

# Low cortisol levels may increase risk of depression in bipolar disorder

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Bipolar disorder is characterized by transitions between depression and mania.  
Credit: Wikipedia

Depression is almost twice as common, and poor quality of life almost

five times as common, in people with bipolar disorder who have elevated or low levels of the stress hormone cortisol in the blood. Researchers at Umeå University, Sweden, report this in a study published in the journal *PLOS ONE*.

"In bipolar [depression](#) the stress system is often activated, which means that the affected individuals have elevated cortisol levels in the blood. We have now been able to show that both over- and underactivity in the stress system, with corresponding elevated or reduced cortisol levels, can impair mental health in terms of depression and poor quality of life in these patients," says Martin Maripuu, a PhD student at the Department of Clinical Sciences, Psychiatry Unit Umeå University and physician at the psychiatric clinic, Östersund Hospital.

Bipolar disorder is a lifelong disease that causes recurrent episodes of both mania and depression. Stress is a known trigger for these episodes, and depression and mania also adds to the accumulated stress load.

One of the body's main stress systems is the HPA axis. This system regulates the production and level of the vital [stress hormone cortisol](#). Cortisol is a hormone that everyone needs in everyday life in order to cope with various stressful situations, such as pain, illness and stress at work.

Stress causes overactivity in the stress system, resulting in elevated levels of cortisol. If the stress continues in the long-term, it is believed to cause an underactivity in the stress system, which results in low cortisol levels.

Previous studies have shown that the stress system is often overactive in patients with bipolar depression. To investigate the relationship between cortisol levels and depression among these patients, the researchers at Umeå University conducted a study with 145 patients who had [bipolar disorder](#), as well as 145 people in a control group. The researchers

measured cortisol levels in the participants, both under normal conditions and after the participants had completed a so-called dexamethasone suppression test, which is sensitive to early abnormalities in the stress system.

The results of the study show that more than half of the patients with bipolar disorder who had elevated or low levels of cortisol in the blood, also had depression. Depression was additionally almost twice as common in those who had [high cortisol](#) levels and in those who had low cortisol levels, compared with those who had normal levels of the hormone in the blood. Prevalence of low quality of life was six times more common in the group with low cortisol levels and nearly five times more common among those with high cortisol levels, compared with those who exhibited normal activity in the stress system.

The study also shows that people who had low cortisol levels, on average, have had their disease longer than those with [high cortisol levels](#), which could suggest that [chronic stress](#) in bipolar disorder can lead to an "exhaustion" of the stress system with reduced cortisol levels as a result. The researchers also believe that the low cortisol levels, once developed, can contribute to a more chronic, manifested state of the disorder.

"These are important results that in the future could contribute to a more personally tailored medical treatment of bipolar disorder. The results may also ultimately lead to the development of new drugs that work by normalizing the stress system and [cortisol levels](#)," says Martin Maripuu.

**More information:** [dx.plos.org/10.1371/journal.pone.0098682](https://doi.org/10.1371/journal.pone.0098682)

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