

Obstetrics and gynaecology

High maternal BMI linked to increasing risk of congenital abnormalities

The risk of major congenital malformations in infants rises with maternal overweight and degree of obesity, a large study from Sweden has shown.

Sweden has comprehensive national registers that record data on prenatal, birth and fetal outcomes. From 2001 to 2014 prospectively obtained data were collected on around 1.5 million pregnancies.

After exclusions for incomplete data, twin pregnancy, chromosomal abnormality and known genetic

syndromes, 1,243,957 remained for analysis. BMI was recorded at booking.

All women were offered a fetal anomaly ultrasound scan at 18 weeks' gestation. Data on the numbers of pregnancy terminations following this were not presented.

Fetal abnormalities were formally classified as: cardiac, urinary system, genital organs, CNS, digestive system, limb, orofacial clefts, for example.

The overall fetal anomaly rate was 3.5% (n = 43,550). The rate was higher in male than female babies; 4.1% versus 2.8%.

Adjusted risk ratios (RR) were significantly higher (P < 0.001) in: nulliparous women RR 1.07 (95% CI: 1.05-1.09); women >35 years compared with 30-34 years RR 1.06 (95% CI: 1.03-1.09); women without partners RR 1.10 (95% CI: 1.06-1.15); women with fewer years of education; and in smokers.

Significantly higher fetal anomaly rates with higher maternal BMI, after adjustment, were seen for digestive system, genital organ, CNS, cardiac and orofacial cleft defects, see table 1, below.

The highest fetal anomaly rates related to BMI were seen in CNS defects, with infants born to mothers with obesity class III having almost double the risk of those born to normal weight women.

The sex difference for genital organ abnormality was striking; 0.9% of all male versus 0.04% of female babies having an anomaly.

A sub-analysis excluding women

with pre-pregnancy and gestational diabetes made no difference to the significance of the associations.

Maternal country of birth (Nordic versus non-Nordic ethnicity) did not affect the results. The fetal anomaly rates did not vary significantly with BMI for eye, urinary system or limb defects.

Several small studies have shown an association between maternal overweight and obesity and fetal congenital abnormality. This large study from Sweden, where obesity rates have doubled in the past 20 years, has confirmed these findings.

This is an important and worrying study given the rising rates of obesity in general, and obesity during pregnancy in particular.

Observational studies can only suggest association. Nevertheless, the number of women studied was huge, the link to high BMI plausible, and the rise for several specific categories of fetal anomaly with BMI compelling.

The authors speculate on the possible mechanisms linking obesity with fetal anomaly and, not surprisingly, conclude it is multifactorial. They did identify metabolic syndrome as a possible significant factor.

We as GPs can help by advising on effective weight loss strategies prior to pregnancy.

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Persson M, Cnattingius S, Villamor E et al. Risk of major congenital malformations in relation to maternal overweight and obesity severity: cohort study of 1.2 million singletons. *BMJ* 2017;357:j2563

Table 1

Adjusted risk ratios (RR) of major congenital malformations

	Underweight BMI < 18.5		Normal weight* BMI 18.5-24.9		Overweight BMI 25.0- 29.9		Obesity class I BMI 30.0-34.9		Obesity class II BMI 35.0-39.9		Obesity class III BMI ≥ 40	
	RR	(95% CI)	RR		RR	(95% CI)	RR	(95% CI)	RR	(95% CI)	RR	(95% CI)
Overall	1.01	(0.95-1.08)	1.00		1.05	(1.02-1.07)	1.12	(1.08-1.15)	1.23	(1.17-1.30)	1.37	(1.26-1.49)
Digestive	0.98	(0.72-1.33)	1.00		0.97	(0.87-1.09)	1.41	(1.21-1.63)	1.33	(1.03-1.72)	1.54	(1.05-2.28)
Genital	1.03	(0.87-1.22)	1.00		1.04	(0.98-1.11)	1.12	(1.02-1.23)	1.27	(1.09-1.47)	1.43	(1.13-1.80)
CNS	1.28	(0.91-1.79)	1.00		1.15	(1.00-1.31)	1.44	(1.20-1.73)	1.65	(1.23-2.21)	1.88	(1.20-2.94)
Cardiac	0.99	(0.90-1.09)	1.00		1.05	(1.01-1.08)	1.15	(1.09-1.20)	1.26	(1.16-1.37)	1.44	(1.27-1.63)
Orofacial clefts	1.20	(0.90-1.60)	1.00		1.09	(0.98-1.22)	1.11	(0.94-1.31)	1.52	(1.19-1.95)	1.44	(0.96-2.16)

*Reference