# The Association of Genetic Variants in Vitamin D Receptor (VDR) with the Severity of COVID-19 Infection, persistent Symptoms, and post-Vaccination Symptoms.

**Prepared by:**

**Ghaida' Khaleel Al-Hamadeen**

**Supervisor**

**Dr. Abdullah El Madani**

**Co-supervisor**

**Dr. Yazun Jarrar**

**Al-Zaytoonah University of Jordan, 2023**

## Abstract

**Introduction:** An increasing amount of research indicates that vitamin D plays a role in COVID-19 prognosis. Therefore, exploring novel genetic factors related to COVID-19 becomes necessary.

**Methods:** In the current study, one hundred Covid-19 infected participants from the Jordanian population were genotyped for three vitamin D receptors (*VDR)* genetic polymorphisms *ApaI, FokI,* and *TaqI*, using the polymerase chain reaction-restriction fragment length polymorphisms (PCR-RFLP) method. The severity of COVID-19 symptoms, persistent symptoms, post-vaccination symptoms, and other variables were analysed and linked to *VDR* genetic polymorphisms.

**Results:** The study didn't find any significant association between neither of *ApaI* or *FokI* polymorphisms with the severity of COVID-19 symptoms, although *TaqI*

polymorphism was found to be associated with the occurrence of severe symptoms after infection with SARS-CoV-2 (*P*-value = 0.045).

Regarding the persistent symptoms, the *VDR ApaI*, as well as *TaqI* genotypes, were shown to be significantly associated with persistent fatigue and muscle pain among COVID-19 infected individuals (*P*- value = 0.00-0.036). Furthermore, the *TaqI* genotype was shown to be associated with persistent shortness of breath following SARS-CoV-2 infection (*P*- value = 0.003). The genotype frequencies of VDR gene polymorphisms were not associated with any of the reported post-vaccination symptoms including thyroid and menstrual abnormalities.

**Conclusion:** The *VDR* gene polymorphism may have a possible association with both the severity of COVID-19 and the long-COVID-19 symptoms. Such results, especially the long-lasting COVID-19 symptoms, require further research in different types of VDR polymorphisms and in larger sample sizes.

**Keyword:** COVID-19, Jordanians, persistent symptoms, VDR polymorphisms.