

A high intake of certain dietary fats associated with lower live birth rates in IVF

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Women with a higher intake of dietary saturated fats have fewer mature oocytes available for collection in IVF, according to results of a study from the Harvard School of Public Health funded by the US National Institutes of Health. The study investigated the effect of dietary fat (classified as total, saturated, monounsaturated, polyunsaturated, omega 6, omega 3 and trans) on a range of preclinical and clinical outcomes in women having IVF. Results showed that the intake of saturated fat was inversely related to the number of mature oocytes retrieved, while polyunsaturated fat consumption was inversely associated with early embryo quality.(1)

Dietary [fat](#) intake has been previously studied for its effect on reproductive health; for example, a high intake of trans-fats has been associated with ovulatory infertility (as in polycystic ovary syndrome) and miscarriage, while saturated fats have been related to lower sperm concentrations. But so far little has been known about the effect of [dietary fat intake](#) on the outcome of [fertility treatment](#).

The results of this study were presented today at the annual meeting of ESHRE (European Society of [Human Reproduction](#) and Embryology) by Dr Jorge Chavarro, Assistant Professor of Nutrition and Epidemiology at Harvard School of Public Health, USA.

The study took place among 147 [women](#) having IVF at the Massachusetts General Hospital Fertility Center. Preclinical assessments included oocyte development, fertilisation, embryo quality and cleavage

rate, while clinical outcomes (pregnancy, [live birth](#)) were recorded in all women who had embryo transfer. The women were also categorised into tertiles of fat intake, with outcomes compared in relation to the lowest tertile. Results were controlled for other sources of energy, infertility diagnosis, ovarian stimulation protocol, [body mass index](#) (BMI) and smoking status.

Following statistical analysis it was found that women with higher intakes of total fat had fewer metaphase II (MII) oocytes retrieved than women in the lowest tertile. This association was driven by intake of saturated fat, said Professor Chavarro. Women in the highest tertile of [saturated fat](#) intake had on average 9.3 MII oocytes, while those with the lowest intake had 11.6 MII oocytes.

"Only MII oocytes can be used for IVF," he explained. "Thus, having fewer mature oocytes can mean fewer embryos to choose from for fresh transfer or future transfer following cryopreservation, particularly among women who respond poorly to ovarian stimulation."

Polyunsaturated fat consumption was found inversely related to embryo quality. Women in the highest tertile of polyunsaturated fat intake had a higher proportion of poor quality embryos and more slowly cleaving embryos than had women in the lowest tertile of intake.

Fat consumption was also associated with clinical outcomes. Higher intakes of monounsaturated fat were related to higher odds of live birth. The odds of a live birth after embryo transfer in women with the highest intake of monounsaturated fat were 3.45 times higher than those of women with the lowest intake.

"We were not entirely surprised that different types of fat were associated with different outcomes," said Professor Chavarro. "One advantage of assisted reproduction as a model for the study of human

fertility is that it allows the examination of factors possibly related to interactions between the embryo and the endometrium independently of other factors related to early embryo development or ovarian response to stimulation.

"Different types of fat are known to have different effects on biological processes which may influence the outcome of assisted reproduction - such as underlying levels of inflammation or insulin sensitivity. However, it is not clear at this moment which biological mechanisms underlie the associations we found."

On the question of recommendations to IVF patients, Professor Chavarro said: "While these results are interesting, this is the first time to our knowledge that dietary fats have been linked to treatment outcome in IVF. So it is important that our results are replicated in other studies before making strong recommendations about [fat intake](#) to women having infertility treatment."

More information: 1. Mature oocytes - in a natural or stimulated cycle - are defined as having reached the metaphase II stage, a point of development in which the first polar body has formed. In a natural cycle the "leading" MII oocyte is ovulated, while in assisted reproduction several MII oocytes are collected for in vitro fertilisation. Development continues after fertilisation when the second polar body forms and the oocyte takes on its full complement of chromosomes.

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