

Editorial

Vitamin D for Clinical Diseases in Women: An Indispensable Factor in Medicine and Dentistry

Dario Calafiore ^{1,*}, Leonzio Fortunato ² and Mario Migliario ^{3,*}¹ Physical Medicine and Rehabilitation Unit, Department of Neurosciences, ASST Carlo Poma, 46100 Mantova, Italy² Dentistry Unit, Department of Health Sciences, University of Catanzaro “Magna Graecia”, 88100 Catanzaro, Italy; leo@unicz.it³ Dentistry Unit, Department of Translational Medicine, University of Eastern Piedmont, 28100 Novara, Italy

* Correspondence: dario.calafiore@asst-mantova.it (D.C.); mario.migliario@med.uniupo.it (M.M.)

Abstract: Vitamin D, commonly known as the “sunshine vitamin”, is a secosteroid hormone. It is recognized for its neuroprotective role in brain development and it has a key role in bone metabolism, muscle function, oral health, and temporomandibular disorders. Vitamin D is involved in a range of important physiological processes, such as promoting cell growth and differentiation, facilitating immunomodulation regulation, neurotransmission, and alleviating anti-inflammatory effects. Vitamin D deficiency is known to be implicated in a range of pathological conditions, particularly in women, including: musculoskeletal disorders; metabolic, autoimmune, and cardiovascular diseases; oral health status; temporomandibular disorders; malignancies; psychiatric conditions; and chronic pain. In this scenario, ongoing research is investigating the role of vitamin D in subcellular, molecular, and chemical processes, with a high interest in physiology, as read in the recent literature on vitamin D deficiency in the female sex. Therefore, in the present Special Issue, we aim to present evidence on the key role that vitamin D might play in the wellbeing of bone health, musculoskeletal status, oral health status, temporomandibular disorders, and pregnancy, in women.

Citation: Calafiore, D.; Fortunato, L.; Migliario, M. Vitamin D for Clinical Diseases in Women: An Indispensable Factor in Medicine and Dentistry. *J. Clin. Med.* **2022**, *11*, 3104. <https://doi.org/10.3390/jcm11113104>

Received: 26 May 2022

Accepted: 27 May 2022

Published: 30 May 2022

Publisher’s Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Keywords: vitamin D; dentistry; women; temporomandibular disorders; oral health; rehabilitation; osteoporosis

Vitamin D deficiency is a global health problem occurring in all age groups and in countries with both high and low levels of sunlight, and improving its role in nutrition could be considered as a public health priority [1,2].

Vitamin D is a generic name referring to both vitamin D2 (ergocalciferol, of vegetable origin) and vitamin D3 (cholecalciferol, synthesized in animal organisms); hence, these steroid hormones could be obtained from both diet (e.g., mushroom, salmon, mackerel, and herring) and dietary supplements. Nevertheless, the primary source of vitamin D is exposure of the skin to sunlight (skin synthesis of vitamin D) [1].

The vitamin D receptor (VDR) is a transcription factor regulating the expression of genes which mediate its biologic activity; thus, vitamin D has an autocrine and paracrine function, regulating cellular proliferation and differentiation, cell maturation, and the innate immune system [3]. In addition to regulating gene expression, vitamin D acts as a hormone and is involved in several metabolic pathways; its endocrine activity could stimulate calcium transport across the plasma membrane, promoting serum calcium and phosphate homeostasis [3].

The wide distribution of VDR allows a pleiotropic beneficial effect of vitamin D on different target tissues, such as bone, muscle, intestine, kidneys, etc. [4]. In this context, particularly in women, vitamin D deficiency showed to be related to an increased risk of fractures and falls [5–7]; osteoarthritis [8]; sarcopenia [9,10]; cardiovascular diseases [11];

malignancy [12,13]; neurological diseases [14–16]; COVID-19 [17]; poor oral health [18,19]; periodontal diseases, especially during pregnancy [20]; and temporomandibular disorders (TMD) [21].

However, to date, the most investigated action of vitamin D is on bone tissue. It might support skeletal health, improving bone mineralization through increased intestinal calcium absorption, prevention of secondary hyperparathyroidism, and direct effects on osteoblast formation; therefore, it might exert a positive effect on bone strength, quality, and consequently, in reducing risk of fracture, counteracting osteoporosis [22–24].

