

**Ministry of higher Education
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A Review Article

***Evaluation of long term use of mobile phone effect
on prevalence of different types of neoplasms in
head and neck area.***

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Abstract:

Mobile or cellular phones are now an integral part of modern telecommunications. In many countries, over half the population use mobile phones and the market is growing rapidly. Given the large number of mobile phone users, it is important to investigate, understand and monitor any potential public health impact. Communication in mobile phones done by transmitting radio waves through a network of fixed antennas called base stations. Radiofrequency waves are electromagnetic fields, it different from ionizing radiation such as X-rays or gamma rays, because of it cannot cause breaking of chemical bonds also cannot cause ionization in the human body. The possibility of cancer prevalence and using of cell phones is controversial. This review investigate the possible association between the use of cell phones and head, neck neoplasms.

Keywords: cellular phones; head and neck neoplasm; Radiofrequency waves.

Introduction

In the beyond 20 years, the usage of cell phones has multiplied exponentially in today's society, with more than 5.3 billion cell subscriptions worldwide^[1].

With the increasing use of mobile telephones, worries have emerged over the cancer-inflicting consequences of electromagnetic fields (Emfs) transmitted from cell telephones [2] There is a growing public fear regarding feasible adverse health effect because of cell radiation exposures, which, retaining in view big range of cell subscribers appears justified. [3] Therefore, it's far essentially these days to meticulously investigate, understand, and display screen any ability widespread on health effect of extending Smartphone devices usage . Cell telephones impart with the aid of using sending radio recurrence waves via an organization of constant receiving wires called base stations. Such radiations are added with the aid of using cellular telephones and different own circle of relatives devices like Wi-Fi, (TV), and radio transmitters and so on Radiofrequency waves are electromagnetic fields, and assorted to ionizing radiation, for example, X-ray beams or gamma beams, can neither destroy substance bonds nor are accurately outstanding to damage our deoxyribonucleic corrosive (DNA).The degree of radiofrequency electricity openness moreover is based upon flexible set innovation, the degree and sort of usage, phones receiving wire, and make contact with pinnacles separation from the client. Physicists have dissected every and each feasible collaboration among flexible radiation and herbal cycles, for e.g., real misshaping of proteins, enactment of flagging pathways, and docking with receptors on cellular layers. For every situation, the decided energy of transportable radiation has been insignificant to steer any pathological change [4] .The long latency period between radiation exposure and subsequent tumor development.

means that many studies do not have enough follow-up time to investigate such possible relationships

and long-term risk. While more and more studies have recently reported an association between long-term (10 years) cell phone use and an increased risk of glioma, the absolute number is

these studies are small ^[5] . An observation period of at least 10 years is considered a minimum needed to study long-term carcinogenic risks from exposure to RF fields when using a mobile device mark.

Short-Term Effects

Several studies have investigated the effects of radio frequency fields on brain electrical activity, cognitive function, sleep, heart rate and blood pressure, etc. In a survey of male students from the National Institute of Technology (NIT), Kerala, India. Headache, dizziness, numbness in the thighs, and chest heaviness have been reported in frequent mobile phone users. The study reported an increase in heart rate variability when the cell phone is held close to the chest and a decrease when it is held close to the head. However, these observations were not significant when compared to the conditions without a cell phone. ^[6] To date, research has not provided consistent evidence for the adverse health effects of exposure to radio frequency fields, with the exception of the effect of tissue heating. In addition, research has failed to support a cause and effect relationship between exposure to electromagnetic fields and self-reported symptoms, such as electromagnetic hypersensitivity, among mobile device users. ^[7]

Long-Term Effects

Epidemiological researches inspecting capability long-time period dangers from radiofrequency publicity have often searched for an affiliation among mind tumors and Smartphone devices usage use. However, as many cancers stay undetectable till a few years after the interactions that caused the tumor, and due to the fact cell

