



# Does Vitamin D Level Influence Surface Antibodies in Chronic Hepatitis B Patients?

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Chronic hepatitis B virus (HBV) infection is a major public health problem which affects approximately 400 million people worldwide (1). Antibodies to HBsAg (anti-HBs) appear after clearance of HBsAg or after immunization. The presence of HBsAg for longer than 6 months is defined as chronic HBV infection (2). On the other hand, vitamin D deficiency is associated with several adverse health outcomes; it plays an emerging role in regulating inflammation, as well as an important role in immunomodulation (3). Although there have been many reports on the relationship between serum 25-hydroxyvitamin D3 levels and chronic liver diseases, the relationship between vitamin D deficiency in patients with HBV infection and the immune response is still unclear.

The modification of vitamin D deficiency needs an accurate illustration of the current position in each region. Recent studies have revealed the functions of vitamin D in addition to those in bone metabolism. It has been demonstrated that vitamin D deficiency may play a role in the development of autoimmune diseases (4,5). Chen et al demonstrated that maintenance of a vitamin D serum concentration of 38 ng/mL or higher could considerably reduce the incidence of acute viral respiratory tract infections (6).

Chronicity of hepatitis B infection is also influenced by mutations in the vitamin D receptor gene, with polymorphisms being associated with higher viral load and increased disease progression and severity (7). Vitamin D is linked not only to liver fibrosis but also to liver cirrhosis. Moreover, a significant correlation exists between polymorphisms in the vitamin D receptor gene and the occurrence of hepatocellular carcinoma in patients with liver cirrhosis; this association is even more

prominent in alcoholic patients (8).

Vitamin D is known to suppress proinflammatory cytokines. Hence, it is believed that vitamin D deficiency may be related to the development of increased viral replication. The action of vitamin D against infections earned the Noble Prize for Dr. Ryberg Finsen in 1903 (9). We now know that vitamin D deficiency is associated with an increase in the rate and poor prognosis of infectious diseases and the absence of response to treatment of viral hepatitis with more chronic liver disease and hepatocellular carcinoma (10). We also know that vitamin D status is related to the persistence of HBsAb.

Luong and Nguyen in 2012 (2) were the first researchers who suggested the effective function of vitamin D in patients with HBV. In the next year, Demir et al measured the levels of vitamin D in three groups as chronic hepatitis B (CHB) patients, naturally immunized people, and control subjects in their study. Demir et al concluded that CHB patients had lower vitamin D levels compared to two other groups (3). Generally, most studies have suggested lower serum 25-OH vitamin D3 levels among chronically infected patients with close and negative association.

Furthermore, lower vitamin D levels in negative HBsAg compared with positive HBsAg patients were studied in limited researches. It is understood that levels of vitamin D may have decreased in CHB patients. Almost in all of the studies, it can be found that vitamin D levels were analyzed in patients chronically infected. On the other hand, in most of the published studies conducted on Iranian population, the prevalence rate of vitamin D deficiency varied from 2.5% to 98% in different regions based on geographical discrepancies. Generally, according to the present national reports, the vitamin D content

is low in the Iranian diet (8,9). The fact is that some potential confounders may influence vitamin D serum levels. The disparate results obtained in interventional studies about vitamin D effect on immunity may not be due to serum levels of vitamin D, but to methodological and pharmacological differences and the vitamin D transporter protein, with perhaps a better response in deficient patients with vitamin D3 in daily or weekly doses (11).

For determination of vitamin D deficiency or insufficiency as the biomarker of CHB, newly designed studies may be required in order to understand the real association of vitamin D with HBV-associated factors. Therefore, future studies should be conducted on the possible causal relationship between vitamin D metabolism and HBV replication which can be attractive and offer therapeutic opportunities for the treatment of chronic hepatitis B.

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