Furthermore, vitamin D is also considered a key factor in the turnover of articular cartilage. Amirkhizi et al. hypothesized that vitamin D could have anti-inflammatory effects and immunomodulatory properties, thus modulating the expression of inflammatory biomarkers in osteoarthritis [25]. Additionally, a reverse relationship between serum levels of inflammatory markers such as IL-1b, TNF-a, hs-CRP, and NF-rB p65, as well as the severity of clinical symptoms and vitamin D status was detected [8].

At the same time, it has been shown that vitamin D deficiency can be associated with a significant higher risk of an impairment of muscle function and, when combined with overweight, is significantly associated with loss of muscle mass [9,10]. In fact, vitamin D serum levels should be investigated considering their significant correlation with a reduction in muscle strength and physical performance [6].

In this context, vitamin D deficiency represents a critical risk factor in the onset of sarcopenia and related disease, such as sarcopenic dysphagia [25], playing a key role in nutritional status and proteins synthesis [26]. Loss of muscle mass seems to be strictly related to the decrease in vitamin D receptor (VDR) expression, eliciting two different effects: (1) a non-genomic effect, such as the modulation of calcium channel activation, muscle contraction and mitochondrial function; (2) a genomic effect, up-regulating the nuclear expression of gene-coding contractile proteins and myogenic transcription factors [3,27].

A higher inflammatory status underpinning the vitamin D deficiency might also explain its role in neurological diseases, such as multiple sclerosis [14], stroke [28], and Parkinson disease [15]. These findings can support a possible role of vitamin D deficiency on brain health, notably for the risk of dementia and cognitive impairment; indeed, Navale et al. showed that hypovitaminosis D was associated with neuroimaging outcomes and a higher risk of dementia and stroke [29].

Furthermore, vitamin D is involved in regulating normal innate and adaptive immunity [30], and it has been shown to suppress pro-inflammatory, and stimulate anti-inflammatory cytokine formation [31], considering the rehabilitation needs of COVID-19 patients [32].

In light of recent evidence, recovered COVID-19 patients showed insufficient 25(OH)D3 serum levels, thus making vitamin D supplementation necessary for treating COVID-19 patients [17]. It should also be considered that vitamin D status has a clinical significance in the field of dentistry. In this scenario, several papers explored the relationship between hypovitaminosis D and poor oral health, but only a few clinical trials investigated the effects of vitamin D supplementation on oral status, as reported by a systematic review published in April 2022 by Ab Malik et al. [19]. However, we are aware that there is a high heterogeneity among oral health outcomes, considering the different parameters that might be investigated. Moreover, the correlation between serum levels of 25(OH)D3 and periodontitis has been widely investigated, with contrasting results, albeit most studies confirmed this hypothesis [33–35], particularly in pregnant women [18] or in those affected by breast cancer [20]. However, to date, although the study quality of the scientific literature has proven to have some limitations, vitamin D supplementation seemed to improve oral health status [19].

Vitamin D supplementation might be considered as a novel therapeutic option for the complex management of TMD that commonly include occlusal splints, extracorporeal shock wave therapy, laser therapy, and physical therapy [21,36–39]. As mentioned above, vitamin D has shown a potential effect on osteoarthritis and general joint pain [40]; thus,

patients suffering from TMD have recently been investigated for their vitamin D serum levels. Kui et al. [21] reported that TMD patients with deficient levels of vitamin D (<30 ng/mL) are most likely to benefit from supplementation. In keeping with this scenario, further studies should better investigate the role that vitamin D might play in terms of pain relief and the functional improvement of patients who are affected by TMD.

In relation to the involvement of vitamin D in regulating normal innate and adaptive immunity, its contribution in the pathogenesis of premalignant oral conditions was recently explored [41,42]. Among them, lichen planus is known to be a chronic inflammatory disease, characterized by symmetrical and bilateral lesions in the oral mucosa, which can be uncomfortable or accompanied by burning and pain. Its etiology is not yet well understood; however, the pathogenesis seems to be related to the immune system's T lymphocytes. Thus, the VDR presence on T lymphocytes and macrophages, and on the mature TCD8 + lymphocytes may explain the potential role of vitamin D in the management of premalignant oral conditions [41–43].

Taken together, the present scientific literature investigated the pleiotropic role of vitamin D in women in the last few years, but further research is still needed to deeply investigate the mechanisms underpinning the correlation between vitamin D and several diseases, in the fields of both medicine and dentistry.

