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Health

Hard Times Better for Female Fetuses, Study Suggest

TUESDAY, Jan. 24 (HealthDay News) -- Males may be the stronger sex, but females rule the roost when it comes to numbers and new research is providing some possible insight into why.

Nearly two centuries of Swedish genealogy records suggest that pregnant women are more likely to spontaneously abort male fetuses and embryos during times of stress. The resulting generations of children are stronger and actually live longer than those born during good times, the researchers contend.

The findings suggest that being conceived in difficult times doesn't hurt the male fetuses who are actually born, said study co-author Ralph Catalano, a professor of public health at the University of California, Berkeley. They do just fine.

Instead, hard times may hurt the weaker fetuses and embryos -- disproportionately male -- that don't make the cut. "You get rid of the weak, and on average the cohort lives longer," Catalano said.

Scientists have known for decades that male fetuses have a more difficult time surviving pregnancy than females. And pregnant women tend to produce more female children during times of stress, such as a famine.

"The argument is that in most species, males will compete with each other for females, and females prefer robust males," Catalano said. When there isn't much food around, a male child might be weaker and less likely to compete with other males to land a female partner, he said.

"You're at a double disadvantage, you're not as robust, you're not as strong," he said.

The result? The mother's genes will be less likely to continue down the generations if she gives birth to a male who might be weak. So, the theory goes, pregnant women produce more females during stressful times.

Indeed, Catalano found that the ratio of female-to-male babies went up in the United States after 9/11 and in Japan after the 1995 Kobe earthquake.

But what exactly happens in the womb during stressful times? Does the stress make all the children weaker? Or do the weak embryos and fetuses -- including lots of males -- get "rooted out," as Catalano put it?

To answer the question, Catalano and a colleague studied Swedish genealogy records from 1751 to 1912. They report their findings in the Jan. 23-27 issue of the *Proceedings of the National Academy of Sciences*.

During tough times when more female children were born, the male children who survived to birth actually lived four months longer than the others, Catalano said. "It may not sound impressive in one individual, but if you're talking about tens of thousands of people, that's a lot of human life years."

This suggests that stress is killing off weaker fetuses that might otherwise have lived, creating new

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generations of children who are stronger overall, he suggested.

What does this all mean? Not a lot in the big picture, Catalano said. "You're not going to change any way we deal with pregnant women or young children."

Another study in this week's *Proceedings of the National Academy of Sciences* brings more bad news for males -- at least male fish -- and, potentially, worse news for their mothers-in-law.

Researchers who studied a Japanese fish species are reporting that the mitochondrial DNA in sperm are largely destroyed during fertilization, perhaps by the female egg or through a kind of suicide.

In humans, mitochondrial DNA is passed from mothers to their children, but men cannot pass them on.

The study findings suggest that mitochondrial DNA in the fish sperm go to waste, depriving the embryo of a significant source of genetic heritage from its paternal grandmother -- its mother's mother-in-law.

More research is needed to "understand the significance of this strange phenomenon, maternal inheritance," said study co-author Yoshiaki Nishimura, a researcher at the Boyce Thompson Institute for Plant Research, in Ithaca, N.Y.

More information

To learn more about DNA, visit the [Cold Spring Harbor Laboratory](#).

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