telephones had been now no longer broadly used till the early 1990s, epidemiological research had been restrained handiest to the ones cancers that turn out to be glaring inside shorter time periods. Results of animal research have continuously proven no growth within side the most cancers hazard because of long-time period publicity to radiofrequency fields. ^[8] Little research have attempted to search for different viable long-time period health outcomes of publicity to cell radiation. In an examine carried out in Amritsar, Punjab, India, a correlation among Smartphone devices use (publicity to radio frequency radiations) and DNA and chromosomal harm in lymphocytes of cell telephones customers turned into observed. Such damages could have long-time period effects in phrases of improved hazard of neoplasms or different age-associated adjustments. ^[9] Indian experimental animal research carried out on rats have moreover proven that Smartphone devices radiations may also have an effect on mind feature and motive numerous neurological problems and continual publicity to nonionizing microwave (MW) radiation may also cause infertility through loose radical/oxidative species-mediated pathway. ^[10], ^[11] In an examine carried out on population dwelling close to Smartphone devices towers, better hazard for growing neuropsychiatric issues and a few adjustments in neurobehavioral capabilities had been observed, therefore, advocating due warning in such regard. ^[12] A systematic overview of the fitness outcomes of publicity to radiofrequency electromagnetic fields from Smartphone devices towers, however, did now no longer suggest an affiliation among any fitness final results and radiofrequency electromagnetic subject publicity at ranges normally encountered in peoples ordinary environment. ^[13], ^[14].

Cancer in Humans

Extensive proof evaluations had been performed to recognize feasible carcinogenic dangers posed with the aid of using cellular radiation with inside the beyond decade. In a meta-evaluation of research on intracranial tumors and Smartphone devices use posted with the aid of using the quit of 2012, excessive heterogeneity changed into detected throughout estimates of glioma and acoustic neuronal danger in long-time period customers because of methodological variations embedded with inside the variable examine groups. Overall, the consequences detracted from the speculation that Smartphone devices use influences the prevalence of intracranial tumors.^[15] In a prolonged follow-up of Danish national cohort, no proof for an affiliation among tumor danger and cell phone use among both short-time period or long-time period customers changed into found.^[16] Similarly, the most important retrospective case-control study INTERPHONE, performed with the aid of using a consortium of researchers from 14 international locations and coordinated with the aid of using the International Agency for Research on Cancer (IARC), showed no statistically significant increase in brain or central nervous system cancers related to higher amounts of mobile phone use.^[17] However, the working group did not ignore the limited human evidence for the carcinogenicity of radiofrequency radiation as positive associations. The study group established an association between exposure to radio radiation from cordless phones and glioma and acoustic neuroma, but it was not statistically insignificant.^[18] The Hardell-institution performed case manipulate research on mind tumors all through 1997-2003 with instances being stated from the Swedish Cancer Registries. Consistent sample of the expanded danger of glioma and acoustic neuroma related changed into visible with use of cellular telephones and cordless telephones. Supportive proof got here from anatomical localization of the tumor to the maximum uncovered location of the mind, cumulative publicity, and latency time that every one upload to the organic relevance of an expanded danger. Based in large part on statistics suggesting expanded danger for glioma, a malignant form of mind in most cancers, the IARC in May 2011 categorized radiofrequency electromagnetic fields as likely carcinogenic to people.^[19]

Recommendations by Expert Agencies

WHO states that “A huge variety of research had been executed during the last a long time to evaluate whether cell telephones pose a capacity health danger. To date, no unfavorable fitness results had been installed as being due to Smartphone devices use. WHO will behavior a proper chance evaluation of all studied health results from radiofrequency fields publicity with the aid of using 2016” [20]. The American Cancer Society (ACS) states that “The IARC category approach that there will be a few hazards related to cancer, however the proof isn't always sturdy sufficient to be taken into consideration causal and desires to be investigated further. Individuals who're involved in approximately radiofrequency publicity can restrict their publicity, such as the usage of an earpiece and restricting Smartphone devices use, specifically amongst children”. [21]. The Centers for Disease Control and Prevention (CDC) of the University of California stated: “There is no clinical test that can give an accurate answer when a cell phone causes cancer. Some companies provide alerts about the use of smartphones with molecular phones. When we understand whether the use of molecular phones is correct This is essential before health is harmful” [22].

