



## Exercise, diet and educational interventions for metabolic syndrome in persons with schizophrenia: A systematic review



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### ABSTRACT

**Introduction:** Individuals with major psychotic disorders such as schizophrenia are at increased risk for developing metabolic syndrome due to lifestyle- and treatment-related factors. Numerous interventions have been tested in inpatient and outpatient mental health settings to decrease risk factors. Diet and exercise represent the mainstay of weight loss treatment. With this background the review aimed to evaluate the effects of psychoeducation, diet and physical activity interventions on reduction of metabolic syndrome risk factors such as BMI, Body weight, biochemical profiles in schizophrenia.

**Methods:** The authors conducted database searches of PsychINFO, MEDLINE, Pubmed, Proquest, EBSCO and the Cochrane Database of Systematic Reviews, and manual searches from 1968 to 2017. Search identified 11 studies that met the inclusion criteria. Study quality was critically appraised by 2 reviewers using established criteria. The outcome measures were body mass index, body weight, waist circumference, lipid profile, fasting glucose.

**Results:** Interventions led to significant weight reduction (8 studies), reduced body mass index (5 studies), decreased waist circumference (4 studies) and lower blood glucose levels (5 studies). Dietician and nurse led interventions (6 studies). The studies showed non pharmacological interventions were effective in reducing risk factors.

**Conclusion:** This review was able to demonstrate effectiveness of psychoeducation, diet and physical activity interventions were helpful to decrease and manage antipsychotic-induced weight gain. Results showed lifestyle interventions are safer and effective for promoting decrease or maintenance of weight and it can be delivered at low cost, safe and improves quality of life.

### 1. Introduction

Individuals with severe mental illness particularly schizophrenia and schizophreniform disorders suffer from psychotic symptoms such as hallucinations and delusions. These individuals are at risk for developing obesity, impaired glucose tolerance, metabolic syndrome, and type II diabetes mellitus (Bruins et al., 2014b). Obesity is a serious problem in people with schizophrenia. The prevalence of obesity among persons with psychotic disorders is 41–50% (Dickerson et al., 2006), which is substantially higher than the 20–27% prevalence in the general population. Atypical antipsychotic drugs are commonly used to treat schizophrenia. These drugs are shown to be associated with an increased risk for diabetes, in addition to varying degrees of metabolic adverse effects, such as weight gain, dyslipidemia and in some cases,

cardiovascular disease (Subashini et al., 2011) which is sometimes referred to as syndrome X (Lieberman, 2004).

The metabolic syndrome is a constellation of different conditions, including abdominal obesity, insulin resistance, dyslipidaemia and elevated blood pressure. All components of metabolic syndrome have been recognized as independent risk factors for cardiovascular disease (Cornier et al., 2008). The cardiovascular risk that is imposed by obesity is about four times higher in people with psychotic disorders (Ratliff et al., 2013). Obesity with weight gain and associated increased waist circumference, high blood pressure, higher levels of triglycerides, high cholesterol and higher levels of fasting glucose and insulin contribute to the risk of cardiovascular disease and premature mortality (Scott and Happell, 2011).

For people with psychiatric disorders particularly in schizophrenia

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consistently suggest that healthy lifestyle interventions might decrease cardiovascular risk and early mortality. Interventions that include physical activity, exercise programmes and improved nutritional habits presumably lead to weight reduction and increased cardiovascular fitness (Verhaeghe et al., 2011). Till date, several studies have examined the effectiveness of different lifestyle interventions in patients with psychotic disorders including schizophrenia; numerous randomized controlled trials (RCTs) as well as a number of meta-analyses (Bruins et al., 2014a) and systematic reviews have been published (Cimo et al., 2012; Nover and Jackson, 2013).

Therefore, people with schizophrenia require careful baseline assessment and ongoing monitoring of physical health parameters. (Beebe, 2008) The treatment and prevention strategies should include encouraging healthy lifestyles, appropriate diet and levels of activity, with contribution of both mental health professionals and primary care providers (Osborn et al., 2007). The European Psychiatric Association stated that maintaining a healthy body weight and shape by healthy eating and regular physical activity is a key component in order to reduce the risk of some important somatic diseases such as Cardio Vascular Diseases and to improve the overall health and well-being of patients (De Hert et al., 2009).

It is of supreme importance to develop and implement strategies which can prevent and tackle this problem in this particular group of patients. It is also imperative that the awareness of health care professionals should be increased regarding this insidious but also potentially lethal condition.

