

**Obesity and IVF outcome  
The hope of improvements through weight reduction**

Akademisk avhandling

Som för avläggande av medicine doktorsexamen vid Sahlgrenska akademien, Göteborgs universitet kommer att offentligens försvaras i hörsal Karl Isaksson, Medicinargatan 16, den 20 oktober 2023, klockan 09.00.

av  
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**Avhandlingen baseras på följande delarbeten**

- I. Einarsson S, Bergh C, Friberg B, Pinborg A, Klajnbard A, Karlström PO, Kluge L, Larsson I, Loft A, Mikkelsen-Englund AL, Stenlöf K, Wistrand A, Thurin-Kjellberg A. **Weight reduction intervention for obese infertile women prior to IVF: a randomized controlled trial.** Hum Reprod. 2017 Aug 1;32(8):1621-1630.
- II. Kluge L, Bergh C, Einarsson S, Pinborg A, Mikkelsen Englund AL, Thurin-Kjellberg A. **Cumulative live birth rates after weight reduction in obese women scheduled for IVF: follow-up of a randomized controlled trial.** Hum Reprod Open. 2019 Dec 10;2019(4):hoz030.
- III. Kluge L, Holter H, Bergh C, Thurin-Kjellberg A. **Women's experience and long-term perspective: a qualitative substudy of a randomized controlled trial on weight reduction prior to in vitro fertilisation.** Reproductive, Female and Child Health. 2023; 2: 143-151.
- IV. Kluge L, Källén K, Thurin-Kjellberg A, Wennerholm UB, Bergh C. **The association between body mass index and live birth and maternal and perinatal outcomes after in-vitro fertilization: A national cohort study.** Accepted for publication in Frontiers in Endocrinology, section Obesity, August 18, 2023.

**SAHLGRENKA AKADEMIN  
INSTITUTIONEN FÖR KLINISKA VETENSKAPER**



## **Obesity and IVF outcome The hope of improvements through weight reduction**

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### **Abstract**

**Background:** Female obesity is associated with decreased live birth rate (LBR) after in vitro fertilization (IVF) and adverse maternal and perinatal outcomes are increased in obese women compared to normal weight women after spontaneous conceived pregnancies. If the same applies in pregnancies achieved after IVF is scarcely investigated. Publicly funded IVF clinics in Sweden have BMI limits that women must meet to be accepted for IVF.

**Aim:** To assess if weight reduction prior to IVF can increase LBR and cumulative live birth rates (CLBR) in obese women. To explore the women's views of the having participated in a randomized weight reduction trial prior to IVF and further, to investigate the association between obesity and CLBR and maternal and perinatal outcomes after IVF.

**Methods:** Paper I: A randomized controlled trial (RCT) including 317 infertile obese women, comparing a weight reduction intervention for 16 weeks prior to IVF to immediate IVF, to assess LBR in the two groups. Paper II: A two-year follow-up to assess CLBR and whether the weight reduction achieved in the RCT remained. Paper III: A qualitative interview study, using thematic content analysis, to explore the women's experiences and views of the RCT. Ten women from the intervention group and seven women from the control group participated in the interviews. Paper IV: A nationwide population-based register study including 126 620 fresh IVF cycles and subsequent frozen embryo transfers (FET) stratified by body mass index (BMI). The fresh cycles were performed between 2007 to 2019 and the main outcome was CLBR. In addition, 58 187 singleton deliveries, achieved after fresh or FET, were included to assess maternal and perinatal outcomes stratified by BMI. The transfers were performed between 2002 to 2020 and the primary outcomes were hypertensive disorders of pregnancy (HDP) and preterm birth less the 37 weeks.

**Results:** Paper I: Despite a substantial weight reduction in the intervention group, mean 9.44 kg no significant difference in LBR could be shown between the weight reduction and IVF group compared to the IVF only group, 29.6% respective 27.5% (difference 2.1%, confidence interval 12.9 to - 8.6). In the weight reduction and IVF group a higher frequency of children born after spontaneous conception was noted. Paper II: The CLBR was similar in the two groups and the women in the weight reduction and IVF group had regained the weight they had lost. Paper 3: The women were happy about the invitation to participate in the RCT. They described the weight reduction treatment as tough, and the support during the weight loss as crucial. They were against a strict BMI limit, and they wished to be evaluated individually. Paper 4: The CLBR decreased in overweight and obese women compared to normal weight women and the adverse maternal and perinatal outcomes increased with severity of obesity.

**Conclusion:** Weight loss prior to IVF did not increase LBRs, nor CLBR after two years. Most interviewed women had a positive attitude to an offer of weight reduction prior to IVF. They wished to be assessed individually and not solely on the basis of their BMI. Overweight and obesity are associated with decreased CLBR and adverse maternal and perinatal outcomes after IVF.

**Keywords:** Infertility, IVF, obesity, weight reduction, live birth, patient's views, maternal outcome, perinatal outcome.