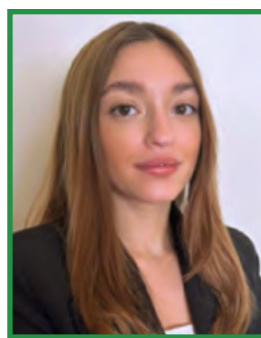
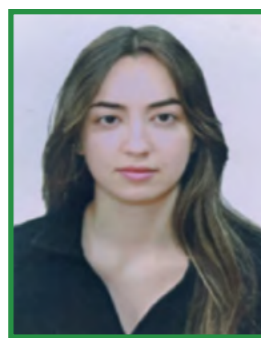


# Hypovitaminosis D & its Impact On Bone Health in the Elderly



Krystel El Helou

Faculty of Nursing &amp; Health Sciences NDU- Louaizé



Sandra Abi Karam

The Third National Health and Nutrition Examination Survey (NHANES III) has revealed that a large segment of American population (61–92%) has low Vitamin D levels. This has been confirmed in many other studies in the US and other parts of the world. Notably, a substantial percentage of these individuals are elderly and facing a deficiency in vitamin D.

Vitamin D is a fat-soluble vitamin that plays an important role in calcium, phosphate homeostasis, bone metabolism and other skeletal and extra-skeletal functions. Vitamin D is mainly found in butter, eggs, cheeses, liver, fortified milk, fatty fish such as salmon and tuna, and it is also synthesized in the skin through UV exposure.

Vitamin D deficiency in the elderly is influenced by various risk factors, including aging, reduced sun exposure, skin production capacity, lack of physical activity, smoking, inadequate dietary calcium and vitamin D intake, gastrointestinal tract diseases such as IBD, celiac disease, and chronic kidney disease and certain medications. For instance, certain laxatives may disrupt the absorption of specific vitamins, particularly those that are fat-soluble, such as vitamin D. Low vitamin D levels can cause symptoms like increased susceptibility to illness, mood changes, cognitive decline, weak muscles, leg heaviness, difficulty standing, appetite loss, digestive

issues, poor sleep, depression and frailty syndrome which is a common clinical syndrome in older adults that carries an increased risk for poor health outcomes including falls, incident disability, hospitalization, and mortality. Vitamin D deficiency diagnosis involves measuring total plasma 25-hydroxyvitamin D concentration. The recommended 25(OH) D concentration is 30 ng/mL for all ages. The National Osteoporosis Foundation (NOF) cutoffs for vitamin D status are sufficiency (over 30ng/ml), insufficiency (20-30ng/mL), and deficiency (less than 20ng/mL). Vitamin D deficiency increases the risk of fractures, falls, osteopenia, osteomalacia, osteoporosis, and sarcopenia. This occurs when the body lacks vitamin D to absorb calcium, essential for maintaining bone strength and hardness. Additionally, hyperparathyroidism, a condition where the parathyroid glands produce too much hormone, leads to increased PTH levels and calcium release from bones.

Studies show a strong link between Vitamin D deficiency and CVD risks, cancers, respiratory diseases like asthma, tuberculosis, chronic obstructive pulmonary disease (COPD) and type 2 diabetes. Ensuring adequate vitamin D intake can reduce insulin resistance and prevent diabetes progression. Regarding the medical nutrition therapy, the European Society for Clinical and Economic Aspects of Osteoporosis and Osteoarthritis (ESCEO) states that elderly people with vitamin D deficiency can take 800–2000 IU daily or 24000–60000 IU monthly; however, since this range is completely safe, they should get tested after three months and have their dosage adjusted accordingly. VD intake of 600IU is recommended for adults aged between 51-70years and 800IU in elderly aged >70y. Calcium intake should be 1000mg/day for adults aged between 51-70years, and 1200mg/day for adults aged >70years, along with adequate consumption of Vitamin D and Calcium rich food such as dairy and fortified products, small fish, canned fish with bones (Sardines), green leafy vegetables and almonds. Senior individuals should steer clear of excessive sodium consumption, smoking, alcohol,



and caffeine, as these can negatively impact the absorption of Calcium and Vitamin D. Instead, it is advisable for them to include fruits and vegetables in their diet, as these have an alkalizing effect. Additionally, engaging in consistent weight-bearing exercises is recommended to enhance bone and muscle strength, in conjunction with getting 30 minutes of sunlight exposure every day.

In conclusion, treatment goals should focus on avoiding 25(OH)D serum levels <30 nmol/l, with a goal to reach levels >50 nmol/l in order to prevent bone diseases in elderly. Of three possible strategies to establish vitamin D sufficiency – sunshine exposure, food fortification, and Vitamin D/Calcium supplementation – the latter seems to be the most effective and practical in the aging population.

## References:

• Aspray, T. J., Chadwick, T., Francis, R. M., McColl, E., Stamp, E., Prentice, A., von Wilamowitz-Moellendorff, A., & Schoenmakers, I. (2019). Randomized controlled trial of vitamin D supplementation in older people to optimize bone health. *The American journal of clinical nutrition*,

109(1), 207–217.

• Bruyère, O., Cavalier, E., Souberbielle, J. C., Bischoff-Ferrari, H. A., Beaudart, C., Buckinx, F., Reginster, J. Y., & Rizzoli, R. (2014). Effects of vitamin D in the elderly population: current status and perspectives. *Archives of public health = Archives belges de sante publique*, 72(1), 32.

• Giustina, A., Bouillon, R., Dawson-Hughes, B., Ebeling, P. R., Lazaretti-Castro, M., Lips, P., Marcocci, C., & Bilezikian, J. P. (2023). Vitamin D in the older population: a consensus statement. *Endocrine*, 79(1), 31–44.

• Hejazi, M. E., Modarresi-Ghazani, F., & Entezari-Maleki, T. (2016). A review of Vitamin D effects on common respiratory diseases: Asthma, chronic obstructive pulmonary disease, and tuberculosis. *Journal of research in pharmacy practice*, 5(1), 7–15.

• Kupisz-Urbańska, M., Płudowski, P., & Marciniowska-Suchowierska, E. (2021). Vitamin D Deficiency in Older Patients-Problems of Sarcopenia, Drug Interactions, Management in Deficiency. *Nutrients*, 13(4), 1247.

• Kweder, H., & Eidi, H. (2018). Vitamin D deficiency in elderly: Risk factors and drugs impact on vitamin D status. *Avicenna journal of medicine*, 8(4), 139–146.