Oral vitamin D₃ supplementation reduced fractures in community dwelling elderly people


QUESTION: Does oral vitamin D₃ (cholecalciferol) supplementation reduce the incidence of fractures in community dwelling elderly people 65–85 years of age?

Design
Randomised (unclear allocation concealment), blinded (participants and clinicians), placebo controlled trial with 5 years of follow up.

Setting
Community based study with participants recruited from the British Doctors Study register and a general practice register in Suffolk, UK.

Participants
2686 elderly people 65–85 years of age (mean age 75 y, 76% men) who were living in the general community. Exclusion criteria included current use of vitamin D₃ supplements and contraindications to vitamin D₃ supplementation such as a history of renal stones, sarcoidosis, or malignancy.

Intervention
Participants, stratified by age and sex, were allocated to supplementation with oral vitamin D₃, 100 000 IU (n=1345) or placebo (n=1341), 1 capsule was sent to participants by post every 4 months for 5 years (total of 15 doses). Participants were asked to take the capsule immediately on receipt, complete a form indicating that they had done so, and return the form by Freepost.

Main outcome measures
Incidence of fractures (self completed questionnaires every 4 months) and all cause mortality.

Main results
Analysis was by intention to treat. At 5 years, 268 participants (10%) had incident fractures, and 471 (18%) had died. The rates for first fracture at any site or for a fracture occurring in the hip, wrist, forearm, or vertebrae were lower in the vitamin D₃ group than in the placebo group (table). The groups did not differ for all cause mortality (table).

Conclusion
Oral vitamin D₃ supplementation reduced the incidence of fractures in community dwelling elderly people 65–85 years of age.

Oral vitamin D₃ supplementation vs placebo in community dwelling elderly people at 5 years*$

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Vitamin D₃</th>
<th>Placebo</th>
<th>RRR (95% CI)†</th>
<th>NNT (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fractures (any site)</td>
<td>8.8%</td>
<td>11.1%</td>
<td>22% (1 to 39)</td>
<td>44 (25 to 964)</td>
</tr>
<tr>
<td>Fractures (hip, wrist, forearm, or vertebrae)</td>
<td>4.5%</td>
<td>6.5%</td>
<td>33% (7 to 52)</td>
<td>29 (18 to 135)</td>
</tr>
<tr>
<td>All cause mortality</td>
<td>16.7%</td>
<td>18.4%</td>
<td>22% (–6 to 26)</td>
<td>Not significant</td>
</tr>
</tbody>
</table>

*Abbreviations defined in glossary; RRR, NNT, and CI calculated from data in article.
†Adjusted for age.

COMMENTARY
The number of fractures among older adults is likely to increase as populations age.¹ Trivedi et al showed that supplementation with oral vitamin D₃ (100 000 IU every 4 mo) may prevent fractures in elderly men and women living in the general community. These results differ from a previous study, which reported that vitamin D₃ did not decrease the incidence of hip or other peripheral fractures in elderly people.² As well, a recent review, which did not include Trivedi et al, concluded that it is unclear whether vitamin D₃ alone reduces fractures.³ However, vitamin D₃ taken with additional calcium supplements does appear to reduce fracture risk,⁴ and the study by Trivedi et al makes an important contribution to this body of research.

Whereas previous studies have included primarily women, Trivedi et al included a large number of men. However, only 52% of invited participants agreed to participate, and 83% were physicians. The modest response rate and the large number of physicians and men included in the study may limit the generalisability of the findings as the sample does not represent most community populations.

The results of this study are relevant to community and public health nurses who work with older adults. Nurses could also recommend fall prevention strategies given that 10% of falls in the elderly result in fractures. Hazard assessments, muscle strengthening and balance retraining exercises, Tai Chi exercises, and the withdrawal of psychotropic medications have been shown to be effective in reducing falls. Additional research is needed to further support the effectiveness of community fracture prevention programmes that include vitamin D₃ supplementation.

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