CORRESPONDENCE

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Rebuttal to Authors' Reply, Re: Cancer Risk in Adult Residents Near Nuclear Power Plants in Korea – A Cohort Study of 1992–2010

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To the Editor:

The followings are point-by-point rebuttal to the explanation by authors of the original paper (1).

1. In their reply remark, the authors are confusing about incomparability of control groups due to selection bias (not comparable due to the difference in selection criteria such as difference in regional socio-economy) with difficulty in comparison due to confounding bias such as variable socio-economic factors. As selection bias is linked with differences in selection of exposure versus control groups, addressing selection bias in the analysis should lead to redefinition of exposure and control so that the original study should become not about cancer risks near nuclear power plant, but about cancer risks in areas of better socio-economic backgrounds. In their reply, however, the authors are only mentioning the control of confounders with multi-variate model, which is not the point we had raised.
2. The authors are also confusing about the definition of prospective, retrospective and both retrospective and prospective cohorts in a cohort study. In a prospective cohort study, as the authors have said, only new exposures as well as new outcomes after the start of prospective observation are ascertained in the analysis. If the authors wanted to restrict the data analysis to prospective observation period, however, they should have used the total time under observation since enrollment, not the total time living near NPPs, as a key exposure variable (Table 7 in the original paper (2)). The cohort of this study who were enrolled with the beginning of prospective observation, were in fact those people who began to reside in the area quite long time before enrollment and may have developed NPP related cancers already. If the authors wanted to examine the effects of living near NPP by employing total time living near NPP as a proxy variable of exposure, which began quite long time before enrollment for most cohort members, the cohort should be defined retrospectively, not prospectively, as those who have had lived near NPP after NPPs started their operation, and the observation of cancer development should also have started not after the enrollment but after the start of exposures from living near NPP.
3. Constructing a model for the final analysis is actually up to the authors. However, most readers will agree that employing only mechanical approaches (the same covariates for different cancers) is not the way to carefully ponder upon which risk factors are well-known and should be included in the final analysis.
4. Who are to be blamed for not being able to differentiate causal relations from statistical associations will be discussed by readers. However, we just want to add some examples of conjectures, such as low dose, but not high dose, effects of environmental hormones or estrogen induced vaginal cancers only among female offspring of those who took the drug during pregnancy, all of which could not be supported by conventional logics but later proved causally related by many curious but sincere epidemiologists.
5. If authors wanted to address cancer risks from living near nuclear power plants, they should have targeted children who are the most vulnerable. However, reply of authors, excusing themselves for restricting objectives and therefore the title of study to adult only cancer risk, not cancer risk itself, is another indication that this study was not originally designed to address the most urgent and probable risks of nuclear power plants in Korea.

Because of these confusions or excuses in their rebuttal, we still think that further studies are warranted, including re-analysis of the existing data, before drawing a hasty conclusion that epidemiologic studies are no longer necessary.

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2. Ahn YO, Li ZM; KREEC Study Group. *Cancer risk in adult residents near nuclear power plants in Korea: a cohort study of 1992-2010. J Korean Med Sci 2012; 27: 999-1008.*

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The Authors Response (Yoon-Ok Ahn):

The rebuttal by the correspondents does not seem to be academic debate, since there is a lack of understanding of our study, a prospective cohort study. And furthermore, as pointed out in the earlier authors' response, the correspondents do not present again the logical grounds and necessity specifically for their final arguments, e.g. 'reanalysis of the existing data' and 'hasty conclusion.'

1. Study result biases in epidemiological study, whichever due to selection or confounding, are finally controlled or adjusted by the multivariate analysis. The procedures and methods for valid comparison between exposed and non-exposed cohort groups through multivariate analysis in this study were clearly delineated on the section of 'Statistical analyses' in the paper (1).
2. Correspondents have certainly misunderstood the term of 'prospective cohort study,' which denotes that enrollment is present time and researcher observe or ascertain the outcome events prospectively, forwards since after enrollment. The duration of living with NPPs in this study (Table 7 in the paper) is the total time living with NPPs at enrollment.
3. Even though certain variables are known as risk factors, if they had no correlation with the exposure variable, they are not estimated as confounders. In the final analysis studying the association between exposure variable and outcome, only the potential confounders are to be included. We'd like to recommend reading carefully the section of 'Statistical analyses' in the paper (1).
4. It is definitely clear that statistical association (or significance) per se does not mean the causality. No further response seems to be necessary.
5. At this rebuttal, the correspondents criticized the study objectives of the paper. It must be a silly question arguing by readers. The study objectives of the paper have already been reviewed by the peer reviewers when our manuscript had been submitted for publication.

REFERENCE

1. Ahn YO, Li ZM; KREEC Study Group. *Cancer risk in adult residents near nuclear power plants in Korea: a cohort study of 1992-2010. J Korean Med Sci 2012; 27: 999-1008.*

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