

# A review: Association of Preventable

## Medical Conditions, Healthy Nutrition, the Ingestion of Psychotropic Medication and People who suffer from Severe Mental Illnesses

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### Abstract

A major concern about the increase of metabolic disorders rates associated with medication use to treat severe mental illnesses (SMI) exist. In fact, several studies suggested an association of body fat distribution with cardiovascular disease, diabetes, etc. On the other hand, psychotropic medications have come to play an increasingly central role in the treatment of psychiatric disorders and many patients consuming psychotropic drugs as medication tend to become obese and they are sensitive to the diseases mentioned above. In addition, it has been associated that a healthy and equilibrated food intake could help to prevent diseases. In this review we will address the effects of psychotropic medication intake and how this relates to obesity, risk of cardiovascular diseases of patients who suffer from severe mental illnesses. It will also evaluate the potential use of healthy diets and exercise to improve the well being of the patient.

**Keywords:** Severe mental illness, cardiovascular risk, equilibrated nutrition

### Introduction

In patients with severe mental illness, second generation antipsychotic (SGAs) or atypical antipsychotics have provided hope for many patients and families struggling with schizophrenia and bipolar disorder. Despite these advances in treatment, metabolic abnormalities, specifically the metabolic syndrome (MetS), are occurring at a greater incidence in persons with severe mental illness<sup>1</sup>. (SMI).

Without a doubt, the metabolic disorders, cardiovascular diseases and diabetes mellitus have been associated with obesity. In fact, several studies have been reported, and there is an association of body fat distribution with cardiovascular disease, diabetes, blood pressure and serum cholesterol<sup>2-4</sup>. Moreover, psychotropic medications have come to play an increasingly central role in the treatment<sup>5</sup> of psychiatric disorders, and many patients consuming psychotropic drugs as medication tend to become obese and are also sensitive to the diseases mentioned above<sup>2</sup>. In addition, it has been associated, that a healthy and equilibrated food intake could help to prevent chronic diseases<sup>6</sup>.

During the following section the terms SMI, metabolic disorder and some of its consequences, such as; *Diabetes Mellitus*, heart diseases, and obesity will be defined. Finally, the relationship between food intake and health will be discussed.

## Severe Mental Illnesses

For the purpose of this review, SMI is defined as all mental disorders characterized by having a psychotic feature such as: schizophrenia, psychotic disorders and mood disorders. Schizophrenia and psychotic disorders are all characterized by having psychotic symptoms as their defining feature. According to the Diagnostic and Statistical Manual of Mental Disorders<sup>7</sup> psychotic is a term restricted to delusions or prominent hallucinations, with the hallucinations occurring in the absence of insight into their pathological nature. In other words, a conceptual definition could be a loss of ego boundaries or a gross impairment in reality testing. Mood disorders include disorders that have a disturbance in mood as their predominant feature. These disorders are divided into depressive disorders, the bipolar disorders, and two disorders based on etiology (mood disorders due to a general medical condition and substance induced mood disorder).

## Metabolic Disorders

Metabolism is the process your body uses to get or make energy from the food you eat. Food is made up of proteins, carbohydrates and fats. Chemicals in your digestive system break the food parts down into sugars and acids, your body's fuel. Your body can use this fuel right away, or it can store the energy in your body tissues, such as the liver, muscles and body fat. A metabolic disorder occurs when abnormal chemical reactions in the body disrupt this process. When this happens, you might have too much of some substances or too little of other ones that you need to stay healthy. A person can develop a metabolic disorder when some organs, such as your liver or pancreas, become diseased or do not function normally<sup>8</sup> (diabetes is an example).

## Diabetes Mellitus

*Diabetes Mellitus* represents a group of diseases of heterogeneous etiology, characterized by chronic hyperglycemia and other metabolic abnormalities, which are due to deficiency of insulin effect. After a long duration of metabolic derangement, specific complications of diabetes (retinopathy, nephropathy, and neuropathy) may occur<sup>9</sup>. Other studies have indicated the increase on diabetes that SMI population suffers<sup>1</sup>. Diabetes is a disease in which your blood glucose, or sugar, levels are too high. Glucose comes from the foods you eat, and insulin is a hormone that helps to regulate the levels of glucose. With Type 1 diabetes, your body does not make insulin. With Type 2 diabetes, the more common type, the body does not make or uses insulin well. Without enough insulin, the glucose stays in your blood and over time, having too much glucose in your blood can cause serious problems. It can damage your eyes, kidneys, and nerves<sup>9</sup>. Symptoms of Type 2 diabetes may include fatigue, thirst, weight loss, blurred vision and frequent urination. However, some other people have no symptoms. A blood test can show

if an individual has diabetes. Exercise, weight control and sticking to your meal plan can help control diabetes. People should also monitor your glucose level and take medicine if prescribed. Diabetes can also cause stroke, even the need to remove a limb and very commonly heart diseases<sup>10</sup>.

## Heart Diseases

The most common cause of heart diseases is the coronary arteries disease: The narrowing or blockage of the coronary artery, the blood vessel that supply blood to the heart itself. It is the major reason people have heart attacks. Other kinds of heart problems may happen to the valves in the heart, or the heart may not pump well and cause heart failure. People can help reduce risk of heart diseases by taking steps to control factors that put them at greater risk: Controlling blood pressure, lowering cholesterol, avoiding smoke and getting moderate exercise and controlling nutrition habits<sup>11-15</sup>.