Author Contributions: Conceptualization, D.C., L.F. and M.M.; writing—original draft preparation, D.C.; writing—review and editing, L.F. and M.M. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Acknowledgments: None.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Bikle, D.D. Vitamin D metabolism, mechanism of action, and clinical applications. *Chem Biol.* **2014**, *21*, 319–329.
2. Aguiar, M.; Andronis, L.; Pallan, M.; Högl, W.; Frew, E. Preventing vitamin D deficiency (VDD): A systematic review of economic evaluations. *Eur. J. Public Health* **2017**, *27*, 292–301. <https://doi.org/10.1093/eurpub/ckw270>.
3. Bikle, D.D. Vitamin D: Production, Metabolism and Mechanisms of Action. In *Endotext*; Feingold, K.R., Anawalt, B., Boyce, A., Chrousos, G., de Herder, W.W., Dhatariya, K., Dungan, K., Hershman, J.M., Hofland, J., Kalra, S., et al., Eds.; MDText.com, Inc.: South Dartmouth, MA, USA, 2021.
4. Umar, M.; Sastry, K.S.; Chouchane, A.I. Role of Vitamin D beyond the Skeletal Function: A Review of the Molecular and Clinical Studies. *Int. J. Mol. Sci.* **2018**, *19*, 1618.
5. Kong, S.H.; Jang, H.N.; Kim, J.H.; Kim, S.W.; Shin, C.S. Effect of Vitamin D Supplementation on Risk of Fractures and Falls According to Dosage and Interval: A Meta-Analysis. *Endocrinol. Metab.* **2022**, *37*, 344–358. <https://doi.org/10.3803/EnM.2021.1374>.
6. Iolascon, G.; de Sire, A.; Calafiore, D.; Benedetti, M.G.; Cisari, C.; Letizia Mauro, G.; Migliaccio, S.; Nuti, R.; Resmini, G.; Gonnelli, S.; et al. Multifactorial Assessment of Risk of Falling in 753 Post-Menopausal Women: A Multicenter Cross-Sectional Study by the Italian Group for the Study of Metabolic Bone Diseases. *Clin. Interv. Aging* **2020**, *15*, 1077–1084. <https://doi.org/10.2147/CIA.S257304>.
7. Montero-Odasso, M.M.; Kamkar, N.; Pieruccini-Faria, F.; Osman, A.; Sarquis-Adamson, Y.; Close, J.; Hogan, D.B.; Hunter, S.W.; Kenny, R.A.; Lipsitz, L.A.; et al. Task Force on Global Guidelines for Falls in Older Adults. Evaluation of Clinical Practice Guidelines on Fall Prevention and Management for Older Adults: A Systematic Review. *JAMA Netw Open.* **2021**, *4*, e2138911. <https://doi.org/10.1001/jamanetworkopen.2021.38911>.
8. Amirkhizi, F.; Asoudeh, F.; Hamed-Shahraki, S.; Asghari, S. Vitamin D status is associated with inflammatory biomarkers and clinical symptoms in patients with knee osteoarthritis. *Knee* **2022**, *36*, 44–52. <https://doi.org/10.1016/j.knee.2021.12.006>.
9. Kupisz-Urbańska, M.; Płudowski, P.; Marciniowska-Suchowierska, E. Vitamin D Deficiency in Older Patients-Problems of Sarcopenia, Drug Interactions, Management in Deficiency. *Nutrients* **2021**, *13*, 1247. <https://doi.org/10.3390/nu13041247>.

