Low Levels of EMFs Affect Semen

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Exposures to ambient magnetic fields may affect the quality of human sperm and may well explain its well-documented decline over the last few decades. De-Kun Li, an epidemiologist at Kaiser Permanente in Oakland, CA, has found that daily exposures of only 1.6 mG or higher for at least two-and-a-half hours were associated with significantly poorer semen quality. Men who were exposed to over 1.6 mG for over six hours a day were four times more likely to have substandard sperm.

"The longer you are exposed, the higher the risk," Li told *Microwave News*. He presented these new findings last week at the annual meeting of the Society for Epidemiologic Research, held in Chicago. He has submitted them for publication.

"If it holds up, this would be very important because magnetic field exposures are ubiquitous," Li said. "We know that sperm quality has been going down for a long time with the largest declines in urban areas. That would be consistent with EMF exposures which are highest in cities."

The quality of the semen was assessed according to WHO criteria for motility and morphology —that is, the ability of sperm to "swim" (to the egg) and their shape. "Sperm quality could turn out to be a sensitive endpoint to study the biological effects of EMFs," Li said.

Li is one of the few to explore new ways of defining what is a biologically significant dose of EMFs. An important implication of his new study is that while he might classify a man as being in a "high" exposure group, that same man could still have a time-weighted, 24-hour average exposure of less than 1mG, which would put him in the "unexposed" group in most past studies. Such a misclassification would reduce the chances of seeing this effect.

In a study published in 2002, Li showed that women exposed above a certain threshold (16 mG) had higher rates of miscarriages (see *MWN*, J/F02, p.1). At the time, many considered that this new concept of EMF dose was worth pursuing. But, in fact, no one did

—at least no one has yet published a follow-up study. "In that earlier study we saw higher miscarriage risks among women who had an exposure of more than 16 mG at least once a day," Li said, "in our new study, men had poorer sperm quality if they were exposed to a much lower field but it had to be for at least 10% of the day."

The power-frequency fields implicated in this new study are extremely weak. They are approximately 1,000 times lower than the current ICNIRP guidelines and some three times lower than what many see as the threshold for increasing the risk of childhood leukemia (3-4 mG). According to a large-scale survey carried out a decade ago, close to 15% of the U.S. population is exposed to an average of more than 2mG over a 24-hour period (see *MWN,* M/J98, p.4).

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