

Long-term Cell Phone Use Linked to Brain Tumor Risk

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Long-term use of both mobile and cordless phones is associated with an increased risk for glioma, the most common type of brain tumor, the latest research on the subject concludes.

The new study shows that the risk for glioma was tripled among those using a wireless phone for more than 25 years and that the risk was also greater for those who had started using mobile or cordless phones before age 20 years.

"Doctors should be very concerned by this and discuss precautions with their patients," study author Lennart Hardell, MD, PhD, professor, Department of Oncology, University Hospital, Örebro, Sweden, told *Medscape Medical News*.

Such precautions, he said, include using hands-free phones with the "loud speaker" feature and text messaging instead of phoning.

The study was [published online](#) October 28 2014 in *Pathophysiology*.

Pooled Data

The recent worldwide increase in use of wireless communications has resulted in greater exposure to radiofrequency electromagnetic fields (RF-EMF). The brain is the main target of RF-EMF when these phones are used, with the highest exposure being on the same side of the brain where the phone is placed.

The new study pooled data from two case-control studies on histopathologically confirmed malignant brain tumours. The first included patients aged 20 to 80 years diagnosed from 1997 to 2003, and the second included those aged 18 to 75 years diagnosed between 2007 and 2009. Cases came from six oncology centers in Sweden.

Cases were matched with controls of the same sex and approximate age who were randomly drawn from the Swedish Population Registry.

All participants filled out a questionnaire detailing exposure to mobile phones and cordless desktop phones.

The analysis included 1498 cases of malignant brain tumors; the mean age was 52 years. Most patients (92%) had a diagnosis of glioma, and just over half of the gliomas (50.3%) were the most malignant variety — [astrocytoma](#) grade IV (glioblastoma multiforme). Also included were 3530 controls, with a mean age of 54 years.

The analysis showed an increased risk for glioma associated with use for more than 1 year of both mobile and cordless phones after adjustment for age at diagnosis, sex, socioeconomic

index, and year of diagnosis. The highest risk was for those with the longest latency for mobile phone use over 25 years.

Table. Glioma Risk With Mobile and Cordless Phone Use

Phone Use	Odds Ratio (95% Confidence Interval)
Mobile phone use > 1 year	1.3 (1.1 - 1.6)
Cordless phone use > 1 year	1.4 (1.1 - 1.7)
Mobile phone use > 25 years	3.0 (1.7 - 5.2)

The risk was increased the more that wireless phones were used. The odds ratios steadily rose with increasing hours of use.

The risk for glioma was greatest in the most exposed part of the brain. The odds ratios were higher for ipsilateral exposure and for glioma in the temporal and overlapping lobes.

Further, the risk was highest among participants who first used a mobile phone (odds ratio, 1.8) or cordless phone (odds ratio, 2.3) before age 20 years, although the number of cases and controls was relatively small.

Developing Brain

As Dr Hardell explained, children and adolescents are more exposed to RF-EMF than adults because of their thinner skull bone and smaller head and the higher conductivity in their brain tissue. The brain is still developing up to about the age of 20 and until that time it is relatively vulnerable, he said.

There was a higher risk for third-generation (3G) mobile phone use compared with other types, but this was based on short latency and rather low numbers of exposed participants, said the authors. 3G universal global telecommunications system mobile phones emit wide band microwave signals, which "hypothetically" may result in higher biological effects compared to other signals, they write.

Such biological effects, said Dr Hardell, could include an increase in reactive oxygen species, which several articles have linked to cancer. The *p53* gene has also been implicated, he said.

The study's very high participation rate (86% for cases and 87% for controls) makes it unlikely that selection bias influenced the results, said the authors.

Dr Hardell believes the new findings reinforce the message that EF-EMF emissions from wireless phones should be regarded as carcinogenic under International Agency on Research on Cancer (IARC) classifications and that current guidelines for exposure "should be urgently revised" to reflect that.

According to the IARC's 2013 report, there is a "causal" relationship between use of both mobile and cordless phones and that the risk of glioma is "possible."

Numerous studies have looked at the link between use of wireless phones and brain tumors. Studies by Dr Hardell and his colleagues dating back to the late 1990s have found a connection with mobile and cordless phones.