Way Forward

There are a few global mobiles and most cancers chance research which are presently underway to gathers mind-tumor records with cell radiation publicity. MOBI-KIDS is a global case-manage have a look at assessing capability hyperlinks among communications devices, environmental change elements and mind tumors in younger people. Over 5 years, 2,000 people among the while of 10 and 24 years with mind tumors, and 2,000 without tumors can be collaborating on this crucial international have a look at. It includes studies of companies in thirteen countries, which include Canada, Australia, Israel, Taiwan, and the Netherlands etc., and the have a look at is funded with the aid of using European Communities Seventh Framework Program. ^[23]

Another have a look at is COSMOS that's a big cohort to have a look at released in Europe in March 2010, it's far investigating viable health consequences for long time use of cell telephones and different Wi-Fi technologies. Approximately 250,000 cell phone customers over the age of 18 are a part of this 20-30 12 months examine. This have a look at will in particular check modifications in signs and symptoms including complications and sleep issues in addition to dangers for most cancers, tumors, neurological, and cerebrovascular diseases. Additionally, WHO is to behavior a proper chance evaluation of all studied health consequences of radio frequency fields publicity with the aid of using 2016. ^[24]

Limitations of Existing Literature

Consideration of trade factors concerning using cellular telephones and the expanded hazard of mind most cancers has proven inconclusive traits. The prevalence of most cancers instances have to be surging due to the fact using cellular telephones has risen dramatically over the previous couple of a long time, however most effective constrained studies shows such traits. Brain cancers can take a few years to develop, so it's miles viable that traits might most effective begin growing after a few greater times. Case-manage research may be in large part laid low with consider bias, as humans have heard approximately mobiles and mind most cancers with inside the media, due to the fact mind most cancers can distort memory, or virtually due to the fact humans misremember matters that passed off a long term ago. There isn't any any clean approaches of assessing someone's real publicity to Smartphone devices radiation. Instead, research use questionnaires to exercise session the exposures, that could cause inaccurate evaluation and fake results. There are conflicts of hobby ascellular Smartphone devices enterprise has supplied investment for a few main studies tasks namely-Interphone study ^[16] and the Danish study ^[17] etc., In each instance, finances had been administered through independent, third-birthday birthday celebration organizations. The mobile era has modified significantly over the past a long time, and it isn't clean if research primarily based totally on using antique fashions will practice to trendy ones.

Recommendations on Mobile Use

IARCs 2B (feasible risk) category stays a cornerstone advisory in components of tips via way of means of authorities or primary public health agencies. In the existing situation, we can't be absolutely certain approximately the long-time period outcomes of cell radiation publicity. In addition, there have now no longer been sufficient research to study how the use of cell telephones ought to have an effect on the health of children. In the modern-day scenario, preventive technique stays the great choice to cell telephones users, who can be advocated to reduce their publicity via way of means of maintaining their calls short. People need to make certain that their cell tool has low unique absorption rate (SAR) of radio frequency and children, adolescent, and pregnant ladies taking unique precautions. Mobile telephones need to be saved far from the body (head) via way of means of the use of textual content messaging, or the use of an “arms free” gadgets reducing publicity to radiofrequency fields and, hence, higher protection. ^[25]

Conclusion

Overall reviews display that the modern-day proof for a causal affiliation among most cancers and publicity to cellular radiation is vulnerable and unconvincing. Some research setting up affiliation had giant boundaries and weaknesses and, therefore, stay unreliable. Studies have highlighted that the use

of those telephones for approximately 10 years is not going to motivate most cancers. But as cellular telephones are nonetheless a brand-new era and there may be little proof approximately outcomes of longer-time period use, therefore, prevention appears the excellent approach. Existing epidemiological studies is constrained and the opportunity of epigenetic and different long-time period health outcomes has now no longer but been very well evaluated, warranting extra studies a greater thorough evaluation of the opportunity of a causal connection among most cancers and cellular telecellsmartphone radiations. The direct relation between long term use of mobile phone and its effect on prevalence of neoplasms in head and neck area is still controversial.

References

1. Lönn S, Ahlbom A, Hall P, Feychting M; Swedish Interphone Study Group. Long-term mobile phone use and brain tumor risk. *Am J Epidemiol*. 2005 Mar 15;161(6):526-35. doi: 10.1093/aje/kwi091. PMID: 15746469.
2. Hardell L, Sage C. Biological effects from electromagnetic field exposure and public exposure standards. *Biomed Pharmacother*. 2008 Feb;62(2):104-9. doi: 10.1016/j.biopha.2007.12.004. Epub 2007 Dec 31. PMID: 18242044.

