Brain Derived Neurotrophic Factor alterations in patients with suicide risk

A Systematic Review and Meta-analysis

Abstract

Brain Derived Neurotrophic factor levels (BDNF) have been investigated in the context of hormonal and endocrine biomarkers of suicide risk. Cross-sectional studies have compared BDNF between patients with versus without suicide risk. Several studies have found lower BDNF levels in patients with suicide risk compared to patients without, while few studies did not report significant differences. This study aims to systematically review and meta-analyze data to examine differences for (plasma and serum) BDNF levels between patients with versus without suicide risk. The primary outcomes will be measured as the mean or standardized mean differences for peripheral serum or plasma blood concentrations of BDNF. Further analyses will encompass subgroup analyses and meta-regression assessing the impact of factors such as age, sex, body mass index, diagnosis, psychotropic medications, symptom severity and publication year. Results will be published in a peer-reviewed journal.

Introduction:

Numerous factors have been studied in the context of risk of suicidal behavior. Research has shown that the majority of fatal and non-fatal suicidal behaviors co-occur with the presence of a psychiatric illness. The neurochemical mechanisms related to suicidal behaviors are particularly complex and poorly understood.[1] Brain Derived Neurotrophic Factor (BDNF) is found to play a critical role in several neural processes, including/by enhancing neurogenesis, neurotransmission, and neuroplasticity.[2,3] BDNF is a protein that is primarily produced in the central nervous system. The protein is unique, however, as it has been shown to cross the blood-brain barrier. The levels of BDNF in the bloodstream are reflective of those in the brain.[2] Evidence shows significantly lower levels of BDNF in patients with a psychiatric disorders compared to healthy controls. [4–7] Moreover, lower BDNF levels were reported in patients who had

previously attempted suicide compared to patients who had not.[4,6,7] However, available data are inconsistent. The aim of this study is to systematically review and meta-analyze BDNF levels in patients with suicide risk compared to patients without suicide risk in order to provide insight on the pathophysiology of suicide risk.

Methods

Search strategy

We will perform a systematic review and meta-analysis. Our search will include Google Scholar, Pub Med, and Embase search engines for all studies predating January 12th 2019.

Inclusion & exclusion criteria

Cross sectional and case control trials with BDNF assessments in patients with and without suicide risk or healthy controls.

Patient Population

Patients with and without suicide risk.

Control

Patient control and healthy control groups without suicide risk.

Main Outcome

Standardized mean differences or mean differences between patients with and without suicide risk.

Secondary Outcome

Effects of age, sex, body mass index (BMI), diagnosis, medications, symptom severity.

Data extraction

Data will be extracted independently by two of the authors based on PRISMA guidelines statement (12).

Risk of bias assessment

The studies' risk of bias will be assessed by two authors using the modified version of Newcastle-Ottawa scale for cross-sectional studies.

Statistical analysis

Fixed and random effect inverse variance meta-analysis will be performed. Results will be summarized using mean differences (MD) or standard mean differences (SMD) with a 95% confidence interval (CI). The heterogeneity variance parameter (τ^2) will be measured by using the DerSimonian-Laird estimator. Additionally, I^2 statistic will be used to further investigate the heterogeneity by measuring the variability within the analysis. The analysis will be conducted in `meta` package of R v.3.6.1.

Subgroup and meta-regression analyses

Subgroup and meta-regression analyses will be implemented to further investigate the role of moderators/confounders, such as age, sex, BMI, diagnosis, psychotropic medications, symptom severity and year of publication.

Dissemination plans

Results will be published in a peer-reviewed journal.

References:

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