

Letter to the Editor

Comments on electromagnetic field exposure on sleep

Sir,

We have read the newly published paper by Gandhi et al (2020) in which they set out to investigate the effects of exposure from a mobile phone on the sleep patterns of medical students.¹ The study population is subjects who keep their phone less than 1 m from the head during sleep.

Sadly, their description of the electromagnetic exposure is confusing. They state that the major wave incidents on the body are due to a static field. Further down in the text they say “the constant electromagnetic field”. Normally, when we discuss exposure from a mobile phone we talk about the radiofrequency electromagnetic field with frequencies from 900 MHz and higher depending on which communication system that is used. We can sometimes also discuss the pulsed low frequency magnetic field from the battery pack, again depending on the system the phone uses, e.g. GSM, 3G or 4G/LTE. Usually the static field is not considered.

In an attempt to express a measure of “dose” the authors use “the total radiation absorbed by the brain tissue was calculated as: total radiation = SAR multiplied by time (in seconds)”. This is a complete misunderstanding of how the SAR is obtained by the mobile phone manufacturer. The SAR value is measured with the phone at a minor distance (1-2cm) from a phantom head, with the phone transmitting at maximum power. This situation is quite different from the situation when the phone is at a larger distance to the head. In that case the output power of the phone is presumably some orders of magnitude lower; the absorbed power in the subjects is even lower since the radiation from the phone decreases inversely proportionally to the square of the distance.

The biological effects of these fields are important to investigate and we welcome reports from relevant experiments. Unfortunately, a vast amount of studies that aim for elucidating possible risks from exposure to various types of electromagnetic fields, including those emanating from mobile communication technologies, produce ambiguous and non-reproducible results. Thus, from any risk assessment point of view, such studies are not useful. Furthermore, they will not contribute to any better understanding of mechanisms of action, which can have a value in itself, separate from the risk assessment aspect.

We highly recommend the authors to further investigate the exposure conditions. With the present description of the exposure conditions there is no way in which one could set up and repeat this experiment and confirm the results. An example of how the exposure could be handled can be seen in the work of for instance Danker-Hopfe et al.² The scientific community dealing with research on the effect of electromagnetic fields has since long abandoned a set up with just “a mobile phone” in a call or in standby mode. In the present case, it is not specified what the phone transmits; e.g. is it in GSM or 3G mode, is it in just a listening mode or is it transmitting, how far from the base stations is it, was the phone positioned on the table or standing in a rack, how much of the radiation did enter the rack? Again: There are just too many unknown factors for this experiment to be reproducible.

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