

Routine blood test may suggest future dementia risk

- *People with unusually low or unusually high haemoglobin levels were more likely to develop dementia over up to 15 years of follow-up*

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Munich, Germany: A common blood test already carried out during routine health checks may contain clues about a person's long-term risk of dementia, according to research being presented at the ECNP Congress in Munich and recently published in the *Journal of Alzheimer's Disease*.

The study followed 316,542 Korean adults aged 40 and over who had a national health screening in 2004–2005, then used national health insurance records to track new dementia diagnoses until the end of 2019 — up to 15 years later. The researchers categorized the participants into 5 groups, from the 20% with the lowest haemoglobin levels, through to the 20% with the highest haemoglobin levels. Researchers found that people in the lowest 20% of haemoglobin levels had a 16% higher risk of all-cause dementia than those in the group with the lowest dementia rate, while those in the highest 20% had a 7% higher risk.

The pattern differed by dementia type. For Alzheimer's disease, the increased risk was mainly seen amongst the 20% of people with the lowest haemoglobin levels, who had a 14% higher risk than the reference group. For vascular dementia (caused by reduced blood flow to the brain), the 20% with lowest haemoglobin levels had a 19% higher risk, whereas the 20% with the highest haemoglobin levels had an 18% greater risk of developing dementia. For vascular dementia, however, the relationship did not follow a simple pattern across all five haemoglobin groups. The association was also clearer and more consistent in women than in men.

Haemoglobin is the protein in red blood cells that carries oxygen around the body. Low haemoglobin is commonly associated with anaemia, while unusually high haemoglobin may reflect factors such as smoking, dehydration, lung or heart disease, or other medical conditions.

Presenting the work at the 39th ECNP Congress in Munich, lead researcher Dr Hyun Soo Kim, assistant professor at Dong-A University College of Medicine, Busan, South Korea said:

“The findings do not show that haemoglobin itself causes dementia, but suggest that abnormal haemoglobin levels may be a visible marker of wider physical vulnerability relevant to brain health”.

He continued *“Dementia is one of the fastest-growing health challenges in aging societies, and there are not many treatments and no cure. Identifying simple, accessible markers of future risk could help researchers and clinicians better understand how whole-body health relates to brain health over time”.*

The study is notable because haemoglobin is already measured in standard blood tests around the world. Unlike specialist scans or emerging biomarkers, it is inexpensive, familiar to doctors and patients, and often already available in routine medical records.

Dr Kim added, *“A blood test most people already get at a routine check-up may say*

something about their brain health many years later. In this large Korean cohort, people with unusually low haemoglobin — and, to a smaller degree, those with unusually high haemoglobin — were more likely to develop dementia. This does not prove that haemoglobin causes dementia, but it supports the idea that general physical health, including the body's ability to carry oxygen, matters for long-term brain health”.

The researchers stress that this was an observational study and so comes with several caveats. It can identify associations, but it cannot prove that low or high haemoglobin directly causes dementia. Early, undiagnosed dementia processes may also affect nutrition, frailty, weight loss, or anaemia, which could contribute to the observed relationship.

Dr Kim said “*We want to emphasise that the findings should not be interpreted as advice to take iron supplements, to raise haemoglobin levels, or to lower high haemoglobin levels in order to prevent dementia. An abnormal haemoglobin result should instead be discussed with a doctor, because it may point to underlying health issues that deserve attention”.*

Commenting, Dr Lindsey Sinclair (University of Southampton) said:

“There is a growing body of evidence that physical health and brain health are intertwined. We are also increasingly aware that changes supporting better brain health, be they medical or lifestyle changes, are important in mid-life to reduce the risk of later dementia. Whilst this study shows a possible link between haemoglobin levels and dementia risk, more work is required to understand if this link is present in people from a wider range of backgrounds; and what can best be done to reduce dementia risk in people with the lowest and highest levels of haemoglobin”.

Dr Sinclair was not involved in this work; this is an independent comment.

Notes for Editors

This work is presented at the 39th ECNP (European College of Neuropsychopharmacology) Congress, taking place in Munich and online 10th-13th October 2026, see <https://www.ecnp.eu/congress2026/> The ECNP Congress is Europe's leading platform for the science and treatment of brain disorders.

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Publication details

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The findings are being presented as a poster at the 2026 ECNP Congress in Munich. The ECNP abstract is based on the same dataset and analyses as the published paper. Comments in the press release do not appear in the paper.

Conference abstract

The association between haemoglobin level and risk of developing dementia

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Background: Dementia is a major global health challenge with rapidly increasing prevalence in aging societies. Despite extensive research, effective disease-modifying treatments remain limited, highlighting the importance of identifying modifiable risk factors. Haemoglobin levels, as indicators of systemic health and oxygen-carrying capacity, have been associated with various adverse outcomes, including cardiovascular disease and stroke. Both low and high haemoglobin levels may influence cerebral perfusion and vascular integrity. However, previous studies examining the relationship between haemoglobin levels and dementia risk have yielded inconsistent findings, and large-scale population-based evidence remains limited. In addition, potential sex differences in this association have not been fully clarified.

Objective: This study aimed to investigate the association between haemoglobin levels and the incidence of all-cause dementia and its subtypes in a nationwide Korean cohort, and to evaluate whether these associations differ according to sex.

Methods: We conducted a retrospective cohort study using data from the National Health Insurance Service–National Health Screening Cohort (NHIS-HEALS). A total of 316,542 adults aged ≥40 years who underwent health screening in 2004–2005 were included and followed until 2019. Haemoglobin levels were categorized into sex-specific quintiles after excluding extreme values (top and bottom 1%). Dementia was defined based on ICD-10 diagnostic codes combined with prescriptions for anti-dementia medications to improve diagnostic validity. Outcomes included all-cause dementia, Alzheimer’s dementia, and vascular dementia. Multivariable Cox proportional hazards models were used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs), adjusting for demographic characteristics, socioeconomic status, lifestyle factors, and comorbid conditions. Restricted cubic spline analyses were performed to assess potential nonlinear associations, and sex-stratified analyses were conducted to explore effect modification.

Results: During follow-up, both low and high haemoglobin levels were associated with an increased risk of all-cause dementia compared to the reference (fourth quintile). The adjusted HRs were 1.16 for the lowest quintile and 1.07 for the highest quintile (NOTE: these are the correct figures, the original conference abstract contained an early version). For Alzheimer’s dementia, increased risk was observed primarily in the lower haemoglobin quintiles, showing a graded association. In contrast, vascular dementia risk was elevated at both low and high haemoglobin levels, suggesting distinct underlying mechanisms. Restricted cubic spline analyses demonstrated a nonlinear association, with a more pronounced increase in risk at lower haemoglobin levels. Notably, sex-stratified analyses revealed that these associations were stronger and more consistent in women, whereas no clear significant associations were observed in men.

Conclusions: Abnormal haemoglobin levels, particularly low levels, are associated with an increased risk of dementia, with distinct patterns across dementia subtypes. The stronger associations observed in women suggest potential sex-specific biological mechanisms, possibly related to hormonal or vascular differences. Given that haemoglobin levels are modifiable through clinical management and lifestyle interventions, these findings highlight a potential target for dementia prevention and risk stratification in population-based settings. These results may also support the integration of routine hematologic parameters into population-level screening strategies for early identification of individuals at elevated risk of dementia.