

# Calcium supplementation, pregnancy

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## Description of condition and intervention

Low calcium intake during pregnancy predisposes to development of hypertensive disorders by altering the blood pressure equilibrium. This risk of pre-eclampsia and eclampsia has been implicated amongst the leading causes of maternal deaths and preterm births in low-income countries. Source: (*WHO 2016 and 2018*). This evidence brief assesses effects and costs for one intervention being analyzed in FairChoices: DCP analytical tool (For an overview of other interventions, see appendix below and the separate evidence briefs for these):

NUTR01-02

Calcium supplementation, pregnancy

## International guidelines

Organization	Indications/recommendations	Applicability in LIC & Lower MIC settings
<a href="#">World Health Organization</a>	1.5 g–2.0 g oral elemental calcium daily is recommended for pregnant women to reduce the risk of pre-eclampsia. Starting from 20 weeks gestation then through the rest of pregnancy	Populations with low dietary intake of calcium

Source: WHO 2018, WHO 2019

## Intervention attributes

### Type of intervention

Preventive

### Delivery platform

Health center

## Equity

In addition to considerations like cost-effectiveness and health systems factors, dimensions of equity can be relevant for priority setting. The opportunity for a long and healthy life varies according to the severity of a health condition that individuals might have, so there are inequities in individuals' opportunities for long and healthy lives based on the health conditions they face. Metrics used to estimate the severity of illness at an individual level can be used to help prioritize those with less opportunity for lifetime health. FairChoices: DCP Analytics Tool uses Health adjusted age of death (HAAD), which is a metric that estimates the number of years lived from birth to death, discounting years lived with disability. A high HAAD thus represents a disease less severe in terms of lifetime health loss, while a low HAAD represents a disease that is severe on average, causing early death or a long period of severe disability. It is also possible to estimate the distribution of HAAD across individuals with a health condition. FairChoices shows for each intervention an average HAAD value of the conditions that are affected by respective interventions that have health effects. Additionally, a plot shows HAAD values for around 290 conditions (Johansson KA et al 2020).

## Time dependence

Moderate level of urgency. Treatment outcomes not highly affected by some days of delay.

## Population in need of interventions

Treated population: All pregnant women in the age group of 10 to 54 years are eligible to receive the intervention. The treated fraction is 1 for this intervention.

Affected population: All pregnant women in the age group of 10 to 54 years are eligible to receive the intervention. The affected fraction is 1 for this intervention.

## Disease state addressed

This intervention delays or prevent development of maternal hypertensive disorders which is caused by calcium deficiency or low calcium intake and its subsequent effects in the treated population on pre-eclampsia and eclampsia.

## Intervention effectiveness and safety

Table 3: Effectiveness and safety of high dose calcium supplementation ( $\geq 1$ g/day) in pregnant women with low calcium intake (based on Hofmeyer et al 2018)

Outcome addressed by intervention & its effect	Certainty of evidence
<p>Prevalence</p> <p>Hofmeyer et al 2018 reported reduction of the relative risk of pre-eclampsia 0.36 (95% CI: 0.20 to 0.65) by giving high dose calcium supplementation compared to placebo in population with low calcium intake.</p>	<p>⊕⊖⊖⊖</p> <p>Low quality</p>

## Model assumptions

Table 4: Summary of model parameters and values used in FairChoices – DCP Analytical Tool

Category	Model parameter	Notes
<b>Intervention</b>	<b>Calcium supplementation, pregnancy</b>	
<b>Cost calculation</b>		
Treated population	Pregnant women	
Treated gender	Female	
Treated fraction age	10 to 54 years	
Treated fraction	1	
<b>Effect calculation</b>		
Affected Population	Pregnant women	
Affected gender	Female	
Affected fraction age	10 to 54 years	
Affected fraction	1	
Comparison	Placebo	
Prevalence Reduction (RRR)	0.64	

## Intervention Cost

The total unit cost is estimated to be USD 8.76 (Year: 2020) per woman per pregnancy for calcium supplementation (high dose) according to *Henriksen et al. (Work in progress)*

## Reference:

Organization WH. WHO recommendations on antenatal care for a positive pregnancy experience 28 November 2016

WHO 2018: World Health Organization. WHO recommendation: calcium supplementation during pregnancy for prevention of pre-eclampsia and its complications. World Health Organization; 2018.

Hofmeyer et al 2018: Hofmeyer GJ, Lawrie TA, Atallah AN, Torloni MR. Calcium supplementation during pregnancy for preventing hypertensive disorders and related problems. Cochrane Database Syst Rev. 2018;10:CD001059.

Henriksen ES, Økeland J, Malawim O, Said S, Kaur G, Rava` MS, et al. Economic evaluation of nutritional interventions in Zanzibar: An analysis using FairChoices – DCP analytic tool.(Work in progress)

## Appendix

### Literature Review for effectiveness & safety

This literature search is an example of level 4 evidence for intervention inputs taken from DCP3.

Level of evidence of efficacy studies:

1. Low (expert opinions, case series, reports, low-quality case control studies)
2. Moderate (high quality case control studies, low quality cohort studies)
3. High (high quality cohort studies, individual RCTs)
4. Very high (Multiple RCTs, metaanalysis, systematic reviews, clinical practice guidelines)

An overview of all NUTR interventions in FairChoices-DCP analytical tool (Interventions assessed in this evidence brief are marked in bold)

NUTR01-01	Daily Iron Folic acid supplementation (pregnant women)
<b>NUTR01-02</b>	<b>Calcium supplementation, pregnancy</b>
NUTR01-03 households	Food and caloric supplementation to pregnant women in insecure
NUTR01-04	Promotion of breastfeeding and/ or complementary feeding
NUTR01-05	Intermittent Iron-folic acid supplementation (Menstruating women)
NUTR01-06	Food to non-pregnant women in insecure households
NUTR01-02-01-01	Daily iron supplementation for children 6 to 23 months
NUTR01-02-01-02	Daily iron supplementation in children health center
NUTR01-02-02	Intermittent iron supplementation in children (24 -59 months)
NUTR01-02-03	Vitamin A supplementation to children 6 to 59 months
NUTR01-02-04	Zink to children 6 to 59 months
NUTR01-02-05	Food to children in insecure households
NUTR01-03-01	Management of severe acute malnutrition without medical complications
NUTR01-03-02	Management of severe acute malnutrition associated with medical complications