Authors’ response to the Comments from S.M.J. Mortazavi regarding: “Occupational exposure to high-frequency electromagnetic fields and brain tumor risk in the INTEROCC study: An individualized assessment approach”
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A R T I C L E   I N F O

Handling Editor: Adrian Covaci

We reviewed the comments on our publication sent by S.M.J. Mortazavi and would like to clarify some of the concerns from this reader, especially those due to misunderstanding of our study methods.

The first concern raised by Dr. Mortazavi is that he states that “the confounding factors were limited to only age, sex, region and country and major confounding factors such as socioeconomic status or education of the participants which play a crucial role in each individuals’ lifestyle and diet are ignored.”

This is not the case since, as explained in the paper (Section 2.4. Statistical analysis; p. 355) in INTEROCC, as well as in INTERPHONE, matching factors (age group, sex, country and region) were used to stratify the subjects, while the subjects’ education level was used to adjust logistic regression models created to estimate the odds ratios for glioma and meningioma. Furthermore, this study focused on exposure to occupational sources instead of non-exposed subjects (which includes both workers and general population), most ORs obtained (in Supplementary material) were above 1.0, although results were inconsistent, and no clear exposure-response associations were identified.

According to the reader, “Another major problem comes from the criteria used for considering exposures as occupational. If we ask anyone who works in a factory, office, school, shop, etc. whether he/she works with or nearby antennas, his/her answer should be positive because there are many antennas near any workplace.”

The questions included in the INTEROCC questionnaire were designed to identify subjects who may have been exposed to high levels of EMF during their working lives (Vila et al., 2016). For this purpose, screening questions were asked to identify subjects who worked with/ nearby RF and/or IF EMF sources. Those who answered affirmatively, were then asked a series of more specific questions regarding the type of equipment used, the purpose and process (e.g. material being heated), and the frequency and duration of use, as well as other information depending on the occupational sector (e.g. for industrial heating we asked whether the process was automated or done manually, for radars we asked whether the subject operated or maintained the radar(s) reported and the distance to the radar(s), etc.). Therefore, since all this detailed information was needed to assess the subjects’ exposure, it is unlikely that subjects who were identified as exposed did not actually work with the sources reported. Furthermore, this study focused on exposure to occupational sources of RF and/or IF EMF while potential environmental sources, which yield ubiquitous but usually low background levels (Gajsek et al., 2013), particularly at the time relevant for this study (Tell and Mantiply, 1982), were not considered.

Although as stated in the conclusions, we did not find a clear association between cumulative occupational exposure to RF or IF EMF and risk of glioma or meningioma, the results for recent exposure to RF magnetic fields show indication of a potential increased risk in this exposure time window, which could be related to a possible role of RF exposure in brain tumor promotion/progression. Moreover, in our analyses using the continuous exposure data, although the linear models obtained the best fit results (i.e. lowest AIC and BIC), overall the models giving a J-shaped exposure-response curve obtained only slightly higher fit results showing that it is possible that this type of curve may explain this relationship better than the linear model. We, therefore, expect that the new study by Mortazavi et al. (in press),

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showing a nonlinear J-shaped dose-response relationship for carcinogenesis and exposure to RF-EMF, may provide more evidence on this issue.

References


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