

# The outcome of fertility treatments using donor sperm is dependent on the quality of sperm

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Despite emerging evidence of a decline in sperm quality with increasing age, an analysis of every first fertility treatment cycle performed in the UK using sperm donation shows that outcome in terms of live birth is not affected by the age of the sperm donor. Results from the study, said its principal investigator Dr Meenakshi Choudhary, from the Newcastle Fertility Centre at Life, Newcastle upon Tyne, United Kingdom, reaffirm the observation that a couple's fertility appears significantly more dependent on the age of the female partner than on that of the male.

The results of the study are reported this week at the Annual Meeting of ESHRE in Munich by Dr Choudhary's colleague, Commonwealth Clinical Fellow Dr Navdeep Ghuman.

Their conclusions were derived from an analysis of all UK treatment cycles with sperm donation registered by the Human Fertilisation & Embryology Authority (HFEA) between 1991 and 2012. From a total of more than 230,000 sperm donation cycles, 39,282 were from a first cycle of treatment (with either IVF or donor insemination) and were included in the analysis (a first cycle would avoid any bias from previous attempts). The authors note that it is the first study to conduct an analysis of the effect of [sperm donor](#) age on [live birth](#) using a large national database.

With the assumption that female fertility clearly declines with age, the study divided its female subjects into two groups: those who were treated with donor sperm between the ages of 18 and 34, and those who were treated after the age of 37. They were further sub-divided according to treatment - donor insemination or IVF. The sperm donors were then divided into six age groups for the analysis (under 20, 21-25, 26-30, 31-35, 36-40, 41-45).

As expected, results showed a difference according to female age, both in the IVF and the donor insemination treatments. Thus, live birth rate from IVF with donated sperm was around 29% in the 18-34 age group, but only around 14% in the over-37 age group.

However, within these same two female age bands, no significant differences were found in live birth rate (LBR) relative to the age of sperm donor. Thus:

- in the younger IVF patients LBR was 28.3% with a sperm donor aged under 20 and 30.4% with a donor aged 41-45
- in the younger donor insemination patients LBR was 9.7% with a donor aged under 20 and 12% with a donor aged 41-45.

The women in the 18-34 age group were defined as at the peak of their reproductive potential. Less likely to conceive were women in the age group over 37, and here some differences in outcome were observed, though not of statistical significance. There was a trend, for example, that sperm donors under the age of 20 were associated with a less successful outcome than older donors. Thus:

- in the older IVF patients LBR was 11% with a donor under the age of 20, 17% with donor aged 26-30, and 16.6% with a donor aged 41-45
- in the older donor insemination patients LBR was 3.1% with a

donor under 20, and 4.6% with a donor aged 41-45

"Despite these trends," said Dr Choudhary, "it's important to note that the impact of sperm donor age on live birth failed to reach statistical significance in any of the age groups we studied. Indeed, this trend of less likelihood of live birth with younger sperm donor age might simply be explained by the fact that younger men who donate sperm are less likely to have proven fertility themselves than older sperm donors with proven fertility."

However, with emphatic results from such a large cohort study, Dr Choudhary was confident that the age of the sperm donor was of little significance in couples having [sperm donation](#) for fertility treatment. "It's [sperm quality](#) rather than male age that matters," she said.

Regulatory requirements on the maximum age of sperm donors tend to range between 40 and 45 years.(1) These regulatory thresholds reflect a decline in sperm quality with age and the greater likelihood of DNA mutations and higher risk of genetic abnormality in offspring. These risks have been highlighted in many recent studies. Studies have also suggested that the principal semen parameters - semen volume, sperm motility and sperm concentration - all decline as men grow older. These declines, however, do not necessarily prevent conception, as the many well recorded examples of celebrity senior fathers illustrate. And many studies, like this one, have failed to find a strong effect of paternal age on a couple's fertility.(2) Conversely, there are still many other studies suggesting that increased paternal age is associated with reduced fertility and that this effect is evident in both natural and assisted conception.

"Whilst advancing female age is clearly associated with fertility decline," said Dr Choudhary, "there is still no consensus about advancing paternal age and fertility outcome. This is an area which is still much under-researched. A few studies show an effect on DNA mutations which

might explain a higher rate of miscarriage, pregnancy loss and birth defect. Advanced paternal age has also been associated with long-term disorders in offspring. But the available evidence is limited.

"Our results suggest that, up to the age of 45, there is little effect of male age on treatment outcome, but sperm donors are a selected population based on good sperm quality. Our study shows that we are good at selecting the right sperm donors with the right sperm quality - and that's why we found no difference in live birth rate despite the increasing age of sperm donors. This confirms the view that a man's age doesn't matter in achieving a live birth provided his sperm quality is good."

**More information:** Abstract O-157: Age of the sperm donor: does it really matter - an analysis of 1,048,576 assisted reproduction treatment cycles

### Notes

1. Current UK guidelines, for example, recommend that sperm should not be taken from donors aged 41 or over. The HFEA states that centres should normally observe the relevant donor age limit, but, "due to less substantial evidence on age limits for sperm donors", centres can assess the possible effect of a donor's age on a case by case basis. Regulations require sperm samples to be screened for certain viral, sexually transmitted and genetically transmitted diseases, and freeze-stored in quarantine for at least six months.

2. See for example, Dain L, Auslander R, Dirnfeld M. The effect of paternal age on assisted reproduction outcome. Fertil Steril 2011; 95: 1.

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