10. Iolascon, G.; Mauro, G.L.; Fiore, P.; Cisari, C.; Benedetti, M.G.; Panella, L.; de Sire, A.; Calafiore, D.; Moretti, A.; Gimigliano, F. Can vitamin D deficiency influence muscle performance in postmenopausal women? A multicenter retrospective study. *Eur. J. Phys. Rehabil. Med.* **2018**, *54*, 676–682. <https://doi.org/10.23736/S1973-9087.17.04533-6>.
11. Jaiswal, V.; Ishak, A.; Peng Ang, S.; Babu Pokhrel, N.; Shama, N.; Lnu, K.; Susan Varghese, J.; Storozhenko, T.; Ee Chia, J.; Naz, S.; Sharma, P.; et al. Hypovitaminosis D and cardiovascular outcomes: A systematic review and meta-analysis. *Int. J. Cardiol. Heart Vasc.* **2022**, *40*, 101019. <https://doi.org/10.1016/j.ijcha.2022.101019>.
12. de Sire, A.; Gallelli, L.; Marotta, N.; Lippi, L.; Fusco, N.; Calafiore, D.; Cione, E.; Muraca, L.; Maconi, A.; De Sarro, G.; et al. Vitamin D Deficiency in Women with Breast Cancer: A Correlation with Osteoporosis? A Machine Learning Approach with Multiple Factor Analysis. *Nutrients* **2022**, *14*, 1586. <https://doi.org/10.3390/nu14081586>.
13. Maturana-Ramírez, A.; Aitken-Saavedra, J.; Guevara-Benítez, A.L.; Espinoza-Santander, I. Hypovitaminosis D, oral potentially malignant disorders, and oral squamous cell carcinoma: A systematic review. *Med. Oral. Patol. Oral. Cir. Bucal.* **2022**, *27*, e135–e141. <https://doi.org/10.4317/medoral.25049>.
14. Feige, J.; Moser, T.; Bieler, L.; Schwenker, K.; Hauer, L.; Sellner, J. Vitamin D Supplementation in Multiple Sclerosis: A Critical Analysis of Potentials and Threats. *Nutrients* **2020**, *12*, 783. <https://doi.org/10.3390/nu12030783>.
15. Wu, H.; Khuram Raza, H.; Li, Z.; Li, Z.; Zu, J.; Xu, C.; Yang, D.; Cui, G. Correlation between serum 25(OH)D and cognitive impairment in Parkinson's disease. *J. Clin. Neurosci.* **2022**, *100*, 192–195. <https://doi.org/10.1016/j.jocn.2022.04.015>.
16. de Sire, A.; Invernizzi, M.; Ferrillo, M.; Gimigliano, F.; Baricich, A.; Cisari, C.; De Marchi, F.; Foglio Bonda, P.L.; Mazzini, L.; Migliario, M. Functional status and oral health in patients with amyotrophic lateral sclerosis: A cross-sectional study. *NeuroRehabilitation* **2021**, *48*, 49–57. <https://doi.org/10.3233/NRE-201537>.
17. Gallelli, L.; Mannino, G.C.; Luciani, F.; de Sire, A.; Mancuso, E.; Gangemi, P.; Cosco, L.; Monea, G.; Averta, C.; Minchella, P.; et al. Vitamin D Serum Levels in Subjects Tested for SARS-CoV-2: What Are the Differences among Acute, Healed, and Negative COVID-19 Patients? A Multicenter Real-Practice Study. *Nutrients* **2021**, *13*, 3932. <https://doi.org/10.3390/nu13113932>.
18. de Sire, A.; Ferrillo, M.; Gennari, A.; Cisari, C.; Pasqua, S.; Foglio Bonda, P.L.; Invernizzi, M.; Migliario, M. Bone health, vitamin D status and oral hygiene screening in breast cancer women before starting osteoporosis treatment: A cross-sectional study. *J. Biol. Regul. Homeost. Agents.* **2021**, *35*, 397–402. <https://doi.org/10.23812/20-686-L>.
19. Ab Malik, N.; Mohamad Yatim, S.; Mokhtar, K.N.; Md Ramli, S.N.R.; Dissanayaka, W.L.; Pelekos, G.; McGrath, C. Oral health and vitamin d in adult—A systematic review. *Br. J. Nutr.* **2022**, *1*–29. <https://doi.org/10.1017/S0007114522000964>.
