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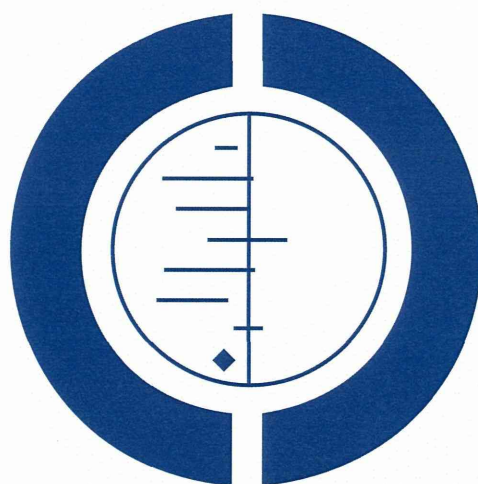
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Antenatal dietary advice and supplementation to increase energy and protein intake (Review)

Ota E, Tobe-Gai R, Mori R, Farrar D



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[Intervention Review]

Antenatal dietary advice and supplementation to increase energy and protein intake

Erika Ota¹, Ruoyan Tobe-Gai², Rintaro Mori³, Diane Farrar⁴

¹Department of Global Health Policy, Graduate School of Medicine, The University of Tokyo, Tokyo, Japan. ²School of Public Health, Shandong University, Jinan, China. ³Department of Health Policy, National Center for Child Health and Development, Tokyo, Japan. ⁴Maternal and Child Health, Bradford Institute for Health Research, Bradford, UK

Contact address: Erika Ota, Department of Global Health Policy, Graduate School of Medicine, The University of Tokyo, 7-3-1 Hongo Bunkyo-ku, Tokyo, 113-0011, Japan. e-i@umin.ac.jp.

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ABSTRACT

Background

Gestational weight gain is positively associated with fetal growth, and observational studies of food supplementation in pregnancy have reported increases in gestational weight gain and fetal growth.

Objectives

To assess the effects of advice during pregnancy to increase energy and protein intake, or of actual energy and protein supplementation, on energy and protein intakes, and the effect on maternal and infant health outcomes.

Search methods

We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (22 July 2011) and contacted researchers in the field. We updated the search on 12 July 2012 and added the results to the awaiting classification section of the review.

Selection criteria

Randomised controlled trials of dietary advice to increase energy and protein intake, or of actual energy and protein supplementation, during pregnancy.

Data collection and analysis

Two review authors independently assessed trials for inclusion and assessed risk of bias. Two review authors independently extracted data and checked for accuracy. Extracted data were supplemented by additional information from the trialists we contacted.

Main results

We examined 110 reports corresponding to 46 trials. Of these trials, 15 were included, 30 were excluded, and one is ongoing. Overall, 15 trials involving 7410 women were included.

Nutritional advice (four trials, 790 women)

Women given nutritional advice had a lower relative risk of having a preterm birth (two trials, 449 women) (risk ratio (RR) 0.46, 95% CI 0.21 to 0.98), head circumference at birth was increased in one trial (389 women) (mean difference (MD) 0.99 cm, 95% CI 0.43 to

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1.55) and protein intake increased (three trials, 632 women) (protein intake: MD +6.99 g/day, 95% CI 3.02 to 10.97). No significant differences were observed on any other outcomes.

Balanced energy and protein supplementation (11 trials, 5385 women)

Risk of stillbirth was significantly reduced for women given balanced energy and protein supplementation (RR 0.62, 95% CI 0.40 to 0.98, five trials, 3408 women), mean birthweight was significantly increased (random-effects MD +40.96 g, 95% CI 4.66 to 77.26, $\text{Tau}^2 = 1744$, $I^2 = 44\%$, 11 trials, 5385 women). There was also a significant reduction in the risk of small-for-gestational age (RR 0.79, 95% CI 0.69 to 0.90, $I^2 = 16\%$, seven trials, 4408 women). No significant effect was detected for preterm birth or neonatal death.

High-protein supplementation (one trial, 1051 women)

High-protein supplementation (one trial, 505 women), was associated with a significantly increased risk of small-for-gestational age babies (RR 1.58, 95% CI 1.03 to 2.41).

Isocaloric protein supplementation (two trials, 184 women)

Isocaloric protein supplementation (two trials, 184 women) had no significant effect on birthweight and weekly gestational weight gain.

Authors' conclusions

This review provides encouraging evidence that antenatal nutritional advice with the aim of increasing energy and protein intake in the general obstetric population appears to be effective in reducing the risk of preterm birth, increasing head circumference at birth and increasing protein intake, there was no evidence of benefit or adverse effect for any other outcome reported.

