

The Impact of Mobile Phones on the Health of Children and Adolescents: A Viewpoint

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Abstract: *The use of digital technology has risen dramatically during the previous few decades. Radiofrequency (RF) radiation is emitted by mobile and cordless phones when in operation. Previous generations were not exposed to this type of radiation throughout childhood or adolescence. The brain is the primary target organ for radiofrequency radiation from portable wireless phone¹. In May 2011, the International Agency for Research on Cancer of the World Health Organisation evaluated the scientific evidence on the risk of brain tumours. The scientific panel determined that RF radiation from equipment emitting nonionizing RF radiation in the 30 kHz - 300 GHz frequency range is a Group 2B, or "possible" human carcinogen². Regarding the health implications of digital (wireless) This particular area is the result of a collaborative effort by professionals from many disciplines. Combining articles on child development and bioelectromagnetics provides a comprehensive review of scientific and public health information on the topic. It's crucial to report on the health effects of digital (wireless) technologies, including cancer, neurological illnesses, addiction, sleep, and behavioural issues³.*

Keyword: Mobile Phones, Health, Children, Adolescents

1. Physical Impact of Mobile Phone

The use of digital technology has risen dramatically during the previous few decades. Mobile phones generate radiofrequency (RF) radiation while in use, and no preceding generation was exposed to this type of radiation during their childhood and adolescent years⁴.

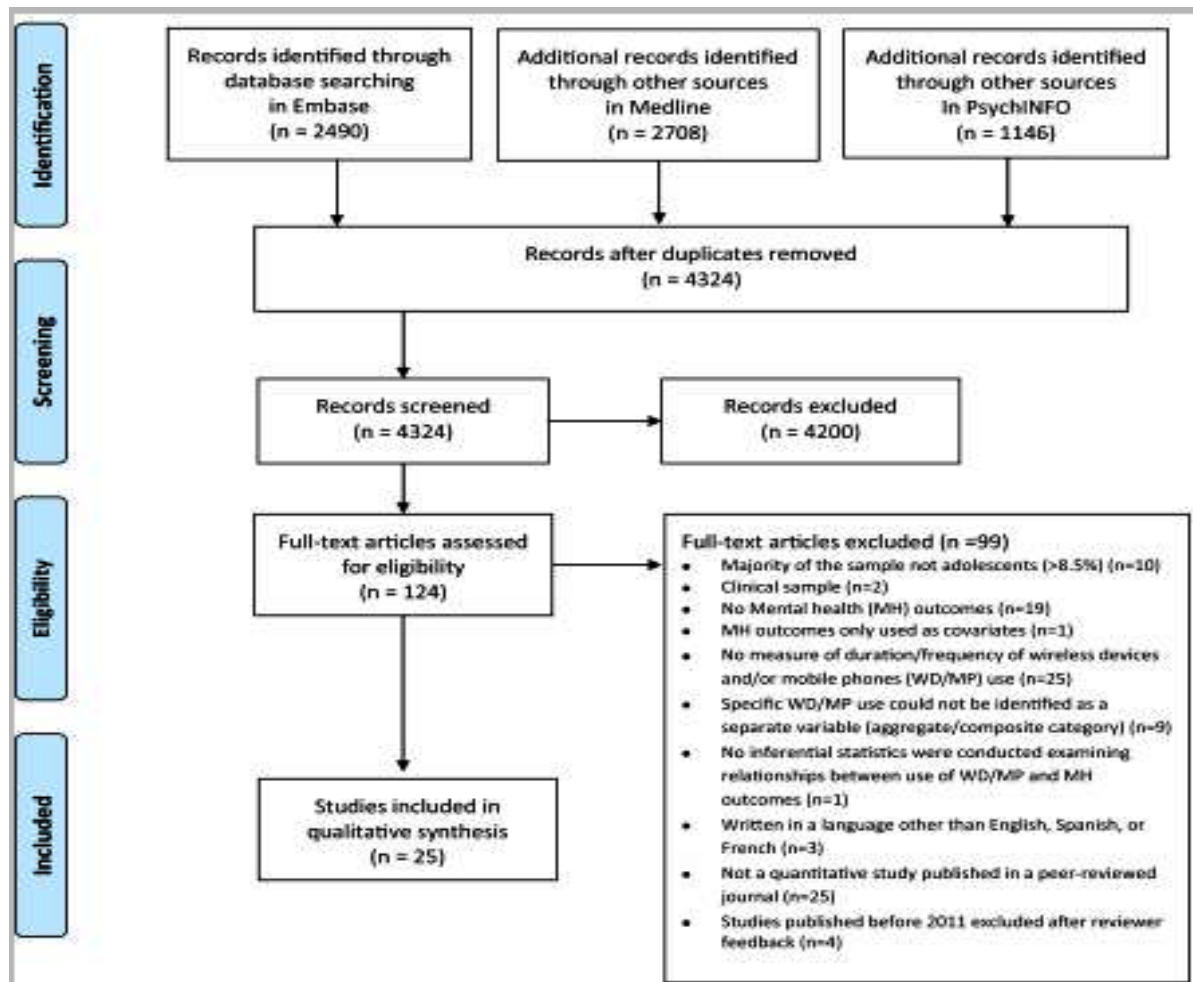
The scope and severity of Cancer risks for glioma and auditory neuroma from mobile phone use are now epidemiologically visible, indicating that this appears to be a very powerful carcinogen to cause such rapid increases in cancer risk. When a wireless phone is used, the brain is the primary target organ for RF radiation, raising concerns about an increased risk of brain tumours. In May 2011, the International Agency for Research on Cancer (IARC) at the World Health Organisation (WHO) conducted an evaluation of current knowledge. According to IARC (2013), RF radiation between 30 kHz and 300 GHz is classified as a Group 2B probable human carcinogen. IARC decision²⁰¹⁴; Hardell and Carlberg, 2015; Hardell, Carlberg, Soderqvist, & HanssonMild, 2013)⁵.