20. Ferrillo, M.; Migliario, M.; Rocuzzo, A.; Molinero-Mourelle, P.; Falcicchio, G.; Umano, G.R.; Pezzotti, F.; Foglio Bonda, P.L.; Calafiore, D.; de Sire, A. Periodontal Disease and Vitamin D Deficiency in Pregnant Women: Which Correlation with Preterm and Low-Weight Birth? *J. Clin. Med.* **2021**, *10*, 4578. <https://doi.org/10.3390/jcm10194578>.
21. Kui, A.; Buduru, S.; Labunet, A.; Balhuc, S.; Negucioiu, M. Vitamin D and Temporomandibular Disorders: What Do We Know So Far? *Nutrients* **2021**, *13*, 1286. <https://doi.org/10.3390/nu13041286>.
22. LeBoff, M.S.; Chou, S.H.; Murata, E.M.; Donlon, C.M.; Cook, N.R.; Mora, S.; Lee, I.M.; Kotler, G.; Bubes, V.; Buring, J.E.; et al. Effects of Supplemental Vitamin D on Bone Health Outcomes in Women and Men in the VITamin D and Omega-3 Trial (VITAL). *J. Bone Miner. Res.* **2020**, *35*, 883–893. <https://doi.org/10.1002/jbmr.3958>.
23. Michos, E.D.; Kalyani, R.R.; Blackford, A.L.; Sternberg, A.L.; Mitchell, C.M.; Juraschek, S.P.; Schrack, J.A.; Wanigatunga, A.A.; Roth, D.L.; Christenson, R.H.; Miller, E.R. 3rd; Appel, L.J. The Relationship of Falls With Achieved 25-Hydroxyvitamin D Levels From Vitamin D Supplementation: The STURDY Trial. *J. Endocr. Soc.* **2022**, *6*, bvac065. <https://doi.org/10.1210/jeendo/bvac065>.
24. Yao, P.; Bennett, D.; Mafham, M.; Lin, X.; Chen, Z.; Armitage, J.; Clarke, R. Vitamin D and Calcium for the Prevention of Fracture: A Systematic Review and Meta-analysis. *JAMA Netw. Open.* **2019**, *2*, e1917789. <https://doi.org/10.1001/jamanetworkopen.2019.17789>. PMID.
25. de Sire, A.; Ferrillo, M.; Lippi, L.; Agostini, F.; de Sire, R.; Ferrara, P.E.; Raguso, G.; Riso, S.; Rocuzzo, A.; Ronconi, G.; et al. Sarcopenic Dysphagia, Malnutrition, and Oral Frailty in Elderly: A Comprehensive Review. *Nutrients* **2022**, *14*, 982. <https://doi.org/10.3390/nu14050982>.
26. de Sire, A.; Invernizzi, M.; Lippi, L.; Curci, C.; Cisari, C.; Iolascon, G. Nutritional supplementation in hip fracture sarcopenic patients: A narrative review. *Clin. Cases Miner. Bone Metab.* **2019**, *16*, 27–30.
27. Nardone, O.M.; de Sire, R.; Petito, V.; Testa, A.; Villani, G.; Scaldaferrì, F.; Castiglione, F. Inflammatory Bowel Diseases and Sarcopenia: The Role of Inflammation and Gut Microbiota in the Development of Muscle Failure. *Front. Immunol.* **2021**, *12*, 694217. <https://doi.org/10.3389/fimmu.2021.694217>.
28. Su, C.; Jin, B.; Xia, H.; Zhao, K. Association between Vitamin D and Risk of Stroke: A PRISMA-Compliant Systematic Review and Meta-Analysis. *Eur. Neurol. Apr* **2021**, *84*, 399–408. <https://doi.org/10.1159/000517584>.
29. Navale, S.S.; Mulugeta, A.; Zhou, A.; Llewellyn, D.J.; Hyppönen, E. Vitamin D and brain health: An observational and Mendelian randomization study. *Am. J. Clin. Nutr.* **2022**, nqac107. <https://doi.org/10.1093/ajcn/nqac107>.
30. Hewison, M. Vitamin D and the immune system: New perspectives on an old theme. *Rheum. Dis. Clin. N. Am.* **2012**, *38*, 125–139.
31. Bui, L.; Zhu, Z.; Hawkins, S.; Cortez-Resendiz, A.; Bellon, A. Vitamin D regulation of the immune system and its implications for COVID-19: A mini review. *SAGE Open Med.* **2021**, *9*, 20503121211014073.
32. de Sire, A.; Andrenelli, E.; Negrini, F.; Patrini, M.; Lazzarini, S.G.; Ceravolo, M.G. International Multiprofessional Steering Committee of Cochrane Rehabilitation REH-COVER Action. Rehabilitation and COVID-19: A rapid living systematic review by

