How Anxiety and Insomnia May Make You More Prone to Disease

A new study finds that anxiety and insomnia may lower your natural killer cell count, potentially repressing immune function.

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SUMMARY: Anxiety and insomnia have been shown to weaken the immune system and make us more prone to disease. Now, researchers found that this may be because experiencing symptoms of either can reduce the number of natural killer cells, our bodies' machinery for defense. Their findings showed that in young women who experience insomnia symptoms, the number of total NK cells was lower. If they experienced anxiety symptoms, the number of NK cells that circulate through the body was lower. These findings could inform the development of novel strategies to raise awareness about the physiological consequences of anxiety and insomnia and help in the prevention of immune-related disorders and cancers, the team said.

Natural killer (NK) cells are the bodyguards of our immune system. As a first line of defense, they destroy invading pathogens, foreign bodies, and infected cells in early stages, thereby preventing them from spreading. NK cells can circulate within the blood stream (circulatory) or reside in tissue and organs. Having too few NK cells can lead to immune system dysfunction and increase susceptibility to disease.

Anxiety disorder and insomnia are two conditions that can disrupt the normal functioning of the immune system. Given these disorders are on the rise, researchers in Saudi Arabia have now examined the association between anxiety, insomnia, and NK cells in young, female students. They published their results in Frontiers in Immunology.

"We found that in students with insomnia symptoms, count and percentage of total NK cells and their sub-populations were declined," said first author Dr. Renad Alhamawi, an assistant professor of immunology and immunotherapy at Taibah University. "Students with general anxiety symptoms, on the other hand, had a lower percentage and number of circulatory NK cells and their sub-populations, compared to symptom-free students."

Decimated defense

60 female students, aged between 17 and 23 years old, participated in the study. They filled out

three questionnaires about sociodemographics as well as anxiety and insomnia symptoms. The symptoms of the latter two were self-reported. The surveys showed that around 53% of the participants reported sleeping disturbance suggestive of insomnia, and 75% reported anxiety symptoms, with around 17% and 13% reporting moderate and severe symptoms, respectively.

Participants also provided blood samples through which percentages of NK cells and their subtypes were determined. NK cells have two subtypes: CD16+CD56dim cells make up the majority of NK cells in the nervous system that connects the central nervous system to the rest of the body (peripheral NK cells). Cells belonging to this subtype also exhibit cytotoxicity, which means they can damage or kills cells that invade the body. The other subtype, CD16+CD56high cells, are less frequent and involved in the production of proteins that function as chemical messengers and in immunoregulation. Both subtypes are circulatory NK cells.

The results showed that students with anxiety symptoms had a lower percentage and number of circulatory NK cells and their sub-populations, compared to students who did not report symptoms. Severity of symptoms also played a role as students with moderate and severe anxiety symptoms had a significant lower percentage of circulatory NK cells compared to students without them. Among students with minimal or mild anxiety symptoms, only a statistically insignificant decline in NK cell percentage was observed. In students with insomnia symptoms, higher anxiety scores were negatively associated with the proportion of total peripheral NK cells.

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Stressed immune systems

A reduction of these cells can lead to the impairment of the immune system, which may result in diseases, cancers, and mental disease, including depression. “Understanding how these psychological stressors influence the distribution and activity of immune cells, especially peripheral NK cells, may provide valuable insights into the mechanisms underlying inflammation and tumorigenesis,” Alhamawi explained.

The study is limited in some respects, the team pointed out. It only included young females – the group amongst whom anxiety and sleeping disorders have been rising disproportionally, limiting the generalizability of the results. The researchers said that future studies that include different age groups, sexes, and people from different regions, are necessary to gain a better overall view of the hidden effects of anxiety and insomnia on the proportion and function of these immune cells.

Previous studies have suggested healthy lifestyles with regular physical activity, stress reduction, and a healthy and balanced diet can boost the number and function of NK cells. However, the impact of anxiety and insomnia can disrupt the normal functioning of various body systems, including the immune system, thereby contributing to the development of chronic and inflammatory diseases. “Such impacts ultimately compromise overall health and quality of life,”

concluded Alhamawi.

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