Maternal body mass index increasing above 20 is associated with increased risk of miscarriage, stillbirth, neonatal death and postneonatal death

10.1136/ebmed-2014-110034

Ruth Bell
Institute of Health and Society, Newcastle University, Newcastle upon Tyne, UK

Correspondence to: Dr Ruth Bell, Institute of Health & Society, Baddiley Clark Building, Newcastle University, Richardson Road, Newcastle upon Tyne NE2 4AX, UK; ruth.bell@ncl.ac.uk


Context
Forty-two per cent of deliveries in England in 2007 involved obese or overweight women.1 Raised body mass index (BMI) has been associated with various adverse pregnancy outcomes, most notably stillbirth.2 3 Relatively few studies have reported on associations with infant death, particularly beyond the neonatal period, or with sufficient power to consider the full range of BMI categories. This study examines the association between maternal BMI and the full range of fetal and infant mortality outcomes.

Methods
This was a review of cohort studies reporting adjusted relative risk estimates of fetal and infant death for at least three categories of maternal BMI reported before or during early pregnancy. Outcome measures were fetal death (any death before delivery), miscarriage (fetal death before 20–24 weeks gestation), stillbirth (fetal death after 20–28 weeks gestation), neonatal death, perinatal death (stillbirth and early neonatal or neonatal death), postneonatal death and infant death. Heterogeneity and publication bias were addressed, subgroup analyses performed and the effect of confounding factors considered. Dose–response analyses were conducted for each outcome, with tests for non-linearity of the relationship. Risk ratios (RR) for five-point BMI increases were presented. Absolute risks were calculated for maternal BMIs between 17 and 40. The review adhered to PRISMA protocols, with a clear question, search strategy and study quality assessment.

Findings
Thirty-eight studies—including 16 272 stillbirths, 11 294 neonatal deaths and 4983 infant deaths—met inclusion criteria. RR for a five-point increase in maternal BMI was 1.21 for fetal death (95% CI 1.09 to 1.35), 1.16 for miscarriage (95% CI 1.07 to 1.26), 1.24 for stillbirth (95% CI 1.18 to 1.30), 1.15 for neonatal death (95% CI 1.07 to 1.35), 1.14 for postneonatal death (95% CI 1.06 to 1.22) and 1.18 for infant death (95% CI 1.09 to 1.28). There was evidence of non-linearity for all outcomes, in particular fetal death, with a steeper curve at higher BMI levels. There was a non-significant increase in fetal and infant death for BMI <20. There was no evidence of threshold effects. There was no significant association with intrapartum stillbirth, in contrast with antepartum stillbirth. The absolute risk increase for women with BMI of 30 compared with BMI of 20 was 19/10 000 pregnancies for stillbirth and 10/10 000 for infant death.

Commentary
This review adds to the previous literature on maternal BMI and perinatal mortality by modelling the relationship for a wide range of maternal BMIs. The absolute risk estimates should prove valuable for counselling women with BMIs up to 40.

The review summarises observational studies and thus cannot prove a causal relationship between maternal BMI and outcome, or can it demonstrate whether the relationship is reversible or modifiable once pregnancy has started. However, the consistency of the relationship, and the existence of studies reporting reduced risk in women whose BMI decreases between pregnancies, make a compelling argument for causality.4 5 Mediating pathways and biological mechanisms are less clearly understood, and likely to be multifactorial. Potential explanatory factors discussed include congenital anomalies and pregnancy disorders related to dysglycaemia and dyslipidaemia. It is notable that the magnitude of the association is similar across all mortality outcomes, with perhaps a stronger association for late-gestation stillbirths. In particular, the association appears to hold for mortality into the infant period, and this is more challenging to explain in relation to direct biological effects during pregnancy. One potential explanation, not addressed in the paper, is the impact of socioeconomic status and material deprivation, which are strongly associated with infant mortality and obesity. These issues deserve fuller consideration.

The review aimed to identify the optimal BMI for mortality outcomes, but this result is not explicitly reported. The graphs imply lowest mortality at BMI 20–22, but the relationship is somewhat flat between 18 and 23.

Questions remain regarding how best to tackle the problem. Risks remain modest for individuals, but population-level impact is large. Risks can be mitigated by universal access to high-quality antenatal, delivery and postnatal care, with assiduous adherence to protocols to identify and manage obesity-related complications. There is little evidence to support lifestyle intervention during pregnancy outside a research setting, but results from large randomised controlled trials evaluating lifestyle change and metformin are awaited.6 Weight loss interventions should be systematically offered where indicated to women planning pregnancy or during the postnatal period, but sustained weight loss is difficult and the impact for individuals is likely to be modest.7

Competing interests None.

Provenance and peer review Not commissioned; internally peer reviewed.

References


7. NICE guidance PH53: Managing overweight and obesity in adults—lifestyle weight management services.
Maternal body mass index increasing above 20 is associated with increased risk of miscarriage, stillbirth, neonatal death and postneonatal death

Ruth Bell

Evid Based Med 2014 19: 237-238 originally published online July 22, 2014
doi: 10.1136/ebmed-2014-110034

Updated information and services can be found at:
http://ebm.bmj.com/content/19/6/237

These include:

References

This article cites 7 articles, 0 of which you can access for free at:
http://ebm.bmj.com/content/19/6/237#BIBL

Email alerting service

Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Topic Collections

Articles on similar topics can be found in the following collections

- EBM Aetiology (123)
- Pregnancy (333)
- Epidemiologic studies (1092)
- Health education (374)
- Obesity (nutrition) (143)

Notes

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/