

Title: Predicting stress-related disorders from laboratory biomarkers in Finnish electronic health records

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Abstract

Motivation: Stress-related disorders predict subsequent somatic conditions, suggesting they involve systemic mechanisms, yet biomarker evidence remains fragmented across physiological systems.

Objective: To investigate whether routinely collected laboratory biomarkers predict the onset of stress-related disorders and analyze their temporal trends prior to diagnosis.

Methods: Nested case-control study using electronic health records from Central Finland (2010-2023). The study included 73,909 participants aged 34-92 at baseline, with 6,758 cases and 67,151 controls, frequency matched on sex and birth year. Ten routine biomarkers were examined: C-reactive protein, hemoglobin, glucose, HbA1c, triglycerides, high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C), creatinine, sodium, and potassium. Temporal trends were visualized using generalized additive models, and Cox proportional hazards models were used to assess whether biomarker levels measured within one year prior to diagnosis predicted the onset of stress-related disorders.

Results: Five biomarkers predicted stress-related disorders within one year prior to diagnosis. Higher potassium (HR 0.73; 95% CI, 0.63–0.84) and higher HDL-C (HR 0.83; 95% CI, 0.74–0.92) were associated with reduced risk, whereas higher LDL-C increased risk (HR 1.10; 95% CI, 1.05–1.16). Higher hemoglobin and sodium were associated with small reductions in risk. Temporal trend analysis indicated lipid differences were detectable years before diagnosis, whereas potassium, sodium, and hemoglobin changes were more transient.

Conclusions: Several routine laboratory markers predict stress-related disorders up to one year in advance, with potassium and lipids showing strongest effects. These findings contribute to understanding the systemic nature of stress-related disorders and identify opportunities for preventive and integrative care approaches.