

Energy and protein intake in pregnancy: Evidence and implications for public health

Review on which this evidence summary is based:

Kramer, M.S., & Kakuma, R. (2003). **Energy and protein intake in pregnancy**. *Cochrane Database of Systematic Reviews*, 2003 (Issue 4), Art. No.: CD000032. DOI: 10.1002/14651858.CD000032.

Note: The Cochrane review that this evidence summary is based on has been updated. This evidence summary summarizes the above-cited version of this review, not the updated version. An updated evidence summary will be provided as soon as possible.

Review Focus

P	Pregnant women
I	Nutritional advice to increase energy and protein intake; balanced energy/protein supplementation; high-protein supplementation; isocaloric protein supplementation; and energy/protein restriction in overweight or high weight gain
C	Usual Care
O	Primary Outcomes: Dietary intake, gestational weight gain, pregnancy outcome for the fetus/infant (stillbirth, neonatal death, fetal growth, gestational duration) and mother (complications or pregnancy, labor and delivery, postpartum weight retention).

Review Quality Rating: 9 (strong) *Details on the methodological quality are available [here](#).*

Considerations for Public Health Practice

Conclusions from Health Evidence	General Implications
<p>This well done review is based on low quality studies</p> <p>Balanced energy/protein supplementation</p> <ul style="list-style-type: none"> • improves fetal growth • may reduce the risk of fetal and neonatal death • equally likely to have a very minimal or quite large impact on preterm birth • has no impact on gestational diabetes, preeclampsia, and growth and development • may result in possible harms (e.g. reduced fetal growth) <p><i>*Note: The results presented are our own interpretation for increasing energy intake.</i></p>	<p>Public health programs should include:</p> <ul style="list-style-type: none"> • nutritional advice to women (but not as a sole strategy) • encourage balanced energy/protein supplements <p>Public health programs should not encourage:</p> <ul style="list-style-type: none"> • isocaloric protein supplements for pregnant women • high protein supplements for pregnant women • energy/protein restriction for overweight pregnant women <p>The findings should be used cautiously given the low quality of the evidence.</p>

Evidence and Implications

Evidence points are not in order of the strength of evidence

What's the evidence?	Implications for practice and policy
<p>1. Nutritional advice to increase energy and protein intake in comparison to controls (5 trials, 1135 women)</p> <ul style="list-style-type: none"> • Effective in reducing the risk of preterm birth (by 54% with the true risk reduced from 2-79%). • Increased head circumference at birth (by 1 cm with the true risk reduced from <0.5 cm to 1.5 cm). • <u>No impact</u> on all other outcomes. 	<p>1. Nutritional advice to increase energy and protein intake</p> <ul style="list-style-type: none"> • Public health organizations should not include nutritional advice as a sole intervention. • Public health messaging should emphasize that increased energy and protein intake is associated with a decreased risk of preterm birth and increased head circumference at birth, but not other important

