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INFLUENCE OF VITAMIN D DEFICIENCY OR INSUFFICIENCY ON COVID-19 SEVERITY

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Introduction: Vitamin D belongs to the fat-soluble group of vitamins. Widespread use of vitamin D for the prevention and treatment of COVID-19 is primarily related to its immunomodulatory and indirect-virucidal effect. A number of studies in 2021 indicated that low blood serum levels of 25-hydroxyvitamin D (vitamin D) were associated with an increased risk of severe COVID-19 and higher mortality.

The aim: The aim of our study was to identify a possible association between COVID-19 severity and vitamin D deficiency or insufficiency in hospitalized patients of different sex and age groups and to substantiate the potential benefit of vitamin D intake for the prevention and treatment of COVID-19.

Material and methods: We have analyzed the health records of 118 COVID-19 patients who were hospitalized in the private clinic "Oberig", Kyiv, Ukraine. All these patients at hospitalization were tested for vitamin D – 25(OH)D₃ initial level. The group included 118 patients with a mean age of 60.9±15.7 years, including 40.7 % of women (n=48) with a mean age of 62.1±15.1 years and 59.3 % of men (n=70) with an average age of 60.1±16.1 years. According to COVID-19 severity, three subsets were identified for further analysis, in particular: moderate severity patients accounted for 36.5 % (n=43), severe and critical patients accounted for 38.1 % (n=45) and patients who have not survived were 25.4 % (n=30).

Results: It was found that 73.7 % (n=87) of the total number of patients had a deficiency or insufficiency of vitamin D. Deficiency or insufficiency of vitamin D was observed: (a) in 76.8 % (n=33) moderate severity patients; (b) in 66.7 % (n=30) severe or critical COVID-19 patients; (c) in 80.0 % (n=24) of patients who died from COVID-19. Multiple comparisons (using analysis of variance) did not reveal any statistically significant difference in vitamin D levels in patient's group with vitamin D deficiency or insufficiency (n=87) in clusters according to the severity of the disease (p=0.435). The particular attention was paid to the calculation of the mean difference and 95% CI of the difference in mean vitamin D levels between the subgroups of patients with moderate COVID-19 (group "Medium") and patients who did not survive (group "Deceased") and all of whom were vitamin D deficient or insufficient. The differences in the mean values of vitamin D levels in the subgroups "Medium" and "Deceased" for both men and women together were 1.9 (95% CI -1.1–5.0) and separately for men 2.2 (95% CI -2.7–7.1) and for women 1.9 (95% CI -2.4–6.1). The difference is not statistically significant, however, further analysis shows that the average values of vitamin D in the group "Medium" are 9.8-11.1 % higher than in the group "Deceased", which may indicate a positive effect of vitamin D on reducing the risk of death due to COVID-19.

Conclusions: We identified difference in the mean values of vitamin D between the subgroups "Medium" and "Deceased" according to COVID-19 severity. These data may be important for clinical interpretation and planning of further studies. These data also suggest the effectiveness of preventing of vitamin D deficiency or insufficiency in order to reduce the risk of severe COVID-19 and death. Further research in this area will deepen the understanding of the role of vitamin D deficiency or insufficiency as a potential risk factor for severe COVID-19.

KEY WORDS: COVID-19, disease severity, risk factors, vitamin D.