New data model reveals novel infertility treatment recommendations

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A new data analysis model developed in part by University of Minnesota faculty is shedding more light on potential treatment for women facing infertility issues, offering possibilities for the future of health

recommendation tools.

In a newly published study in the *Journal of the American Statistical Association*, Carlson School of Management Assistant Professor Xuan Bi and his colleagues examine existing data on 1,376 women with polycystic ovary syndrome (PCOS). The condition is one of the most common causes of infertility, but it is not well understood. Why? The dataset shrinks.

In PCOS studies, three stages—ovulation, pregnancy and live birth—are usually analyzed separately. However, fewer women progress to each stage and only a small number reach live birth. Despite the challenge, the researchers developed a series of algorithms and revealed effects existing across all three stages.

"Our model bridges the three stages to look at the whole pregnancy process to see how different factors, like treatment or alcohol use, may affect the chance of a live birth," said Bi. "The analysis shows how doctors could better identify a treatment at the start of the ovulation stage based on those factors."

The model highlighted novel infertility treatment recommendations that improved the chances of a live birth. For example, clomiphene citrate—also known as Clomid—was more effective for older women. The team also confirmed existing clinical research, such as the negative impact of smoking on pregnancy rates. Bi says while the treatment recommendations should go through more rigorous clinical trials and FDA approval, the findings are promising.

Researchers believe the new method could be applied to other clinical research of sequential processes that face similar diminishing data issues. Bi says the model could eventually be developed into a medical artificial intelligence tool used by doctors as a second opinion.

"This could be a step toward a potential software in a doctor's office, where a patient could enter risk factors and other information to help augment a doctor's decision for treatment," said Bi.

Provided by University of Minnesota