Bundesamt
für Strahlenschutz

Spotlight on EMF Research

Spotlight on “Time course of health complaints attributed to RF-EMF exposure and predictors of electromagnetic hypersensitivity over 10 years in a prospective cohort of Dutch adults” by Traini et al. in Science of the Total Environment (2023)

Category [radiofrequency, epidemiology]

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Competence Centre Electromagnetic Fields (KEMF)

1 Putting the paper into context by the BfS

Some individuals attribute non-specific symptoms of ill health, such as sleep disorders, headaches and skin conditions, to electromagnetic fields (EMF) exposure. This phenomenon is commonly referred to as “electromagnetic hypersensitivity” (EHS). However, in the absence of an accepted bio-electromagnetic mechanism explaining the symptoms experienced by self-declared EHS sufferers, the more neutral term in the sense of the cause of the illness “idiopathic environmental intolerance attributed to EMF” (IEI-EMF) has been recommended by the World Health Organization [2]. Lacking an objective case-definition, the estimated IEI-EMF prevalence varies between 1.5% and 18% in epidemiological studies [3]. Yet, evidence on the stability of the syndrome over time is insufficient. In addition, current hypotheses to explain the symptoms of IEI-EMF have not been found to be satisfactory [4].

2 Results and conclusions from the authors perspective

Traini et al. investigated the time course of attribution of health complaints specifically to radiofrequency (RF) EMF exposure (IEI-RF) in a Dutch population over ten years and factors related to the dynamics of IEI-

RF. In addition, they investigated the predictors of the development of EHS at the follow-up. Of note, the authors distinguish between IEI-RF and EHS.

Data of the occupational and environmental health prospective cohort study (AMIGO), conducted in the Dutch general population aged 31–65 years, were used. The subjects consisted of a subset of AMIGO participants in the baseline survey 2011/2012 (T_0), who had filled in additional questionnaires in 2013 (T_1) and 2021 (T_4) (n=892). Participants were considered as IEI-RF if they had selected at least one RF-EMF category in response to consecutive questions on (1) the presence of health complaints attributed to the environment and (2) the presumed sources from a list of environmental factors including several RF-EMF sources. They were regarded EHS if they had ranked themselves as electromagnetic hypersensitive in the range of 4–6 on a scale of 0–6 (at T_4 only). EHS, thus, differs from IEI-RF in the sense that reporting health complaints attributed to RF-EMF was no case criterion; I.e. the authors differentiated between IEI-RF, as attributing symptoms to RF electromagnetic fields, and EHS, as individual who feel themselves sensitive but do not attribute symptoms to EMF. Furthermore, perceived RF-EMF exposure and risk were assessed by rating various RF-EMF sources in this regard, each on a scale of 0–6. Multi-state Markov models were fitted to represent individuals' transition between IEI-RF states and to identify associated factors. Logistic regression models were used to explore predictors of EHS.

At each time point, about 1% of the AMIGO sub-cohort self-reported IEI-RF. In contrast, 12% of the subjects self-reported EHS at T_4. Over the ten-year period, participants had a 95% probability of transitioning from "yes" to "no" and a 1% probability of transitioning from "no" to "yes" in terms of IEI-RF. Participants with a high perception of both RF-EMF exposure and risk (each defined by values at or above the 90^{th} percentile at T_0) tended to be more likely to develop IEI-RF over the follow-up. Moreover, perceived RF-EMF exposure and risk as well as non-specific symptoms and sleep disturbances at baseline were each positively associated with self-declared EHS ten years later.

The authors conclude that, according to their study, IEI-RF seems to be a more transient phenomenon than previously thought. The knowledge of predictors of IEI-RF and EHS may provide opportunities for future risk communication and prevention.

3 Comments by the BfS

Traini et al. address an issue of (potential) public health concern and raise relevant research questions. The authors provide detailed information on their study design and the participants, the variables of interest and their assessment, as well as on data analysis. The investigators discuss limitations of their study and put it in context to other relevant evidence. The prospective cohort design with a long follow-up and repeated data collection is particularly noteworthy as an appropriate approach to answer the study questions. However, the investigation has also some shortcomings that may compromise the validity and significance of its conclusions.

In particular, given the low prevalence of IEI-RF in the study population, the AMIGO sub-cohort with only about 900 participants is too small to draw conclusions on IEI-RF stability and associations with individuals' characteristics. This is evident from the very small number of participants who self-reported IEI-RF at each time point (n=9) and the wide confidence intervals. In addition, low participation in both the AMIGO baseline survey (16% of those invited) and the sub-study considered here (40% response overall) may have severely affected the representativeness of the sample for the target population. A percentage of more than 50% highly educated participants may be indicative of this. The authors differentiation between IEI-RF and EHS is an unusual approach as IEI-RF and EHS are often used as different terms for the same phenomenon, with IEI-RF being considered the more etiologically correct designation [2].

It has been reported previously, with a follow up for up to two years, that IEI-RF does not seem to persist for long [5, 6]. This study extends the follow up to 10 years with consistent results. In summary, the results of the paper are interesting and in principle plausible, but there are doubts about their validity and

representativeness for the reasons mentioned above. On a further note, the issues of a lacking case definition and the insufficient evidence for the stability of the syndrome over time, should be further addressed, given the impact of IEI-EMF on the lives of those affected.

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The first reference is the manuscript at hand.

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