3. Sharma RS. National Activities on Non-Ionizing Radiation.
4. Friedman J, Kraus S, Hauptman Y, Schiff Y, Seger R. Mechanism of short-term ERK activation by electromagnetic fields at mobile phone frequencies. *Biochem J* 2007;405:559-68.
5. Hardell L, Carlberg M, Soderqvist F, Mild KH, Morgan LL. Long-term use of cellular phones and brain tumours: increased risk associated with use for > or = 10 years. *Occupational and environmental medicine*.2007 Sep; 64(9):626±32.
6. Ahamed VI, Karthick NG, Joseph PK. Effect of mobile phone radiation on heart rate variability. *Comput Biol Med* 2008;35:709-12.
7. Rösli M. Radiofrequency electromagnetic field exposure and non-specific symptoms of ill health: A systematic review. *Environ Res* 2008;107:277-87.
8. Volkow ND, Tomasi D, Wang GJ, Vaska P, Fowler JS, Telang F, *et al*. Effects of cell phone radiofrequency signal exposure on brain glucose metabolism. *JAMA* 2011;305:808-13.
9. Gandhi G, Anita. Genetic damage in mobile phone users. Some preliminary findings. *Int J Hum Genet* 2007;11:99-104.
10. Shahin S, Mishra V, Singh SP, Chaturvedi CM. 2.45-GHz microwave irradiation adversely affects reproductive function in male mouse, *Mus musculus* by inducing oxidative and nitrosative stress. *Free Radic Res* 2014;48:511-25.
11. Kesari KK, Meena R, Nirala J, Kumar J, Verma HN. Effect of 3G cell phone exposure with computer controlled 2-D stepper motor on non-thermal activation of the hsp27/p38MAPK stress pathway in rat brain. *Cell Biochem Biophys* 2014;68:347-58.
12. Abdel-Rassoul G, El-Fateh OA, Salem MA, Michael A, Farahat F, El-Batanouny M, *et al*. Neurobehavioral effects among inhabitants around mobile phone base stations. *Neurotoxicology* 2007;28:434-40.
13. Rösli M, Frei P, Mohler E, Hug K. Systematic review on the health effects of exposure to radiofrequency electromagnetic fields from mobile phone base stations. *Bull World Health Organ* 2010;88:887-96F.

14. Moulder JE, Foster KR, Erdreich LS, McNamee JP. Mobile phones, mobile phone base stations and cancer: A review. *Int J Radiat Biol* 2005;81:189-203.
15. Lagorio S, Rösli M. Mobile phone use and risk of intracranial tumors: a consistency analysis. *Bioelectromagnetics*. 2014 Feb;35(2):79-90. doi: 10.1002/bem.21829. Epub 2013 Nov 6. PMID: 24375548.
16. Schüz J, Jacobsen R, Olsen JH, Boice JD Jr, McLaughlin JK, Johansen C. Cellular telephone use and cancer risk: Update of a nationwide Danish cohort. *J Natl Cancer Inst* 2006;98:1707-13.
17. Interphone Study Group. Brain tumour risk in relation to mobile telephone use: Results of the INTERPHONE international case-control study. *Int J Epidemiol* 2010;39:675-94.
18. IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. Non-ionizing radiation, Part 2: Radiofrequency electromagnetic fields. IARC monographs on the evaluation of carcinogenic risks to humans/World Health Organization, International Agency for Research on Cancer. 2013;102(Pt 2):1.
19. Hardell L, Carlberg M, Hansson Mild K. Use of mobile phones and cordless phones is associated with increased risk for glioma and acoustic neuroma. *Pathophysiology* 2013;20:85-110.
20. IARC classifies radiofrequency electromagnetic fields as Possibly carcinogenic to humans Lyon, France, May 31, 2011-- The WHO/International Agency for Research on Cancer (IARC)
21. Otis Brawley responds to IARC Classification of Cell Phones as Possible Carcinogenic. Otis W. Brawley, M.D., American Cancer Society chief medical officer.
22. Web Page: Frequently Asked Questions about Cell Phones and Your Health. Centers for Disease Control and Prevention Jan 2015.
23. MOBI-KIDS Study on Communication Technology, Environment and Brain Tumours in Young People homepage.
24. COSMOS. Cohort study of mobile phone use and health.

25. Lin M, Peper E. Keep cell phones and PDAs away from EMG sensors and the human body to prevent electromagnetic interference artifacts and cancer. *Biofeedback* 2009;37:114-6
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