

<b>Dissertation Title</b>	Comparing the Severity of Long Covid and Vitamin D Levels
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### ABSTRACT

“Long COVID” is a condition where patients continue with persistent symptoms even after they have recovered from the initial COVID-19 infection. These ongoing symptoms might damage various systems in their body. Several risk factors contribute to long-term COVID-19 development, including vitamin and mineral deficiencies. Vitamin D is an important nutrient for maintaining overall health and may be associated with the onset of long COVID. As a result, we studied the prevalence and compared long COVID cases among individuals with varying vitamin D levels. We also examined the relationship between vitamin D levels and the prevalence of eight long-term COVID-19 symptom categories in 170 patients who had previously been infected with the COVID-19 virus and received treatment at Foresta Clinic. This study used a cross-sectional descriptive design, collecting data by using a case record form that included demographic data, eight long COVID symptom categories, and vitamin D levels.

The study results indicated a female-to-male ratio of 1.1:1 among the participants, with a mean age of  $45.87 \pm 8.65$  years. Additionally, 62.4% had received three doses of the COVID-19 vaccination. Long COVID was found in 64.7%, with the majority (50.0%) had mild long COVID, followed by 11.2% with moderate long COVID, and 3.5% with severe long COVID. The blood vitamin D level was 41.2% of participants had insufficient, 30.6% were deficiency, and 28.2% had sufficient status. All participants with severe long COVID had vitamin D deficiency, while 73.7% of moderate, 28.2% of mild, and 13.3% without long COVID were deficient with

statistical significance ( $P < 0.001$ ). Participants with long COVID symptoms had significantly lower blood vitamin D levels than those without symptoms ( $p < 0.05$ ) across all symptom categories. Multivariable analysis found that vitamin D deficiency was significantly associated with long COVID symptoms at the 0.05 level. Specifically, associations were found for general symptoms (Adj. OR 4.55 [95%CI 1.88, 10.87]), respiratory symptoms (Adj. OR 6.06 [95%CI 2.37, 15.54]), cardiovascular symptoms (Adj. OR 22.63, 95%CI [5.88, 87.14]), neurological symptoms (Adj. OR 16.22 [95%CI 4.81, 54.65]), musculoskeletal symptoms (Adj. OR 13.77 [95%CI 4.54, 41.82]), skin symptoms (Adj. OR 11.28 [95%CI 4.30, 29.57]), psychiatric symptoms (Adj. OR 3.97 [95%CI 1.56, 10.08]), and the overall occurrence of long COVID (Adj. OR 5.80 [95%CI 2.10, 16.13]). Therefore, assessing and maintaining vitamin D levels, vitamin D supplementation, and sunlight exposure in COVID-19 patients can reduce the risk and severity of long-term COVID symptoms.

**Keywords:** Long COVID, COVID-19, Post-COVID-19 Symptoms, Vitamin D