Balanced energy and protein supplementation seems to improve fetal growth, and may reduce the risk of stillbirth and infants born small-for-gestational age. High-protein supplementation does not seem to be beneficial and may be harmful to the fetus. Balanced-protein supplementation alone had no significant effects on perinatal outcomes.

The results of this review should be interpreted with caution, the risk of bias was either unclear or high for at least one category examined in several of the included trials and the quality of the evidence was low for several important outcomes. Also the anthropometric characteristics of the general obstetric population is changing, therefore, those developing interventions aimed at altering energy and protein intake should ensure that only those women likely to benefit are included. Large, well designed randomised trials are needed to assess the effects of increasing energy and protein intake during pregnancy in women whose intake is below recommended levels.

PLAIN LANGUAGE SUMMARY

Energy and protein intake in pregnancy

During pregnancy, a baby developing inside the womb receives all its nutrition from its mother. Therefore, advising women on their diet and providing food supplements in pregnancy may help babies to grow and thrive. This review of randomised controlled trials examined several aspects of dietary advice and supplementation and produced the following four findings.

- (1) Providing nutritional advice resulted in an increase in the mother's protein intake, fewer preterm births in two trials involving 449 women and increases in birth head circumference in one trial involving 389 women.
- (2) Giving the mothers balanced energy and/protein supplements was associated with clear increases in mean birthweight (11 trials, 5385 women) with fewer stillbirths (five trials, 3408 women) and fewer small-for-gestational age births (seven trials, 4408 women), but the impact on the long-term health of the baby was uncertain, including among undernourished women.
- (3) High-protein supplementation: one trial involving 1051 women showed no benefit for women and potential harm for the baby.
- (4) Isocaloric protein supplementations (i.e. balanced supplements in which the protein replaces an equal quantity of other nutrients, e.g. macronutrients, fat and carbohydrate): in two trials involving 184 women this intervention showed no benefit for women or their babies.

Providing nutritional advice or balanced energy and protein supplements to women during pregnancy may be beneficial; high-protein supplements and Isocaloric protein supplements given in to women in pregnancy may be unhelpful or harmful.

SUMMARY OF FINDINGS FOR THE MAIN COMPARISON *[Explanation]*

Nutritional advice compared to no counselling or advice during pregnancy for perinatal outcomes

Patient or population: Pregnant women

Settings:

Intervention: Nutritional advice during pregnancy

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Control	Nutritional advice during pregnancy				
Stillbirth	Study population		RR 0.37 (0.07 to 1.9)	431 (1 study)	⊕⊕○○ low ^{1,2}	
	24 per 1000	9 per 1000 (2 to 46)				
	Moderate					
	24 per 1000	9 per 1000 (2 to 46)				
Neonatal death	Study population		RR 1.28 (0.35 to 4.72)	448 (1 study)	⊕⊕○○ low ^{1,2}	
	18 per 1000	23 per 1000 (6 to 83)				
	Moderate					
	18 per 1000	23 per 1000 (6 to 85)				

Birthweight (g)		The mean birthweight (g) in the intervention groups was 205.75 higher (242.54 lower to 654.03 higher)		426 (2 studies)	⊕○○○ very low ^{1,2,3}
Birth head circumference (cm)		The mean birth head circumference (cm) in the intervention groups was 0.99 higher (0.43 to 1.55 higher)		389 (1 study)	⊕⊕⊕○ moderate ²
Small-for-gestational age	Study population		RR 0.97 (0.45 to 2.11)	404 (1 study)	⊕⊕○○ low ^{1,2}
	60 per 1000	58 per 1000 (27 to 127)			
	Moderate				
	60 per 1000	58 per 1000 (27 to 127)			
Preterm birth	Study population		RR 0.46 (0.21 to 0.98)	449 (2 studies)	⊕⊕○○ low ^{2,3}
	85 per 1000	39 per 1000 (18 to 84)			
	Moderate				
	92 per 1000	42 per 1000 (19 to 90)			
Protein intake (g/day)		The mean protein intake (g/day) in the intervention groups was 6.99 higher		632 (3 studies)	⊕⊕○○ low ^{2,4}

(3.02 to 10.97 higher)

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **RR:** Risk ratio;

GRADE Working Group grades of evidence

High quality: Further research is very unlikely to change our confidence in the estimate of effect.

Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low quality: We are very uncertain about the estimate.

¹ Wide 95% CI.

² Sample size is smaller than optimal information size.

³ Allocation concealment, blinding, incomplete outcome reporting is high risk of bias in one study.

⁴ Random sequence, allocation concealment is unclear in some studies.