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Evidence Assessment: Summary of a Systematic Review

Who is this summary for?

For health personnel, health facility administrators Community Health Workers and the stakeholders involved in mother and child health.

Calcium supplementation during pregnancy for preventing hypertensive disorders and related problems

Key findings

- Women receiving calcium supplements are less likely to die or have serious problems related to pre-eclampsia.
- No adverse effects were found but further research is needed into the ideal dosage for supplementation.
- Babies were less likely to be born preterm from mothers who receive calcium supplements.

Background

Pre-eclampsia is the presence of high blood pressure and protein in the urine of a pregnant woman. It is a major cause of death in pregnant women and newborn babies worldwide. It also causes preterm birth (birth before 37 weeks) which is a leading cause of newborn deaths, especially in low-income countries. If pre-eclampsia is not treated, it develops into eclampsia which is characterized by extremely high blood pressure and seizures.

Question

What are the effects of calcium supplementation during pregnancy on the risk of high blood pressure and related maternal and fetal or neonatal adverse out-comes ?

Calcium supplementation during pregnancy for preventing hypertensive disorders and related problems in Cameroon: In Cameroon, approximately 10% of pregnant women are hypertensive with mortality from eclampsia relatively high. Calcium is not systematically used to prevent hypertension in pregnant women in Cameroon.

Table 1: Summary of the systematic review

	What the review authors searched for	What the review authors found
Studies	All published, unpublished and ongoing trials with random allocation to calcium supplementation during pregnancy versus placebo.	Twenty four trials met the inclusion criteria.
Participants	Pregnant women, regardless of the risk of hypertensive disorders of pregnancy. We excluded women with diagnosed hypertensive disorders of pregnancy.	Pregnant women, regardless of the risk of hypertensive disorders of pregnancy.
Interventions	Supplementation with calcium from at the latest 34 weeks of pregnancy compared with placebo treatment. We excluded studies with no placebo. We limited the initial analysis to intended supplementation with at least 1 g of calcium per day. Future updates of this review would include an analysis of effect by dosage, including lower dosage regimens. For the 2012 update of the review, we included trials of calcium less than 1 g daily plus additional supplements (e.g. vitamin D, linoleic acid, or anti-platelet agents).	For most studies the intervention was 1.5 g to 2 g per day of calcium. Four studies investigated calcium supplementation alone, three investigated calcium plus vitamin D, two studies from the same group investigated calcium plus linoleic acid and one investigated calcium plus antioxidants.
Controls	Placebo	Placebo
Outcomes	**Primary outcomes** **For the woman** **1.** High blood pressure as defined by trial authors, with or without proteinuria. Ideally, high blood pressure would be defined as diastolic blood pressure equal to or greater than 90 mmHg, or an increase in systolic blood pressure of 30 mmHg or more, or in diastolic blood pressure of 15 mmHg or more. 2. High blood pressure with significant proteinuria, as defined by trial authors. Ideally, proteinuria would be defined as 2+ by dipstick testing, equal to or greater than 300 mg per 24 hours, or equal to or greater than 500 mg per litre. Although the strict definition of pre-eclampsia includes confirmation of no hypertension or proteinuria outside pregnancy, for convenience the above definition will be referred to in this review as pre-eclampsia. **For the child** 1. Preterm birth (birth before 37 weeks of estimated gestation). 2. Admission to a neonatal intensive care unit. 3. Stillbirth or death before discharge from hospital. **Secondary outcomes** **For the woman** 1. Maternal death or serious morbidity. Serious morbidity includes eclampsia; renal failure; syndrome of haemolysis, elevated liver enzymes and low platelets (HELLP syndrome); and admission to intensive care. This will be a composite outcome of death or at least one measure of serious morbidity. In addition each individual outcome will be presented. 2. Placental abruption. 3. Caesarean section. 4. Proteinuria. 5. Severe pre-eclampsia as defined by trial authors. 6. Eclampsia. 7. HELLP syndrome. 8. Intensive care unit admission. 9. Maternal death 10. Mother's hospital stay seven days or more. 11. Miscarriage. For the child 1. Low birth weight (the first weight obtained after birth less than 2500 g). 2. Neonate small-for-gestational age as defined by trial authors. 3. Neonate in intensive care unit seven days or more. 4. Death or severe neonatal morbidity. 5. Childhood disability. 6. Systolic blood pressure greater than 95th percentile during childhood. 7. Diastolic blood pressure greater than 95th percentile during childhood. 8. Dental caries in childhood (one or more decayed, missing or filled teeth, or as defined by trial authors). Only those outcomes with data appear in the analysis table.	The outcomes reported were: • High blood pressure with or without proteinuria • Pre-eclampsia • Preterm birth • Admission to neonatal intensive care unit • Stillbirth or death before discharge from hospital • Maternal death or serious morbidity • Placental abruption • Caesarean section • Proteinuria • Severe pre-eclampsia as defined by trial authors • Eclampsia • HELLP syndrome • Maternal intensive care unit admission • Maternal death • Mother's hospital stay seven days or more • Birth weight less than 2500 g • Neonate small-for-gestational age • Neonate in intensive care unit seven days or more • Death or severe neonatal morbidity • Childhood disability • Childhood systolic blood pressure > 95th percentile • Childhood diastolic blood pressure > 95th percentile • Childhood dental caries • High blood pressure with or without proteinuria
Date of the most recent search: 24 May 2013		

Limitations: This is a high quality systematic review, **AMSTAR =10/11**
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Table 2: Summary of findings

Calcium supplementation compared with placebo for preventing hypertensive disorders and related problems in pregnancy			
People: pregnant women **Settings:** outpatient **Intervention:** high-dose calcium (≥ 1 g/day) **Comparison:** placebo			
Outcomes	**Estimated effects (95% CI)**	**No of Participants (studies)**	**Quality of the evidence (GRADE)**
Pre-eclampsia			
Overall	0.45 [0.31-0.65]	15730 (13)	High
Low calcium diet	0.36 [0.20-0.65]	10678 (8)	High
High-risk women	0.22 [0.12-0.42]	587 (5)	High
Preterm birth			
global	0.76 [0.60-0.97]	15275 (11)	High
haemolysis, elevated liver enzymes and low platelets Syndrome	2.67 [1.05-6.82]	12,904 (2)	High

Applicability

Studies included were conducted in high, middle and low income countries such as India, USA, Argentina, Australia, Columbia, Bangladesh, Gambia, Ecuador, Egypt, South Africa, Vietnam, at that point, the results may be applicable to other low income countries such as Cameroon.

Conclusions

They is a good quality evidence that calcium supplementation with high doses during pregnancy is a safe and relatively cheap way of reducing the risk of pre-eclampsia, especially in women from communities with low dietary calcium and those at increased risk of pre-eclampsia.

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