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COVID-19 intensity and the status of vitamin D

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Implication for health policy/practice/research/medical education: Vitamin D is able to potentiate the body against coronavirus disease 2019 (COVID-19) by increasing angiotensin-converting enzyme-2 expression, inhibiting the renin-angiotensin-aldosterone system and regulating the innate and adaptive immunity.

Keywords: Coronavirus disease, Vitamin D, COVID-19, SARS-CoV-2

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The coronavirus disease 2019 (COVID-19) pandemic has quickly extended around the world. At the initiation of this disease, worldwide endeavors focused on diminution of virus spread and avoiding contamination (1). Along with these efforts, it is also necessary to know the defending parameters against this disease (2). The intensity and mortality of severe acute respiratory syndrome coronavirus type (SARS-CoV-2) is disproportionately high in some conditions like elderly, particularly when is associated with other comorbidities or in certain micronutrient deficiencies and malnutrition (3). There is some idea that appropriate status of essential nutrients is critical in supporting both the initial viremia and subsequent hyperinflammatory periods of COVID-19 (4). This virus infects several cells of the organs mainly in respiratory system consisting of upper airway epithelial cells and pneumocytes of pulmonary alveoli and also macrophages which cause cytokine storm as the main cause of death and mortality. In COVID-19, there is also a dysregulation of the innate immune system with an expression of several proinflammatory mediators (cytokines) and chemokines resulting in disproportionate provocation of the adaptive immune pathway (5). The disturbed immune system characterized by depressed adaptive immunity alongside unregulated innate immunity. In this condition an abridged and delayed responses to interferons are existed, which results in stimulation of proinflammatory cytokines and progressive infiltration of inflammatory cells into the respiratory tract, directing to lung infection (6). To regulate this condition, several micronutrients for example zinc, selenium, vitamin D or vitamin C have antiviral, anti-inflammatory,

antioxidant, antithrombotic, and immuno-modulatory properties. Hence, they have advantages in both adaptive and innate immunity responses (4). Consequently, our therapeutic schedules should also emphasize first the infection prevention and then disease control. Subsequently, the administration of various nutraceutical compounds has beneficial property to control various features of COVID-19, predominantly the inflammatory condition and the immune system regulation of infected individuals. Moreover, this management could be a distinct approach to control of worst consequences of this pandemic (7). It has been well detected that low-plasma concentration of vitamin D is accompanied by seriousness of various viral infections like influenza (8). Previous reports in COVID-19 found the capability of vitamin D to influence SARS-CoV-2 gene presentation and accordingly to relieve the infection following joining to the vitamin D receptor (9,10). In addition, vitamin D modulates the renin-aldosterone-angiotensin system and presentation of ACE2 (angiotensin converting enzyme-2) and its receptor which proceeds the COVID-19 infection (11). Recent studies showed, vitamin D diminishes the local presentation of podocyte uPAR (urokinase-type plasminogen activator receptor) and decreases elevated circulating soluble urokinase-type plasminogen activator receptor (suPAR) concentration. This condition restores the glomerular, therefore preserving kidney function (12). Furthermore, this vitamin is able to potentiate the body against COVID-19 by increasing angiotensin-converting enzyme 2 expression, inhibiting the renin-angiotensin-aldosterone system and regulating the innate and adaptive immunity. We believe that suitable vitamin

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D administration could prevent the development intensity of COVID-19, since further investigations on this subject are still necessary.

Author's contribution

HN is the single author of the manuscript.

Conflicts of interest

The author declares that he has no competing interest.

Ethical issues

Ethical issues (including plagiarism, data fabrication, double publication) have been completely observed by the author.

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