This review focuses with the objectives to identify the effects of physical activity, exercise, dietary, psycho educational and combined interventions targeting physical health and improving cardiovascular risk factors in patients with schizophrenia. It also evaluates the effects on weight, BMI, waist circumference, blood pressure and biochemical profiles by lifestyle interventions targeting diet, eating habits, physical exercises in persons with schizophrenia.

The specific questions to be answered by this review of randomised controlled trials (RCTs) were the following.

- a) Do nutrition interventions and exercise interventions improve anthropometric measures and biochemical profiles of people with Schizophrenia?
- b) Are these interventions feasible for people with Schizophrenia?

## 2. Materials & methods

### 2.1. Inclusion criteria

We adhered to the PRISMA reporting guidelines (Moher et al., 2009). Systematic search for all randomized controlled trials evaluating the effects of lifestyle interventions on weight management in patients with psychotic disorders such as schizophrenia and schizophreniform disorders was conducted from inception to December 2017. The following electronic databases were searched: PubMed, Science Direct, PsycINFO and MEDLINE, ProQuest, ProQuest Digital Dissertations, EBSCO Search terms included: “schizophrenia” or “schizophrenic” or “psychotic” or “schizoaffective disorder” or “mental disorder” or “mentally ill” or “psychiatric disorders” or “antipsychotic” and Boolean terms like “lifestyle intervention” or “diet” or “physical activity” or “nutrition” or “lifestyle” or “body weight” or “weight loss” or “weight management” or “exercise” or “weight gain” “psychoeducation”, “intervention”, “metabolic” or “metabolic syndrome” or “health”. Further papers were found by hand-searching the references of all retrieved articles and previous reviews.

Review included all randomized controlled trials (RCTs) that examined lifestyle interventions; i.e. interventions either targeting overweight patients in order to help them lose weight, or patients in the early stages of their illness in order to help them prevent antipsychotic induced weight gain with participants diagnosed with schizophrenia,

schizophrenia-spectrum disorders using ICD 10 criteria. With age group of 18 yrs or older. Interventions were considered lifestyle interventions when they had a nutritional element, physical activity and/ aimed at weight loss or weight gain prevention. In eligible studies, all included subjects were diagnosed with schizophrenia and study outcomes were reduction in either body weight or cardiometabolic risk factors (e.g. waist circumference, blood pressure, blood lipids, glucose and/or insulin).

Pharmacological interventions were excluded, as were non-randomized studies and studies that did not qualify as lifestyle interventions. These selection criteria were first applied to the title. When the title did not present exclusion criteria (e.g. non-RCT, no intervention, no psychotic disorders) or was inconclusive, the abstracts of the articles were read and where necessary the full articles. Finally, the bibliographies of selected articles were searched for relevant references to be included in our review.

The primary outcome was considered to be mean change in body weight and body mass index (BMI) by the end of intervention, with secondary outcome measures including mean change in both body weight and BMI by follow-up. With regard to cardiometabolic risk, we examined all available metabolic parameters, which include waist circumference, systolic and diastolic blood pressure, total cholesterol, HDL-cholesterol, LDL-cholesterol, triglyceride concentrations, fasting glucose concentrations and fasting insulin concentrations.

### 2.2. Data extraction

Two reviewers (GJ,DD) independently extracted relevant data from included trials, including treatment approach (prevention of weight gain v. weight loss), the nature of the intervention such as psychoeducation, diet and exercise, treatment format (group v. individual), intervention provider, length of intervention, participants' characteristics, comparison intervention, antipsychotic type and dosage.

Trials were assessed against the following quality criteria: random sequence generation, allocation concealment, masked assessment of outcomes, and number of withdrawals, intention-to-treat analysis and manual-based intervention. Mean and standard deviations at baseline and endpoint or change scores of the outcome schizophrenia symptoms.

### 2.3. Outcome

Several researchers have tried to summarize the current evidence of metabolic syndrome in patients with schizophrenia in numerous systematic or selective reviews. We identified a significant number of reviews that focused on behavioural interventions, diet and nutrition therapy, physical activity, exercise interventions targeting metabolic disturbances in schizophrenia and schizophreniform disorders. There are a number of reviews that focused on epidemiological studies, which also attempted to address the pathophysiological connections between metabolic Syndrome and schizophrenia.

In addition, a group of reviews have focused particularly on studies of metabolic features and interventions incorporate dietary and/or exercise components with psychoeducation.

- 1 Nutritional education, which consisted of specialist dietary input, focusing on calorie restriction and healthy diet and discouraging maladaptive dietary practices,
- 2 Weight management, a term used to describe a combination of strategies targeting obesity or overweight, such as physical activity and modification of dietary habits.
- 3 Psycho-education, usually describing information offered to patients regarding their medication and illness in a manner that can enhance medication adherence and promote relapse prevention.

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