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Does Vitamin D Affect Neuromuscular Function in Older Adults?

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**Background**

Of the approximately 1 billion people with vitamin D deficiency, it is especially prevalent among the elderly population (Sarota, 2014). When a person 20-30 years old and a person older than 65 spend the same amount of time in sunlight, the older adult will only absorb approximately a quarter of the vitamin D that the young adult will absorb (Hill & Aspray, 2017). "Neuromuscular control involves the subconscious integration of sensory information that is processed by the central nervous system, resulting in controlled movement through coordinated muscle activity" (Hurd & Snyder-Mackler, 2017, p. 297). Some of the risk factors that contribute to the incidence of falls in older adults include hazardous environments in the home, use of certain medications, sensory impairments, history of falls, use of assistive devices such as a walker or a cane, and balance or gait impairments (Sharif, Al-Sarhil, Al-Suhaib, Al-Daour, & Sharif, 2013). In the past year, the world had an estimated 29 million older adult falls. This accounts for 21.7% of the older adult population (CDC, 2012). "The older adult population is expected to increase 55% by 2030. Applying the number of falls from (the 2014) analysis to the projected 2030 population would result in an estimated 41.3 million falls and 11.7 million fall injuries, unless effective interventions are implemented nationwide" (Bergen, et al., 2016, p. 596-598).

**Question**

In adults older than 65 with vitamin D deficiency, what is the effect of vitamin D supplementation versus no vitamin D supplementation on neuromuscular function?

**Summary**

**Study**


"The effect of vitamin D supplementation on lower-extremity power and function in older adults: a randomized control trial," by S. Fielding, and Dawson-Hughes (2019)

"Cholecalciferol or 25-hydroxycholecalciferol supplementation does not affect muscle strength and physical performance in prefrail and frail older adults," by Vaes, Teeland, Trousaint, Nelwick, Verdejk, van Loon, and de Groot (2011)

**Findings**

**Level II, double-blind, randomized, placebo-controlled trial** intending to investigate the effects of vitamin D supplementation on corticospinal excitability and intracortical inhibition in older adults with insufficient serum 25(OH)D levels” (Perotta, Kidgell, & Daly, 2015, p. 132).

"No significant changes in grip strength and lower extremity function between the different supplementation groups." (Fielding et al., 2019, p. 369).

"Muscle strength significantly improved in the participants taking vitamin D supplements; however, they did not see any significant differences in muscle strength compared to the placebo group." (Perotta et al., 2015).

"Concluded that increasing the serum 25(OH)D concentration did not change muscle strength or function in prefrail and frail older adults." (Vaes et al., 2013, p. 733).

**Results**

- The results of the research were inconclusive because of the inconsistencies in guidelines for vitamin D deficiency and supplementation regimens.
- More research is needed to understand the effects of vitamin D supplementation on functional parameters in older adults as well as the effects on neuromuscular function to prevent falls.
- Implementing clinical practice guidelines for vitamin D screenings in older adults and supplementing to achieve sufficient vitamin D levels.
- Implementing clinical standards for blood levels that are considered vitamin D deficient.
- Because more research is necessary, nurse researchers could evaluate the effect of vitamin D supplementation on neuromuscular function in deficient older adults based on clinical practice guidelines.

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This work is not original. This is a systematic review of published research conducted by professionals. Guidance was provided by Stephanie Burkholder, professor of NU307: Evidence-Based Practice Research Methods.