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Evidence summary

A summary of a Cochrane review: Vitamin D supplementation during pregnancy

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1. Introduction

Review authors in The Cochrane Collaboration conducted a review of the effects of vitamin D supplementation during pregnancy. This review was originally published in 2012, and this is the second update, following an earlier update in 2016. After searching for all relevant studies, the authors identified 22 studies comparing supplementation with vitamin D to placebo or no supplementation. The review also found studies that included vitamin D with calcium or with other vitamins and minerals. This summary presents the findings of the 22 studies comparing supplementation with vitamin D to placebo or no supplementation.

1.1. Vitamin D and pregnancy

Vitamin D is an essential vitamin to maintain health and activity. The main source of vitamin D for most people is sunlight, but it is also found in some foods, or taken as a supplement. Supplements include either vitamin D_2 or D_3.

Vitamin D deficiency or low vitamin D blood levels may be a widespread health problem, and deficiencies in pregnant women are associated with a greater risk of several conditions, such as high blood pressure, pre-eclampsia, and gestational diabetes. These conditions can cause short- and long-term problems for both the mother and the infant. As the mother is the only source of vitamin D during fetal development, researchers have thought that providing vitamin D supplementation to women during pregnancy could protect pregnant women and their babies from these problems. There is debate about what levels of vitamin D in the blood are sufficient or optimal, either for pregnant women or for other groups, and there is concern that vitamin D supplements could lead to kidney problems (nephritic syndrome) or excess calcium in the blood (hypercalcaemia).

2. What does the research say?

Twenty-two studies with a total of 3725 women compared the effects of vitamin D supplementation with placebo or no supplementation. The studies were carried out between the 1980s and 2015 in Bangladesh, India, Iran, New Zealand, and the UK. Studies were carried out during various seasons and in places with long or short sunlight hours. Seven studies began supplementation before week 20 of the pregnancy; the remainder began supplementation at 20 weeks or later. Daily doses ranged from 200 IU to 5000 IU; regimens included daily, weekly, monthly, or single doses. The form of vitamin D (D_2 or D_3) given also varied and was not reported in many of the studies.

The results from these studies are summarised in Table 1. In summary, giving pregnant women vitamin D supplements may reduce the risk of pre-eclampsia and postpartum bleeding (haemorrhage) and may slightly reduce the risk of gestational diabetes. Vitamin D supplementation may reduce the number of babies born at a low birth weight but may make little or no difference to the number of babies born before 37 weeks' gestation. The studies found that it is uncertain whether vitamin D supplements lead to high blood levels of calcium (hypercalcaemia) or to kidney problems (nephritic syndrome) in the mother.

Assessments of the certainty of the evidence ranged from low to very low, due to some limitations in how studies were designed and conducted and to small numbers of events or women in the studies.

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Table 1
Effects of vitamin D supplements on birth outcomes in pregnant women.

What was measured	Effect when not taking vitamin D	Effect when taking vitamin D	Certainty of the evidence	What happens when taking vitamin D
Number of preterm births that occurred (< 37 wks) (7 studies, 1640 women)	87 out of 1000 babies	On average 30 fewer babies per 1000 (from 58 fewer to 26 more)	⊕⊕⊖⊖ **low**[a]	Vitamin D may make little or no difference to the chances of preterm birth.
Number of babies at low birth weight (< 2500 g) (5 studies, 697 women)	136 out of 1000 babies	On average 61 fewer babies per 1000 (from 88 fewer to 18 fewer)	⊕⊕⊖⊖ **low**[a]	Vitamin D may reduce the chance of low birthweight.
Number of women experiencing pre-eclampsia (4 studies, 499 women)	168 out of 1000 women	On average 89 fewer women per 1000 (from 118 fewer to 37 fewer)	⊕⊕⊖⊖ **low**[a]	Vitamin D may reduce the chance of pre-eclampsia.
Number of women developing gestational diabetes (4 studies, 446 women)	127 out of 1000 women	On average 62 fewer women per 1000 (from 93 fewer to 4 fewer)	⊕⊕⊖⊖ **low**[a]	Vitamin D may slightly reduce the chance of gestational diabetes.
Number of women with severe bleeding after birth (1 study, 1134 women)	158 out of 1000 women	On average 52 fewer women per 1000 (from 79 fewer to 16 fewer)	⊕⊕⊖⊖ **low**[a]	Vitamin D may reduce the chance of severe bleeding after birth.
Harms to the mother: number of women with kidney problems (nephritic syndrome) (1 study, 135 women)	1 woman taking vitamin D supplements had kidney problems.		⊕⊖⊖⊖ **very low**[b]	It is uncertain whether vitamin D makes any difference to the chance of kidney problems (nephritic syndrome).
Harms to the mother: number of women with high blood calcium levels (hypercalcaemia) (1 study, 1134 women)	None of the women at the end of the study had high blood calcium levels.		⊕⊖⊖⊖ **very low**[b]	It is uncertain whether Vitamin D makes any difference to the chances of high blood calcium levels (hypercalcaemia).

Details about the certainty of the evidence: [a]Evidence is low certainty because there are some problems with how the trials were conducted and there were not a lot of events in the trials. [b]Evidence is very low certainty because there are problems with how the trial was conducted and there were not enough women in the study.

When there is little or no information about the outcomes available from the studies, this makes it very difficult to be certain about the evidence.

The authors of the review suggested that larger and better designed studies should be performed. They suggest that studies should test the effects of providing supplements early in pregnancy, and the effects in pregnant women who have different blood levels of vitamin D, different skin pigmentations and different weights. Information on dosage levels, regimens, and timings; potential interactions between vitamin D and other supplements; and consistent reporting of maternal adverse events would also be beneficial to developing better evidence-informed policy.

3. Where does this information come from?

This summary is based on a Cochrane systematic review: Palacios C, Kostiuk LK, Peña-Rosas JP. Vitamin D supplementation for women during pregnancy. Cochrane Database of Systematic Reviews 2019, Issue 7. Art. No.: CD008873. DOI: 10.1002/14651858.CD008873.pub4.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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