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# Vitamin D supplementation and bone health in menopausal women: a systematic review of randomised controlled trials

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Serum 25(OH)D (vitamin D) plays an important role in skeletal and muscle function<sup>(1)</sup>. Menopausal women are at an increased risk of reduced bone mineral density (BMD) and fracture due to a decline in oestrogen levels<sup>(2)</sup>. A low circulating 25-hydroxyvitamin D (25(OH)D) level during menopause is a common problem and has been associated with changes in dietary intake and body composition<sup>(3)</sup>. While vitamin D supplementation has been shown to increase serum 25(OH)D levels, its isolated effects on bone health in menopausal women is largely misunderstood. A systematic review was conducted to identify, appraise, and synthesise available studies to assess the impact of vitamin D supplements and bone health in menopausal women.

Four electronic databases (PubMed, EMBASE, Scopus, and Cochrane Library) were searched from inception to 8 December 2023. Only randomised controlled trials (RCTs) examining the efficacy of vitamin D supplementation in menopausal and/or post-menopausal women were included. Studies published in English and measuring BMD, fracture risk, calcium absorption, or serum 25(OH)D levels were eligible. Animal/lab trials, studies involving pharmaceutical co-treatments or vitamin K and/or calcium supplements were excluded. Two researchers independently extracted data according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines<sup>(4)</sup> and assessed possible bias using the Cochrane risk of bias tool v2. A narrative approach was used to synthesise the data.

In total, 243 studies were retrieved through initial database searches. Following the elimination of duplicates and screening stages, six RCTs involving 696 menopausal women met the eligibility criteria. The studies varied in intervention length (range 4 wks–4 yrs) and were conducted across four different countries including: Brazil, Bangladesh, Japan, and the USA. Study samples ranged from 38 to 230 participants. A variety of vitamin D supplements (dosages/frequencies) were used across the included studies. Despite heterogeneity in study methods and vitamin D dosages, significant improvements were observed in BMD, risk of falls, and calcium absorption following vitamin D supplementation. Results also found that vitamin D supplementation may improve postural balance and muscle function, improving mobility for menopausal women.

This systematic review demonstrates that vitamin D supplementation can enhance BMD, calcium absorption, reduce the risk of falls, and improve postural balance in menopausal women. However, the optimal dosage of vitamin D has not been determined. Limitations include methodological heterogeneity and lack of long-term follow-up, highlighting the need for further large-scale RCTs with rigorous methodology. These findings underscore the importance of ongoing research to better understand the role of vitamin D supplementation and bone health in menopausal women.

## References

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