

Vitamin D, Inflammation and Schizophrenia: What's the Relationship?

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A recent study found that individuals with high C-reactive protein levels and low vitamin D status are at a significantly increased risk for schizophrenia compared to those with low C-reactive protein levels and high vitamin D status.

Schizophrenia is a chronic and disabling mental disorder characterized by the inability to recognize what is real, resulting in delusions and hallucinations. A combination of genetic and environmental factors are thought to be the cause of schizophrenia.

Studies have reported that patients with schizophrenia have elevated inflammatory markers. This led researchers to the idea that inflammation plays a role in the pathogenesis of schizophrenia.

Vitamin D levels have also been linked to inflammation, with high vitamin D levels associated with decreased inflammation. Therefore, in the current study, researchers tested the hypothesis that high vitamin D status is linked to low inflammation and reduced risk of schizophrenia.

The researchers measured vitamin D status and C-reactive protein (a common inflammatory marker) in 93 patients with schizophrenia and 93 family-matched controls. The participants were enrolled between January 2012 and December 2013 at Anhui Mental Health Center located in Hefei, Anhui Province, China.

The researchers wanted to know if vitamin D levels were associated with the risk of schizophrenia. Was C-reactive protein linked to schizophrenia? Lastly, were vitamin D levels inversely related to C-reactive protein? Here is what they found:

- The average vitamin D levels of the patients and the family matched controls were 10.5 ng/ml and 17.5 ng/ml, respectively.
- The average vitamin D levels of patients with schizophrenia were 39.6% lower compared to controls. This difference was considered statistically significant before and after adjusting for confounders ($p < 0.001$).
- Patients with schizophrenia had 38.5% higher average C-reactive protein levels compared to controls. This relationship was considered statistically significant before and after adjusting for confounders ($p < 0.001$).
- Those with the highest C-reactive protein levels had 24.57 increased odds of schizophrenia compared to those with the lowest C-reactive protein levels.
- Those with the lowest vitamin D levels had 6.53 increased odds of schizophrenia compared to those with the highest vitamin D levels.
- Vitamin D status was significantly inversely related to C-reactive protein levels in patients with schizophrenia.
- Participants with both high C-reactive protein and low vitamin D status had the highest proportion of schizophrenia. Those with high C-reactive protein levels and low vitamin D status had 36.01 increased odds of having schizophrenia compared to those with low C-reactive protein levels and high vitamin D status.

The researchers concluded,

“Elevated levels of CRP or decreasing levels of 25(OH)D were independently associated with increased risk of schizophrenia.”

They went on to state,

“Intriguingly, we found that 25(OH)D were significantly inversely associated with CRP in patients with schizophrenia. Although these findings cannot establish causality, the findings suggested that high levels of vitamin D may be linked to reduced risk of schizophrenia with elevated CRP.”

The researchers proposed a theory that high vitamin D levels may decrease the risk of schizophrenia by reducing inflammation and protecting against neurobiological damage related to schizophrenia. However, this mechanism is merely a theory and still needs to be tested.

The study possesses several important strengths along with limitations to acknowledge. The researchers adjusted for many potential confounding factors. Additionally, the study used matched family members as controls, which would likely reduce genetic and environmental confounders. On the contrary, the researchers did not adjust the findings for physical activity. Patients with schizophrenia may spend more time indoors with less physical activity, which results in decreased vitamin D levels. Therefore, low vitamin D levels may contribute to the development of schizophrenia, or low vitamin D status may be merely a result of staying indoors more.

The researchers called for further randomized controlled trials to confirm the role of vitamin D supplementation on inflammation in patients with schizophrenia.

Source

Zhu D., et al. High levels of vitamin D in relation to reduced risk of schizophrenia with elevated C-reactive protein. Elsevier, 2015.