INPLASY PROTOCOL

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INTRODUCTION

Review question / Objective: P: Schizophrenic patients. I: This is a crosssectional study, no intervention.C: healthy people. O: levels of oxidative stress factors and the correlation with cognition. S: cross-sectional study. Condition being studied: Schizophrenia (SZ) is a mental disorder whose core clinical features include positive and negative symptoms, emotional symptoms and cognitive impairment. According to the World Health Organization in 2021, SZ affects more than 24 million people worldwide.And it is frequently associated with significant distress and impairment in

Oxidative Stress and Its Correlation With Cognition in schizophrenia: a Systematic Review and Meta-analysis

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Review question / Objective: P: Schizophrenic patients. I: This is a cross-sectional study, no intervention.C: healthy people. O: levels of oxidative stress factors and the correlation with cognition. S: cross-sectional study.

Information sources: The papers up to October 20, 2022 have been searched on PubMed, Web of Science and Cochrane library. Use the following keywords: "Oxidative Stress" or "Antioxidative Stress" and "Schizophrenia" or "Schizophrenic Disorders" and "Cognition" to search the related papers. We selected a case-control study that included a comparison of oxidative stress levels between the healthy control (HC) group and SZ group, and the correlation between cognitive and oxidative stress levels in SZ patients.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 16 December 2022 and was last updated on 16 December 2022 (registration number INPLASY2022120067). important areas of life and discrimination, which seriously affect the quality of life of patients.

Oxidative Stress (OS) refers to a state that oxidation and antioxidant effects are unbalanced in the body, tending to oxidation, leading to inflammatory infiltration of neutrophils, increased protease secretion, and the generation of a large number of oxidative intermediates. The most common manifestation of oxidative stress is the accumulation of reactive oxygen stress (ROS) represented by superoxide anion, hydrogen peroxide and hydroxyl free radicals. Superoxide dismutase (SOD) and glutathione peroxidase (GSH) play important roles in the redox process of mitochondrial oxidation and NADPH oxidase. In addition. when there is excessive ROS in the brain, N-methyl-D-aspartic acid (NMDA) receptor will be activated to mediate calcium overload and death of neuronal cells.

At present, there isn't robust conclution how does SZ lead to cognitive impairment. It may be related to the abnormal connections of brain neural network arising from interplay of genetic, epigenetic, developmental and environmental factors. However, many evidence shows that increased oxidative stress and cognition impairment have been evidenced in schizophrenia. Breno et al. have found that the overoxidation of serum lipids in SZ patients was significantly related to the decrease of cognitive level, which could be reflected in the levels of serum GSH and thiobarbituric acid reactive substances (TBARS). Two studies verified the influence of abnormal mitochondrial oxidative stress on the cognition of SZ petients and found that the supplementation of antimitochondrial oxidative stress factors such as coenzyme Q and Vitamin C could improve the cognitive impairment of patients. The findings add to the argument that oxidative stress can lead to increased cognitive impairment in schizophrenia.

Although there are a lot of studies supporting the connection between oxidative stress and schizophrenia, there are still a few reports indicating that this conclusion is not applicable in some populations. Therefore, a meta-analysis of schizophrenia with levels of oxidative stress and the association between oxidative stress and cognitive performance of SZ is essential.

METHODS

Participant or population: Schizophrenic patients.

Intervention: This is a cross-sectional study, no intervention.

Comparator: Healthy people.

Study designs to be included: Crosssectional study.

Eligibility criteria: (1) case-control studies written in English;(2) Study on the level of oxidative stress factors in SZ patients and HC group;(3) Study on the relationship between oxidative stress factors and cognition in SZ patients.

Information sources: The papers up to October 20, 2022 have been searched on PubMed, Web of Science and Cochrane library. Use the following keywords: "Oxidative Stress" or "Antioxidative Stress" and "Schizophrenia" or "Schizophrenic Disorders" and "Cognition" to search the related papers. We selected a case-control study that included a comparison of oxidative stress levels between the healthy control (HC) group and SZ group, and the correlation between cognitive and oxidative stress levels in SZ patients.

Main outcome(s): (1)the levels of many oxidative stress factors in healthy people and schizophrenia patients (2)the correlation between oxidative stress factors and cognition in schizophrenia patients.

Quality assessment / Risk of bias analysis: We included the case control studies, so we used the Newcastle–Ottawa scale (NOS) to evaluate the quality of the studies. Strategy of data synthesis: We used Stata version 12.0 (Stata Corp LP, College Station, TX) for all calculations of metaanalysis. Each result parameter was showed by a forest plot. Statistical heterogeneity is evaluated according to P value and I2 using standard chi-square test. When I2>50%, P<0.1 is considered as significant heterogeneity, that is, a random effect model is used. Otherwise, the fixed effect model is adopted.The continuous results are represented by standard mean difference (SMD) with 95% confidence interval (CI).

Subgroup analysis: If possible, subgroup analysis is conducted to explore the origin of heterogeneity. We will perform a subgroup analysis based on first episode and chronic patients.

Sensitivity analysis: We performed sensitivity analyses when the number of included studies was more than or equal to five, and there was high heterogeneity between studies, and sources of heterogeneity could not be identified by subgroup analysis.

Country(ies) involved: China.

Keywords: oxidative stress, Schizophrenia, cognition.

Contributions of each author:

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