

Polycystic ovary syndrome in women with severe obesity - effects of a 12-month weight loss intervention

Akademisk avhandling

Som för avläggande av medicine doktorsexamen vid Sahlgrenska akademien, Göteborgs universitet kommer att offentligens försvaras i Hörsal Arvid Carlsson, Academicum, Medicinaregatan 3, Göteborg, den 12 april 2024, klockan 9.00

av Josefin Kataoka

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Avhandlingen baseras på följande delarbeten

- I. Kataoka J, Larsson I, Björkman S, Eliasson B, Schmidt J, Stener-Victorin E. **Prevalence of polycystic ovary syndrome in women with severe obesity - effects of a structured weight loss programme.** Clinical Endocrinology (Oxf). 2019 Dec;91(6):750-758
- II. Kataoka J, Larsson I, Lindgren E, Kindstrand LO, Schmidt J, Stener-Victorin E. **Circulating Anti-Müllerian hormone in a cohort study of women with severe obesity with and without polycystic ovary syndrome and the effect of a one-year weight loss intervention.** Reproductive Biology and Endocrinology 2022 Oct 29;20(1):143
- III. Kataoka J, Olsson M, Lindgren E, Larsson I, Benrick A, Schmidt J, Stener-Victorin E. **Symptoms of anxiety and depression and health-related quality of life in women with severe obesity and polycystic ovary syndrome and the effect of a one-year weight loss intervention.** Submitted to journal.
- IV. Kataoka J, Stener-Victorin E, Schmidt J, Larsson I. **A prospective 12-month structured weight loss intervention study in women with severe obesity and polycystic ovary syndrome: focusing on eating behavior, energy intake, physical activity, and impact of weight loss on these behaviors.** Submitted to journal.

**SAHLGRENSKA AKADEMIN
INSTITUTIONEN FÖR NEUROVETENSKAP
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Background: Polycystic ovary syndrome (PCOS) affects one out of eight women and is associated with reproductive, metabolic, and psychiatric features. There is a strong association with obesity but studies on PCOS in women with severe and morbid obesity are lacking.

Aim: To estimate the prevalence of PCOS in women with severe obesity (body mass index [BMI] ≥ 35 kg/m²), and to compare hormonal and metabolic features, anxiety and depression, health-related quality of life (HRQoL), energy intake, physical activity, and eating behavior by PCOS diagnosis and evaluate the effects of a 12-month weight loss intervention.

Methods: Participants with severe obesity were recruited from the obesity unit at Sahlgrenska University Hospital where they had been referred for weight loss treatment. Participants were divided into groups by PCOS-status, diagnosed with the National Institutes of Health-criteria, and assessed with clinical examination and questionnaires at baseline and after a 12-month weight-loss intervention.

Results: PCOS was present in 25.6% (n=63/246). Participants with PCOS had higher androgen levels, lower low-density lipoprotein cholesterol (LDL-C) and lower total cholesterol compared to women without PCOS. Groups did not differ in the prevalence of metabolic syndrome, symptoms of anxiety and depression, HRQoL, energy intake, or physical activity at baseline. Those with PCOS had higher cognitive restraint eating behavior at baseline. Anti-müllerian hormone (AMH) was higher in those with PCOS, but due to low sensitivity and specificity it was not possible to use AMH as a discriminator between women with and without PCOS. Over the course of the 12-month weight loss intervention, 70% (n=174) of participants dropped out leaving 72 women for follow up (PCOS n=16, non-PCOS n=56). Both groups lost weight (PCOS -12.5 ± 9.3 kg p <0.001; non-PCOS -14.0 ± 12.5 kg p <0.001), with no difference between groups. In women without PCOS, weight loss was associated with lower androgens, insulin and blood lipids, less symptoms of anxiety and depression and higher mental HRQoL. Further, those without PCOS reported reduced energy intake, and changed eating behavior. From baseline to follow-up, in comparison between the two groups, women without PCOS reported larger increase in cognitive restraint than those with PCOS and larger reduction in carbohydrates and sugars compared to women with PCOS, whereas women with PCOS reported larger reduction in fat intake.

Conclusion: In this unique cohort of women with severe obesity, PCOS was present in one out of four. AMH could not be used as a single surrogate marker of the syndrome. Before obesity treatment, women with PCOS had more conscious control regarding eating. Importantly, using a structured weight loss intervention, those with PCOS lost weight to the same extent as women without PCOS. Comparing groups regarding change from baseline, there were no major discernible differences except that women without PCOS changed more in eating behavior with more cognitive restraint towards a behavior more favorable for further weight loss.

Keywords: polycystic ovary syndrome, severe obesity, weight loss, AMH, anxiety and depression, eating behavior