

## Editorial

# Vitamin D and mental health during the Covid-19 outbreak

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### Abstract

The relationship between hypovitaminosis D and depressive disorder is well documented in the medical literature. However, the biological mechanisms by which vitamin D can modulate psychological distress are still unclear. Containment measures can decrease individual's exposure to the sun, significantly increasing their needs for vitamin D, a nutrient already deficient in patients with depression. Therefore, it can be inferred that by ingesting the same amount of vitamin D, depressive individuals seem to obtain a lesser amount of this nutrient from the sun's rays when compared to healthy people. We found the relationship between vitamin D and COVID-19 has been increasingly studied, mainly due to the changes that this substance can cause in the inflammatory process - especially in the release of cytokines, in SARS and in lung injuries. Despite the benefits, the existing observational studies on this exchange are not enough to definitively associate vitamin D as a protective factor for COVID-19.

COVID-19, caused by the SARS-CoV-2 virus, was initially identified in Wuhan, China, and quickly reached several countries, being declared a pandemic by the World Health Organization (WHO) in March 2020. The transmission of this disease occurs through respiratory tract fluids and the symptoms are diverse, including fever and cough.<sup>1</sup> In view of this scenario, with the objective of limiting the spread of the disease, countries have adopted measures of social distancing. However, it's noticeable that the measures had a negative impact on the mental health of individuals, with the risk of developing psychological problems or aggravating existing mental illnesses. These aggravating factors include the fear of contracting the infection, economical loss, and stigmas related to COVID-19.<sup>2</sup>

This drastic change in routine has impacted the mental health of several social groups and may be associated with a feeling of frustration and boredom. In this sense, quantitative studies among quarantined people have shown high rates of symptoms of psychological distress such as stress, insomnia, and depression.<sup>2</sup> In addition, containment measures can decrease individual's exposure to the sun, significantly increasing their needs for vitamin D, a nutrient already deficient in patients with depression when compared to healthy people of the same age and sex.<sup>3,4</sup>

Vitamin D is a fat-soluble compound found naturally in few foods such as fish with high levels of oil, cod liver oil, egg yolks, shiitake mushrooms, liver, and other entrails. Approximately 90% of it's absorbed after exposure to ultraviolet-B (UVB) radiation, with dermal synthesis being the main route to obtain it.<sup>5</sup>

The relationship between hypovitaminosis D and depressive disorder is well documented in the medical literature. However, the biological mechanisms by which vitamin D can modulate psychological distress are still unclear and require further investigation.<sup>5</sup> By ingesting the same amount of vitamin D, depressive individuals seem to obtain a lesser amount of this nutrient from the sun's rays when compared to healthy people. However, it has been shown that sun exposure is the main factor involved in the occurrence of vitamin D deficiency for both patients with depression and healthy individuals.<sup>3</sup> Therefore, it can be inferred that social isolation is closely related to a reduction in serum levels of this substance, as it can decrease people's exposure to sunlight.

In addition, studies have shown that vitamin D has an assisting function in the immune system, especially regarding the modulation of the inflammatory process during viral infection.<sup>6</sup> In this sense, individuals with vitamin D deficiency are more susceptible to various infectious diseases, with an emphasis on viral infections that affect the upper respiratory tract.<sup>7</sup> Still in this context, some experimental research suggests the role of vitamin D as a mitigating factor of important lung damage in the pathogenesis of COVID-19, as well as indicating the association between vitamin D and the lower concentration of interleukin-6 (IL-6), a cytokine that significantly influences SARS-CoV-2-induced severe respiratory syndrome (SARS).<sup>6,7</sup> Although the role of vitamin D in combating COVID-19 is imprecise, it has been shown that supplementation with vitamin D3 is associated with a reduction in the length of hospital stay for patients affected by infectious diseases of the respiratory tract, such as COVID-19.<sup>8</sup>

Therefore, the negative implications of vitamin D deficiency on mental health are even more evident in the current pandemic context. The need for social isolation reduces the frequency of exposure to solar radiation and thus the ability to obtain this nutrient. Many studies have found the presence of hypovitaminosis D in patients with depressive disorder, a health condition considerably impacted by the pandemic scenario.

Finally, the relationship between vitamin D and COVID-19 has been increasingly studied, mainly due to the changes that this substance can cause in the inflammatory process - especially in the release of cytokines, in SARS and in lung injuries. Despite the benefits, the existing observational studies on this exchange are not enough to definitively associate vitamin D as a protective factor for COVID-19. Controlled and randomized studies are necessary to test and prove this relationship. Although the protective and therapeutic effect of vitamin D against COVID-19 is not confirmed, there are reasons for recommending supplementation of this nutrient to avoid its deficiency during this pandemic.

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### Conflict of interest

The authors declare that they have no competing interests.

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