In 2016, the National Toxicology Programme at the National

Institutes of Health produced a paper on the impact of cell phone RF radiation on cancer in animals (Wyde et al.). In rats, there was an increased incidence of glioma in the brain and malignant schwannoma in the heart. Acoustic neuroma, also known as vestibular schwannoma, is a benign tumour that is comparable to those found in the heart. Thus, these results are corroborated.

Findings from human epidemiological investigations. Carlberg and Hardell (2017) investigated the relationship or causation between wireless phone use and glioma risk using the Bradford Hill viewpoints established in 1965. As evidenced. Epidemiological studies conducted by our group in Sweden were among the first to investigate the danger of brain tumours connected with the use of cellular phones. Research suggests that RF radiation from mobile and cordless phones increases the risk of glioma and acoustic neuroma in the most exposed area of the brain (ipsilateral) (Hardell & Carlberg, 2015; Hardell et al., 2013; IARC 2013).

The risk was higher in individuals who first used a wireless phone before the age of 20. Further issueisthat⁶



Flow Chart: PRISMA Flowchart

Long Term Use of Mobile Phone Effect:

Long - term use of mobile and cordless phones was linked to lower survival rates in patients with glioblastoma multiforme, with the largest hazard ratio in those who started before the age of 20. One continuing study (Sadetzki et al., 2014). A multicenter case - control research enrolled children and adolescents aged 7 to 19 years. Regular mobile phone users (one call per week for at least 6 months) had a non - significant higher risk of brain tumours (odds ratio (OR) = 1.36, 95% confidence interval (CI) = [0.92, 2.02]. Aydin et al. (2011) found that the cumulative duration of subscriptions and calls led to a slight rise in OR. No long - term data was provided; the longest lag interval (time from first

The use period (till tumour diagnosis) was barely five years. The results of operator - recorded use for 62 cases and 101 controls, with a time since first subscription of more than 2.8 years, support the true association. Children have smaller and thinner skull bones than adults⁷

Their brain tissue is also more conductive, which results in greater absorption of RF radiation than adults (Gandhi et al., 2012). The developing brain is more vulnerable to poisons, and it continues to develop until approximately 20 years of age. Children are more vulnerable to mobile phone radiation than adults due to their higher absorption of RF energy per unit of time, greater sensitivity of their brains, and longer

lifespans, which increase the likelihood of developing a brain tumour or other health impacts⁸.

Psychiatric Effects

The evidence so far raises the following questions: When, where, how, and why do children and adolescents use mobile phones, and what are the health risks? What are according to the Russian National Committee on Non - Ionizing Radiation Protection's 2008 report to WHO, the following health risks are predicted to be encountered by children mobile phone users in the near future: Memory disturbance, attention decrease, reduced learning and cognitive abilities, increased irritability, sleep issues, increased stress sensitivity, and epileptic preparedness. Remote health hazards may include brain tumours, auditory and vestibular nerve tumours (25 - 30 years old), Alzheimer's disease, "got dementia," depressed syndrome, and nervous system degradation⁹.

Disrupted sleep among teens appears to be a developing concern, with multiple studies indicating negative impacts from cell phone use. Certainly, more research should be conducted to investigate potential detrimental health impacts of RF radiation. One example is the b - trace protein (lipocalin - type prostaglandin D synthase), which is an enzyme involved in the synthesis of prostaglandin D2, an endogenous neurohormone that promotes sleep. Cell phone use has been linked to reduced levels of b - trace protein in

individuals aged 18 - 30 years, suggesting a potential impact on sleep (Soferqvist et al., 2012).

The findings of this study suggest that more research should focus on mechanistic investigations¹⁰.