- Cochrane Rehabilitation Field updated as of December 31st, 2020 and synthesis of the scientific literature of 2020. *Eur. J. Phys. Rehabil. Med.* **2021**, *57*, 181–188. <https://doi.org/10.23736/S1973-9087.21.06870-2>.
33. Anbarcioglu, E.; Kirtiloglu, T.; Öztürk, A.; Kolbakir, F.; Acikgöz, G.; Colak, R. Vitamin D deficiency in patients with aggressive periodontitis. *Oral Dis.* **2019**, *25*, 242–249.
 34. Agrawal, A.A.; Kolte, A.P.; Kolte, R.A.; Chari, S.; Gupta, M.; Pakhmode, R. Evaluation and comparison of serum vitamin D and calcium levels in periodontally healthy, chronic gingivitis and chronic periodontitis in patients with and without diabetes mellitus—a cross-sectional study. *Acta Odontol. Scand.* **2019**, *77*, 592–599.
 35. Isola, G.; Alibrandi, A.; Rapisarda, E.; Matarese, G.; Williams, R.C.; Leonardi, R. Association of vitamin D in patients with periodontitis: A cross-sectional study. *J. Periodontol. Res.* **2020**, *55*, 602–612.
 36. Deregibus, A.; Ferrillo, M.; Grazia Piancino, M.; Chiara Domini, M.; de Sire, A.; Castroflorio, T. Are occlusal splints effective in reducing myofascial pain in patients with muscle-related temporomandibular disorders? A randomized-controlled trial. *Turk. J. Phys. Med. Rehabil.* **2021**, *67*, 32–40. <https://doi.org/10.5606/tftrd.2021.6615>.
 37. Marotta, N.; Ferrillo, M.; Demeco, A.; Drago Ferrante, V.; Inzitari, M.T.; Pellegrino, R.; Pino, I.; Russo, I.; de Sire, A.; Ammendolia, A. Effects of Radial Extracorporeal Shock Wave Therapy in Reducing Pain in Patients with Temporomandibular Disorders: A Pilot Randomized Controlled Trial. *Appl. Sci.* **2022**, *12*, 3821. <https://doi.org/10.3390/app12083821>.
 38. Ferrillo, M.; Marotta, N.; Giudice, A.; Calafiore, D.; Curci, C.; Fortunato, L.; Ammendolia, A.; de Sire, A. Effects of Occlusal Splints on Spinal Posture in Patients with Temporomandibular Disorders: A Systematic Review. *Healthcare* **2022**, *10*, 739. <https://doi.org/10.3390/healthcare10040739>.
 39. Ferrillo, M.; Ammendolia, A.; Paduano, S.; Calafiore, D.; Marotta, N.; Migliario, M.; Fortunato, L.; Giudice, A.; Michelotti, A.; de Sire, A. Efficacy of rehabilitation on reducing pain in muscle-related temporomandibular disorders: A systematic review and meta-analysis of randomized controlled trials. *J. Back Musculoskelet. Rehabil.* **2022**, <https://doi.org/10.3233/BMR-210236>.
 40. Veronese, N.; La Tegola, L.; Mattera, M.; Maggi, S.; Guglielmi, G. Vitamin D Intake and Magnetic Resonance Parameters for Knee Osteoarthritis: Data from the Osteoarthritis Initiative. *Calcif. Tissue Int.* **2018**, *103*, 522–528. <https://doi.org/10.1007/s00223-018-0448-7>.
 41. Bahramian, A.; Bahramian, M.; Mehdipour, M.; Falsafi, P.; Khodadadi, S.; Dabaghi Tabriz, F.; Deljavanghadrati, M. Comparing Vitamin D Serum Levels in Patients with Oral Lichen Planus and Healthy Subjects. *J. Dent.* **2018**, *19*, 212–216.
 42. Motahari, P.; Pournaghi Azar, F.; Rasi, A. Role of Vitamin D and Vitamin D Receptor in Oral Lichen Planus: A Systematic Review. *Ethiop. J. Health Sci.* **2020**, *30*, 615–622. <https://doi.org/10.4314/ejhs.v30i4.17>.
 43. Zanetta, P.; Squarzanti, D.F.; Sorrentino, R.; Rolla, R.; Aluffi Valletti, P.; Garzaro, M.; Dell'Era, V.; Amoroso, A.; Azzimonti, B. Oral microbiota and vitamin D impact on oropharyngeal squamous cell carcinogenesis: A narrative literature review. *Crit. Rev. Microbiol.* **2021**, *47*, 224–239. <https://doi.org/10.1080/1040841X.2021.1872487>.