Chronic Pain Associated With Measurable Cognitive Difficulties

A new study combining a meta-analysis of 67 published studies with data from more than 37,000 UK Biobank participants found that people with chronic pain generally performed worse on cognitive tests than people without pain. The average differences were small to moderate and tended to be greater among people reporting more severe or widespread pain.

Researchers at McGill University in Canada first analyzed 67 studies involving 2,993 people with chronic pain and 3,906 controls. They then examined UK Biobank data from 29,787 people with chronic pain and 7,352 pain-free controls. The two approaches allowed them to compare findings from clinical research with those from a larger, community-based population.

The meta-analysis found a moderate difference in objective cognitive performance between the chronic pain and control groups (effect size = 0.48). In the UK Biobank, differences were generally smaller (effect sizes = 0.04–0.30). The cognitive tests assessed several abilities, including memory, reasoning, and executive functioning, which involves skills such as attention, planning, and organizing information.

The researchers did not find consistent evidence that one broad area of cognition was more affected than others. Cognitive differences were also observed across multiple chronic pain conditions, although the size of the differences varied between studies and diagnoses. This suggests that some of the cognitive effects may be associated with persistent pain rather than being unique to any one condition.

Pain severity was an important factor. In the meta-analysis, greater pain intensity was associated with larger differences in cognitive test performance. In the UK Biobank, people reporting pain in more body regions generally had greater cognitive differences, although the associations between individual pain measures and test results were mostly small.

The study also compared patients' assessments of their own cognitive difficulties with results from standardized cognitive testing. In the meta-analysis, differences based on self-reported difficulties were nearly three times as large as differences measured by performance-based tests (effect sizes = 1.35 and 0.48, respectively). This does not mean patients' experiences were inaccurate. Formal cognitive tests assess performance under specific conditions and may not fully reflect the demands of daily life while managing ongoing pain.

In another analysis, the researchers used cognitive test scores to estimate a statistical "cognitive age." Participants reporting pain in four or more body regions showed a pattern of performance resembling that of older individuals. However, the study did not demonstrate accelerated brain aging or a faster rate of cognitive decline. The cognitive-age measure was model-based, and the comparisons were made at one point in time.

These results are relevant to Chiari patients, many of whom experience chronic pain and report difficulties with concentration, memory, and other cognitive functions. Previous Chiari studies have identified cognitive differences, but separating neurological effects associated with Chiari from the effects of ongoing pain remains challenging. The present study supports considering pain severity as one potential contributor, without establishing that it accounts for all cognitive symptoms in Chiari.

Several limitations are important. Results varied substantially across the studies in the meta-analysis, which used different cognitive tests and included different pain conditions. In the UK Biobank, differences were generally modest and the design could not determine whether chronic pain caused poorer cognitive performance. Depression, anxiety, fatigue, sleep problems, medication use, and other factors could also contribute. The findings therefore describe average group differences rather than predicting the experience of any individual patient.

Source: Gentile E, Guglietti G, Haward B, et al. Unraveling the profile of cognitive deficits associated with chronic pain: a meta-analysis and cross-sectional study. Pain. 2026;167(12):2701–2714. doi:10.1097/j.pain.0000000000004085.

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