Epigenetics, a novel mechanism, may explain the rapid genetic alterations (de novo mutations) associated with childhood neurodevelopmental disorders such as ADHD and autism. Precautionary warnings should be widely distributed to parents and schools by health professionals with expertise in wireless technology due to its rapid adoption by children worldwide (Reykjavik Appeal on Wireless Technology in Schools, 2017¹¹).

2. Conclusion

Mobile phone addiction and mobile user well-being are two major themes among the almost 100 letters of intent submitted to this special section. These are really important topics. According to Spitzer (2014), up to 20% of pupils experience information technology addiction, and the benefits in education remain mostly unproven. Furthermore, millions of youthful users face crucial concerns and challenges on a regular basis.

This special section includes four studies on mobile privacy, peer influence, joint attention, and touch screen effects, demonstrating the need for timely and effective research. Research on texting behaviour, everyday use, mobile bullying, sleeping disturbance, sexting, distracted driving, and radiation consequences continues to be inventive. Among youthful users, as seen in this specific section.

The special section highlights the potential health risks posed by digital devices and wireless technology emissions, as well as the impact on children and adolescents' behaviour due to interactions with mobile phones and other digital technologies.

References

- [1] Hardell L. Effects of mobile phones on children's and adolescents' health: A commentary. *Child Dev* [Internet].2018 [cited 2024 May 25]; 89 (1): 137–40. Available from: <https://pubmed.ncbi.nlm.nih.gov/28504422/>
- [2] Lagorio S, Blettner M, Baaken D, Feychting M, Karipidis K, Loney T, et al. The effect of exposure to radiofrequency fields on cancer risk in the general and working population: A protocol for a systematic review of human observational studies. *Environ Int* [Internet].2021; 157 (106828): 106828. Available from: <http://dx.doi.org/10.1016/j.envint.2021.106828>
- [3] Ricci RC, Paulo ASC de, Freitas AKPB de, Ribeiro IC, Pires LSA, Facina MEL, et al. Impacts of technology on children's health: a systematic review. *Rev Paul Pediatr* [Internet].2023 [cited 2024 May 25]; 41. Available from: <http://dx.doi.org/10.1590/1984-0462/2023/41/2020504>
- [4] Sciorio R, Tramontano L, Esteves SC. Effects of mobile phone radiofrequency radiation on sperm quality. *Zygote* [Internet].2022 [cited 2024 May 25]; 30 (2): 159–68. Available from: <https://www.cambridge.org/core/journals/zygote/article/abs/effects-of-mobile-phone-radiofrequency-radiation-on-sperm-quality/21C2B120266B06C1C4F034D2FD55554D>
- [5] Benson VS, Pirie K, Schüz J, Reeves GK, Beral V, Green J, et al. Mobile phone use and risk of brain neoplasms and other cancers: prospective study. *Int J Epidemiol* [Internet].2013 [cited 2024 May 25]; 42 (3): 792–802. Available from: <https://pubmed.ncbi.nlm.nih.gov/23657200/>
- [6] Report of partial findings from the national toxicology program carcinogenesis studies of cell phone radiofrequency radiation in hsd: Sprague dawley® SD rats (whole body exposures) [Internet]. *Biorxiv.org*. [cited 2024 May 25]. Available from: <https://www.biorxiv.org/content/10.1101/055699v2.full.pdf>
- [7] Carlberg M, Hardell L. Evaluation of mobile phone and cordless phone use and glioma risk using the Bradford Hill viewpoints from 1965 on association or causation. *Biomed Res Int* [Internet].2017 [cited 2024 May 25]; 2017: 1–17. Available from: <http://dx.doi.org/10.1155/2017/9218486>
- [8] Researchgate.net. [cited 2024 May 25]. Available from: https://www.researchgate.net/publication/325683399_Absorption_of_wireless_radiation_in_the_child_versus_adult_brain_and_eye_from_cell_phone_conversation_or_virtual_reality
- [9] Miller AB, Sears ME, Morgan LL, Davis DL, Hardell L, Oremus M, et al. Risks to health and well-being from radio-frequency radiation emitted by cell phones and other wireless devices. *Front Public Health* [Internet].2019 [cited 2024 May 25]; 7. Available from: <http://dx.doi.org/10.3389/fpubh.2019.00223>
- [10] Sinha S, Dhooria S, Sasi A, Tomer A, Thejeswar N, Kumar S, et al. A study on the effect of mobile phone use on sleep. *Indian J Med Res* [Internet].2022 [cited 2024 May 25]; Publish Ahead of Print (3–4): 380. Available from: http://dx.doi.org/10.4103/ijmr.ijmr_2221_21
- [11] Rangasamy S, D'Mello SR, Narayanan V. Epigenetics, autism spectrum, and neurodevelopmental disorders. *Neurotherapeutics* [Internet].2013 [cited 2024 May 25]; 10 (4): 742–56. Available from: <https://pubmed.ncbi.nlm.nih.gov/24104594/>