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### **Factors affecting the outcome of IVF/ICSI**

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#### **Abstract:**

Fertility declines with advancing age and the number of couples seeking infertility treatment at an older age is constantly increasing. A top quality embryo is believed to have the highest potential for implantation and development into a child. A better understanding of the relative importance of patient and treatment characteristics and of embryo quality could help to optimise the existing therapeutic schemes and the safety of in vitro fertilisation/intracytoplasmic sperm injection (IVF/ICSI).

In this work, databases of five Finnish infertility clinics were studied retrospectively. Data on treatments performed in the years 1994–2005 were collected. A total of 19,000 treatment cycles were analysed. Special attention was paid to the relative significance of the transfer of top quality embryos with regards to pregnancy, miscarriage, live birth and cost of treatment in the general IVF/ICSI patient population and in groups with expected poor outcome.

The results showed that the transfer of a top quality embryo is associated with a better chance of pregnancy and live birth. However, it does not diminish the probability of miscarriage. Both low and high BMI increase the miscarriage rate. Advancing age and a positive history of previous miscarriages are also associated with a higher probability of miscarriage. In addition, the need for hormonal substitution in cases of frozen-embryo transfer is a risk factor of miscarriage, probably because of suboptimal endometrial function.

Since the transfer of several embryos leads to multiple pregnancies, which are associated with a high risk of maternal and fetal complications, elective single embryo transfer (eSET) of a top quality embryo allows all additional good quality embryos to be frozen and transferred later in frozen-thawed embryo transfer cycles. The present work demonstrates that eSET is a safe treatment strategy at least until the age of 40. However, it might not be performed in women with fewer than four collected oocytes, since the prognosis might remain poor even if the response is improved in a following cycle.

When eSET is applied routinely and on a large scale, it diminishes treatment costs while increasing the number of deliveries occurring at term, making IVF/ICSI at the same time safer and more affordable even to patients without access to reimbursed IVF treatment.

**Keywords:** cost effectiveness, elective single embryo transfer, fertilisation in vitro, frozen-thawed embryo transfer, low response, obesity, spontaneous abortion, top quality embryo