Medical Xpress

US survey finds high interest in polygenic screening, genetic editing of embryos

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An article published today in the journal *Science* indicates that a substantial proportion of Americans are willing to use an essentially unregulated reproductive genetic technology to increase the chances of having a baby who is someday admitted to a top-100 ranked college.

Survey respondents with college degrees, as well as those under 35 years

of age—prime child-bearing age—were more willing to use polygenic embryo screening in conjunction with in vitro fertilization (IVF) to do so, the study found.

Polygenic indexes (also called polygenic risk scores) can provide an estimate of disease risk—or other traits—based on an individual's genes. Private companies working with IVF clinics offer the service to patients who can select an embryo with a lower chance of developing diabetes, cancer, heart disease, inflammatory bowel disease, Alzheimer's disease or schizophrenia as an adult.

Some patients have also reported uploading their embryos' genomic data to online platforms that make predictions about non-medical traits, and the founder of one such company has not ruled out offering to screen for non-medical traits.

Noting how quickly new technologies can spread, researchers wanted to gauge public attitudes toward reproductive technologies and whether their willingness to use them was influenced by what others do.

Using a large, nationally representative sample, researchers asked respondents how likely they were to use polygenic screening, CRISPR-style gene editing, or standard SAT prep course training to increase the odds of their child getting into a top-100 ranked college, assuming that they were already using IVF and that all options were free and safe.

A majority of people (68%) said they were more likely than not to use SAT prep; substantial minorities were more likely than not to use gene editing (28%) and polygenic screening (38%) for this purpose. And people who were told that most people in a position to use each service choose to do so were more likely to say that they, too, would use it, suggesting the potential for a modest "bandwagon effect."

These results suggest substantial—and likely growing—interest in using genetic technologies to try to influence offspring traits and outcomes, including to "enhance" social and behavioral outcomes like educational attainment.

The researchers argue that the time for a national conversation about possible regulation of polygenic embryo screening is now. They note that their survey about a complex technology that is only briefly described is not a substitute for the considered judgments that should emerge from such a sustained national conversation about the expected outcomes and risks of screening embryos for polygenic traits. It is not clear, for instance, whether the same people would still want to use that service if they were more fully informed about it.

Previous research by some of the same authors, published in the *New England Journal of Medicine*, described the limitations of polygenic screening, warning that patients and even IVF clinicians may form the mistaken impression that the technology is more effective and less risky than it is.

"Polygenic indexes are already only weak predictors for most individual adult outcomes, especially for social and behavioral traits, and there are several factors that lower their predictive power even more in the context of embryo selection," said senior author Patrick Turley, Ph.D., assistant research professor of economics at the USC Dornsife College of Letters, Arts and Sciences. "Polygenic indexes are designed to work in a different setting than an IVF clinic. These weak predictors will perform even worse when used to select embryos."

Assessments of the predictive power of polygenic indexes typically assume very similar environments for the generation from which the genetic information was collected and the generation born as a result of polygenic screening. An embryo selected via this technology may face a

very different environment as an adult, which may lower predictive power. In addition, because biobanks disproportionately enroll people with predominantly European genetic ancestries, most of today's polygenic indexes are less predictive for people of other genetic ancestries.

"There is—rightly—a lot of concern among scholars, including us, that companies and IVF clinics that use polygenic embryo screening could intentionally or unintentionally exaggerate its likely impact," said Michelle N. Meyer, Ph.D., J.D., associate professor and chair of the Department of Bioethics and Decision Sciences at Geisinger and first author of the article.

"But in this study, we stipulated a realistic effect—that each service would increase the odds of having a child who attends a top-100 college by 2 percentage points, from 3% to 5% odds—and lots of people are still interested."

More information: Michelle N. Meyer, Public views on polygenic embryo selection, *Science* (2023). DOI: 10.1126/science.ade1083. www.science.org/doi/10.1126/science.ade1083

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