	infant outcomes.
<p>2. Balanced energy/protein supplementation in comparison to controls (13 trials, 4665 women)</p> <ul style="list-style-type: none"> • Effective in reducing the risk of small for gestational age (by 32% with the true risk reduced from 16-44%); and stillbirth (by 45% with the true risk reduced from 0.03-69%). • Increased maternal weight gain (by 20.74 g/wk with the true risk reduced from 1.46-40.02 g/wk). • <u>No impact</u> on all other outcomes. 	<p>2. Balanced energy/protein supplementation</p> <ul style="list-style-type: none"> • Public health organizations should not promote balanced energy/protein supplementation as a sole intervention. While it can reduce the risk for small for gestational age and stillbirth, the estimates reported likely overestimate the true effect, given the low methodological quality of the evidence. Furthermore, there was no impact on most important fetal, infant and maternal outcomes.
<p>3. High protein supplementation (2 trials, 1076 women)</p> <ul style="list-style-type: none"> • Increased risk of small for gestational age (by 58% with the true risk reduced from 3-141%). • <u>No impact</u> on all other outcomes. 	<p>3. High protein supplementation</p> <ul style="list-style-type: none"> • Public health programs should not promote or provide high protein supplementation as it has no impact on most maternal, fetal, and infant health outcomes and may, in fact, have adverse outcomes
<p>4. Isocaloric protein supplementation (3 trials, 966 women)</p> <ul style="list-style-type: none"> • Increased risk of small for gestational age (by 35 with the true risk reduced from 12- 61%) • <u>No impact</u> on all other outcomes. 	<p>4. Isocaloric protein supplementation</p> <ul style="list-style-type: none"> • Public health programs should not include the promotion or provision of isocaloric protein supplementation as it is potentially harmful (and not associated with other benefits).
<p>5. Energy/protein restriction in women with overweight or high weight gain (4 trials, 457 women)</p> <ul style="list-style-type: none"> • Resulted in less weekly weight gain (by 230.31 g/week, with the true risk reduced from 112.89 to 347.73 g/week) • Resulted in small head circumference at birth (by 1cm with a range from 0.14 cm to 1.86 cm smaller. • <u>No impact</u> on all other outcomes. 	<p>5. Energy/protein restriction</p> <ul style="list-style-type: none"> • Public health programs should not include energy/protein restriction as a means of improving maternal, fetal, or infant health outcomes, since energy/protein restriction is not likely to be beneficial for maternal or infant health and may lead to smaller head circumference among infants.
<p>Legend: P – Population; I – Intervention; C – Comparison group; O – Outcomes; CI – Confidence Interval; OR – Odds Ratio; RR – Relative Risk ** For definitions see the healthevidence.org glossary http://www.healthevidence.org/glossary.aspx</p>	

Why this issue is of interest to public health in Canada

Nutrition and overall health are important before and during pregnancy since it influences the health of the developing baby. Health Canada's Prenatal Nutrition Guidelines for Health Professionals states that pregnant women need more iron and folate.¹ However, most Canadian women have difficulty getting enough iron and folate from food intake.² Health Canada also suggests pregnant women eat an extra two to three Food Guide Servings of Meat and/or Alternative a day in order to meet their energy needs.^{1,3} Consequently, the Canada's Food Guide recommends that pregnant women consume a combination of food and supplements to ensure they receive the nutrients and energy needed during pregnancy.¹ Considering that pregnant women's energy needs increase during pregnancy², normal body weight women need about 350 extra calories in their second trimester, and 450 extra calories in their third trimester in order to support the baby's growth and development.¹ As a result, public health and clinical care sectors are providing more attention to pregnancy readiness for women of reproductive age.⁴

1. Health Canada. (2009). *Prenatal nutrition guidelines for health professionals: Background on Canada's food guide*. Ottawa, ON: Health Canada. Retrieved from http://www.hc-sc.gc.ca/fn-an/alt_formats/hpfb-dqpsa/pdf/pubs/guide-prenatal-eng.pdf
2. Health Canada. (2008). *Canadian Community Health Survey, Cycle 2.2, Nutrition (2004)—Nutrient Intakes*. Food, Volume 2. Cat.: H164-45/2-2008E-PDF. Ottawa, ON: Health Canada
3. Health Canada. (2007). *Eating well with Canada's Food Guide*. (HC Pub.: 4651 Cat.: H164-38/1-2007E). Ottawa, ON: Health Canada. Retrieved from http://www.hc-sc.gc.ca/fn-an/alt_formats/hpfb-dqpsa/pdf/food-guide-aliment/view_eatwell_vue_bienmang-eng.pdf
4. U.S. Department of Health and Human Services. (n.d.) *Healthy people 2010: Maternal, infant, and child health*. Washington, DC: U.S. Department of Health and Human Services. Retrieved from <http://www.healthypeople.gov/Document/pdf/Volume2/16MICH.pdf>

Other quality reviews on this topic are available on www.healthevidence.org

Suggested citation

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This evidence summary was written to condense the work of the authors of the review referenced on page one. The intent of this summary is to provide an overview of the findings and implications of the full review. For more information on individual studies included in the review, please see the review itself.

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