposed to the 1988 chemical attacks or represent newer generations affected indirectly via environmental contamination. Without such demographic clarity, it is difficult to distinguish between acute and chronic exposure pathways.

Inadequate exposure assessment: Estimated Daily Intake (EDI) calculations use standardized consumption values rather than locally collected dietary data. Without a food frequency survey or dietary intake study, the risk estimations may not reflect actual exposure in the population.

Methodological ambiguity in sample design: Samples were taken only from the vicinity of cancer patients' homes. To reduce selection bias, it would have been scientifically sound to also sample from homes within the same village where no cancer cases were reported, to establish intra-village exposure variability.

Lack of comparative epidemiological context: No comparison was made with other similarly bombarded areas in the region. Analyzing cancer incidence and environmental contamination in those areas would have provided a valuable secondary control group, helping to isolate the effects of chemical exposure from background geological risk.

Bioaccumulation inconsistencies: The study reports elevated levels of cadmium, lead, and chromium in certain plant species despite stating that corresponding soil concentrations were within normal limits. This discrepancy raises questions about the consistency of sampling depth, soil pH, or potential external contamination sources (e.g., irrigation water, fertilizers) that were not addressed.

Speculative chemical weapons reference without analysis: Although the authors mention the village was exposed to chemical attacks in 1988, the study does not include chemical residue analysis or biomonitoring data. While the historical context is valid, scientific conclusions must be based on measurable evidence.

In summary, while the article addresses a critical health concern and provides preliminary data, a more rigorous and comparative design is needed to draw conclusions about cancer risk. I recommend future studies include defined control populations, clearer demographic and exposure data, and integration with epidemiological and historical records.

Thank you for considering these remarks.
Sincerely,
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Reply to: letter to Editor

Dear Editor

Regarding comments on the paper "An investigation of radon and heavy metal detection for cancer patients in Barji village, in the Iraqi Kurdistan region" by Kareem et al., published in the Int J Radiat Res (Vol. 23, No. 1, 2025), we address the comments point by point as follows:

Thank you very much for these deep and critical precise notes on our articles and your environmental and health care attention. Sure, there are many limitations and critical scientific criticism to this pioneer and may be the first one that pay attention to this health and environmental issue in this region. And in order to improve the critical limitations identified in the study, a structured approach addressing each weakness with targeted methodological, analytical, and design enhancements is needed.

Control Group Integration

The samples were taken randomly from all villages nearby cancer patient homes and non-patient, but forget to mentioned directly. And we don't take external control outside the village for the presence of risk bombarding by Turkish military planes as they fight with PKK in that time to know and isolates whether contamination is localized or widespread. Kurdish people chance with bombarding is high.

Longitudinal & Seasonal Data

We take samples only in summer seasons which dry and hot in this region. Sure, it's better to conduct repeat sampling across seasons (e.g., dry vs. wet seasons) to capture temporal trends. As we measure radon gas one time only and it's better to use continuous radon monitors or time-series as well as soil and plant analyses. To reveals fluctuations in exposure risks (e.g., higher radon in winter, metal uptake during rains).

Demographic Clarity

The area was bombarded certainly by chemical weapons and I have friend exposed to this attach and he still suffer from eye problems. And many of village inhabitant still a live direct survivor of the 1988 attacks and also non direct younger generations also raise the risk of cancer and the issue is transgenerational effects. We take many medical reports from health authorities in this area Include medical histories and latency periods for cancer development. And the attack is chronic exposure pathways.

Refined Exposure Assessment

We not perform household dietary surveys to quantify local food and water intake as the inhabitant were not ready mentally and psychologically to use biomonitoring (e.g., blood and urine tests for heavy metals in residents). To replaces assumptions with empirical exposure data.

Mitigating Sampling Bias

Randomized sampling was performed for homes of non-cancer patients in the same village but not mentioned clearly in the paper. The finding of heavy metals inside the village enables to make a spatial distribution of heavy metals to map contamination gradients. To reduces selection bias and identifies intra-village variability.

Regional Epidemiological Comparisons

The authors team intended to take all these notes in consideration to collect data from other village exposed to chemical bombarding in 1988 to compare data with other historically bombarded villages as the region now became safe and accessible. Also, we will use national environmental databases for background contamination levels. To contextualizes findings beyond a single village.

Bioaccumulation Mechanisms.

To assess accurate metal bioaccumulation of metals in edible plants. It's better to test additional soil variables affecting plant uptake like Soil pH, organic matter, irrigation water quality. Fertilizer/pesticide use in farming. And to conduct controlled greenhouse experiments with local crops. To explains discrepancies between soil and plant metal levels. But will lead to the lengthening of paper, and this will be the topics of other papers.

Chemical Weapons Residue Analysis

Due to the lack of advanced tools, we are not able detect the residual effects of chemical weapons in this region. To test for legacy contaminants (e.g., sulfur mustard derivatives, arsenic) in: Soil (deep cores to avoid degradation). Groundwater/sediments. This will be easier with assistance of partner with forensic chemists or disarmament organizations. To Links current contamination to historical events conclusively.

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Additional Notes

Like enhancements and engagement of multidisciplinary collaboration as epidemiologists, geochemists, and historians, community involvement, local knowledge can guide sampling (e.g., bomb sites, farming practices), public data sharing, compare results with global post-conflict contamination studies (e.g., Vietnam, Kosovo).

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