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Omega-3, Metabolic Syndrome, and Schizophrenia: A review

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ABSTRACT

According to the literature, schizophrenia is associated with the components of metabolic syndrome. This mental disorder has such manifestations as visceral obesity, impaired lipid metabolism, hyperglycemia, and hypertension. The prevalence rate of schizophrenia varies in different countries. There is a body of evidence about the higher incidence of cardiovascular events in the schizophrenic patients with metabolic syndrome. Therefore, the prevention or treatment of this condition in sthese patients is a matter of fundamental importance. Fish oils, commonly used by people, contain omega-3 fatty acid. Omega-3 has been demonstrated to be effective in the patients with metabolic syndrome.

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Introduction

The association between **s**chizophrenia and the components of the metabolic syndrome has been demonstrated in various studies.

This disorder is identified by such symptoms as visceral obesity, impaired lipid metabolism, hyperglycemia, and hypertension (1).

Many studies have demonstrated high cardiovascular-related mortality rate and short life span in the patients suffering from metabolic syndrome.

However, the mechanism underlying the high incidence of metabolic disorders among the schizophrenic patients is not well illuminated yet.

Nevertheless, some reasons have been proposed in this regard including poor lifestyle, dietary habits, and direct effect of antipsychotic medications on metabolism (2-4).

The prevalence of metabolic syndrome in the schizophrenic patients varies from 10-30% based on the antipsychotic drug administration.

There are some shortcomings in many of the available studies investigating this issue including the employment of small sample size, the use of cross-sectional studies rather than control trials, and no use of matched-group design with regard to different medications (5).

Although schizophrenia itself is an important risk factor for metabolic syndrome, some disease-specific risk factors contribute to the increasing mortality rate of this disorder. These risk factors include genetic factors, antipsychotic drugs, and inappropriate lifestyle due to negative symptoms, smoking, and substance or alcohol abuse (6). The patients with psychotic disorders have a reduced life expectancy with higher rate of physical co-morbidities due to a poor or unhealthy life style and the complications of antipsychotic treatment (7). The mortality rate in the patients affected by schizophrenia is 2-3 times higher than that in the general population.

This is due to the fact that the suicide, cardiovascular events, and metabolic diseases are more common in these patients (7).

The antipsychotic agents have a great impact on the modifiable risk factors leading to weight gain and other metabolic changes (e.g., insulin resistance, dyslipidemia, and hypertension) (8).

Regarding this, it is crucial to prevent or treat this condition in the **s**chizophrenic patients. Fish oils, commonly used by people, contain omega-3 fatty acid.

Omega-3 has been demonstrated to be effective in the patients with metabolic syndrome (9-11). In some countries, omega-3 is an over-the-counter drug.

With this background in mind, in the current study, we aimed to perform a review over the recently

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published articles on the association between metabolic syndrome and **s**chizophrenia.

Materials and Methods

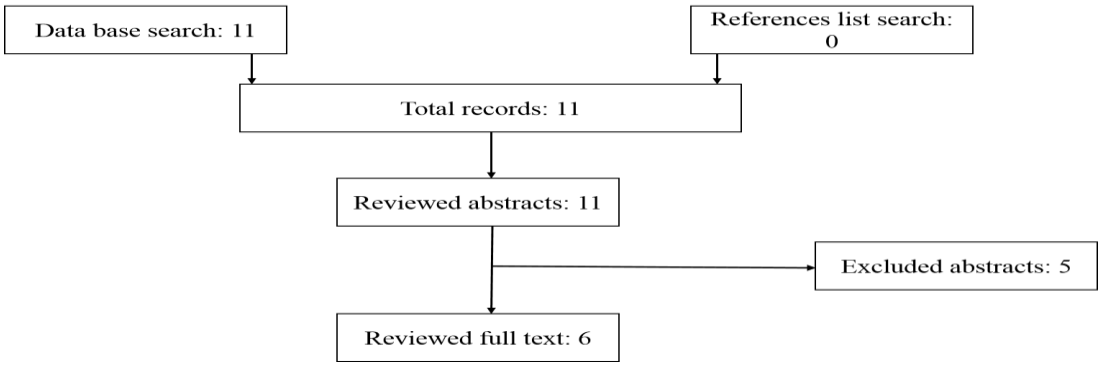
The articles, which were published up to November, 2016, were selected through searching the PubMed database. Our keywords and medical subject headings were broad terms such as "**s**chizophrenia" AND "metabolic syndrome" AND "Omega-3". Subsequently, the reference lists of the retrieved articles were examined to identify the additional related articles. Finally, those articles with available abstract and full text in English language were included in the study.

Critical appraisal

First, the abstracts were reviewed by two independent researchers. As a result, 11 abstracts were screened for relevancy two times, and none of them was excluded. The 11 abstracts were fully assessed by our reviewers. Based on the study type, five articles were excluded from the study. To assess the quality of the retrieved studies, the consolidated standards of reporting trials checklist was employed. The meta-analysis was not performed due to the heterogeneity of the findings of these studies.

Results

The flow diagram of literature search process is presented in Figure1.



Discussion & Conclusion

The mechanism of metabolic syndrome in the schizophrenic patients is not fully understood yet. There is a bulk of evidence regarding the higher incidence of cardiovascular events in the schizophrenic patients with metabolic syndrome. Consequently, the prevention or treatment of this condition in the patients afflicted with schizophrenia is crucial. The alterations of the hypothalamic-pituitary-adrenal axis or hippocampal volume are proposed for the impaired lipid and carbohydrate metabolism in hypercortisolism (12-14). Recent studies have revealed that the long-chain Omega-3 Fatty Acids (OM3FAs) can effectively reduce the Triglyceride (TG) levels (12). In the 2016 Standards of Medical Care in Diabetes, which was published by the American Diabetes Association, the use of OM3FAs is recommended in all diabetic patients with hypertriglyceridemia. Omega-3 can directly decrease the low-density lipoprotein and TG levels. The safety and tolerability of the OM3FAs have been demonstrated in the literature (13), and no serious drug interaction was reported after its usage (14).

Brain autopsy revealed reduced levels of polyunsaturated fatty acids, particularly docosahexaenoic and arachidonic acids, in the frontal lobes of the schizophrenic patients. Furthermore, the deficiency of polyunsaturated fatty acids in neuronal membrane is correlated with abnormality in these patients (15). According to a recent study, carried out in Australia, low omega-3 index in people with mental illness, especially schizophrenia, can contribute to higher cardiovascular disease mortality (16).

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