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The effect of vitamin D supplementation on muscle strength in community-dwelling postmenopausal Asian women: a scoping review

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Approximately 40% of the community-dwelling population aged over 65 experiences falls annually, leading to significant morbidity, immobility, and mortality, with reduced muscle strength identified as a major risk factor⁽¹⁾. In comparison to other ethnic populations, Asian older adults often demonstrate weaker muscle strength, with this decline accelerating notably in female Asian older adults as they age⁽²⁾. Existing research indicates a correlation between vitamin D deficiency (circulating level of 25(OH)D below 50 nmol/L) and sarcopenia in community-dwelling older adults⁽³⁾. Postmenopausal women, experiencing a decline in oestrogen, face an elevated risk of vitamin D deficiency⁽⁴⁾. Notably, vitamin D deficiency is prevalent in Asian populations⁽⁵⁾. However, the effectiveness of vitamin D supplementation in promoting muscle strength among community-dwelling postmenopausal Asian women has not been comprehensively investigated. This scoping review aims to provide an overview and synthesis of existing evidence in the literature concerning the efficacy of vitamin D supplementation in enhancing muscle strength among community-dwelling postmenopausal Asian women.

A scoping review was conducted in accordance with PRISMA-ScR recommendations⁽⁶⁾. Randomised controlled trials (RCTs) published from 2013 to 2023 were identified through searches conducted in PubMed, EMBASE, and the Cochrane Central databases. Articles would be included if they: (i) were human RCTs with a cross-over or parallel design, (ii) included community-dwelling postmenopausal women, and (iii) investigated the effect of vitamin D supplementation on muscle strength. The review excluded: (i) *in vivo* animal studies, *in vitro* cell research, case reports, and observational studies; (ii) studies investigating the effect of vitamin D supplementation combined with other interventions, such as physical exercise, amino acid supplements, or other medication administration records like insulin or hormone therapy; and (iii) studies not in English. Following deduplication and relevance screening, five studies met the criteria, with Jadad scores (methodological quality assessment) of 1, 3, 5, 5, and 5, respectively.

Five RCTs involving a total of 872 subjects were reviewed⁽⁷⁻¹¹⁾. The three studies with Jadad scores of 5 indicated statistically significant and meaningful increases in muscle strength, measured by handgrip strength, with p-values <0.05 and effect sizes of 0.97, 1.75, and 3.83, respectively, indicating large effect sizes. The study with a Jadad score of 3 highlighted such increases only in the younger subgroup (<68 years old). Conversely, the study with a Jadad score of 1 suggested no significant changes in muscle strength.

In conclusion, this review suggests promising outcomes for vitamin D supplementation in enhancing muscle strength among postmenopausal Asian women. The prevalence of vitamin D deficiency underscores potential health benefits, but heterogeneity in study designs, Jadad scores, and age subgroup responses necessitates cautious interpretation. Further high-quality research is imperative to elucidate optimal dosages and durations, ensuring a nuanced understanding of the relationship between vitamin D supplementation and muscle strength.

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