## Obesity

Excessive weight may raise levels of total cholesterol, cause high blood pressure, and increase the risk of coronary artery disease. Obesity increases the probability of acquiring other cardiovascular risk factors such as; resistance to insulin, metabolic syndrome, and diabetes<sup>16</sup>.

## Food, Diet and Health

Currently the consensus is the relationship between the prevention of diseases and type of food ingested. Some type of food are currently been developed with modifications in its composition (by decreased, removal or addition of nutrients) in order to avoid and to prevent health diseases<sup>17-19</sup>. Moreover, dietary habits are implicated in the occurrence of cardiovascular diseases (CVD). To deal with the unhealthy diets, there is an urgent need to develop targeted strategies and measures, that match will the levels of economic development and local customs. A fast food dietary pattern, high in saturated fat dietary and low fiber intake is prevalent among most of the social groups, and a quite less population practice a healthy eating associated with lower CVD risk markers.

The traditional Mediterranean diet is a high unsaturated fat diet due to customary use of olive oil and it contains abundant vegetable products (cereals, legumes, fresh vegetables, fruits, and nuts). In addition, fish is a common staple and meals are usually accompanied by wine. On the contrary, the Mediterranean diet includes little consumption of meat, dairy products and commercial sweets rich in refined sugar. Several controlled clinical studies, usually short-term and with small sample sizes, have shown that intervention with the Mediterranean diet or its main components has a clear beneficial effect on intermediate risk markers, such as blood pressure, the lipid profile glucose tolerance, the oxidative status, inflammation, and endothelial function<sup>3,4,20-24</sup>. The use of diets such as; the traditional Mediterranean diet, on the SMI population could be a possible help to prevent the (MetS) and then the CVD risk.

### Risk of the patient with SMI

The increase of mortality rates associated with severe mental illnesses (SMI) due to preventable medical conditions: Metabolic disorders, cardiovascular diseases, diabetes mellitus and high prevalence of obesity are concerning<sup>25</sup>.

Prior studies have found that patients with SMI were less likely to receive coronary revascularization and have higher risk of death following Acute Myocardial Infarction (AMI)<sup>26</sup>. The cited reasons for this inequality include increased medical comorbidity, reduced access to medical technology, social isolation, low income, interference with informed consent because of the cognitive symptoms and provider hesitation to aggressively treat SMI patients<sup>27</sup>.

Moreover, today, there is quite little information in regard to the effects of the psychotropic medications on the health of individuals who suffer from severe mental illnesses (SMI), and who have being treated by these medications. Besides, there are not specific diets to improve the physical health of those patients. Additionally, despite the continuous increasingly use of psychotropic medications to treat mental illnesses, data regarding their efficacy and safety are limited. Correll and Carlson 2006<sup>28</sup> pointed out, that because youth are still physically developing at the time of psychotropic drug exposure, most reference values need to be adjusted for gender and age; as in adults, youngsters receiving lithium require monitoring for thyroid dysfunction. Psychostimulants appear to cause mild reversible growth retardation in some patients, most likely because of decreased weight or slowing of expected weight gain; some patients may experience clinically significant reductions in adult height. Although still controversial, valproate use has been associated with an increased risk for polycystic ovary syndrome, in addition to causing weight gain. Although more data are required, children and adolescents appear to be at higher risk than adults for antipsychotic-induced hyperprolactinemia, weight gain, and possibly, associated to metabolic abnormalities, which is of particular concern. Endocrine and metabolic adverse effects are among the most concerning adverse effects of commonly used psychotropic medications<sup>28</sup>.

Many psychoactive medications have prominent cardiovascular side effects, toxicities, and undesirable drug interactions with cardiovascular medicines<sup>29,30</sup>. Kovac and Arora, 2008<sup>31</sup>, have pointed out that in a psychiatric population, the prevalence of cardiovascular disease is higher than in the general population, because of a different lifestyle and greater frequency of risks factors such as smoking, obesity, and increased stress. In addition, an anonymous author of the journal of Current Problems in Cardiology pointed out some discoveries that have shown that some psychiatric illnesses: eg, depression<sup>32</sup> and phobic anxiety<sup>33</sup> may have direct effects as independent cardiovascular risk factors. Moreover, in his review this author pointed out that clinical cardiologists are increasingly asked to consult about these effects<sup>34</sup>. In addition, Alexander and Niño, 1969<sup>35</sup> had published a

preliminary report over the cardiovascular complications in young patients taking psychotropic drugs. Additionally, Correl and Carlson, 2006<sup>28</sup>, have pointed out, that although more data are required, children and adolescents appear to be at higher risk than adults for antipsychotic-induced hyperprolactinemia, weight gain, and possibly, associated metabolic abnormalities, which is of particular concern. The authors have concluded that the clinicians and caregivers need to be aware of potential endocrine and metabolic adverse effects of psychiatric medications. A careful selection of patients, choice of agents with potentially lesser risk for these adverse events, healthy lifestyle counseling, as well as close health monitoring are warranted to maximize effectiveness and safety.

On the other hand, the prevalence of Diabetes Mellitus (DM) is becoming a serious public health problem. The use of atypical antipsychotics has been associated with disruption of the glucose metabolism and therefore with causing DM. The underlying mechanisms are unknown, but knowledge of the differences between the pharmacological features of various antipsychotics combined with their diabetogenic profile might help us understand those mechanisms<sup>36</sup>. This author describes how the binding of various essential receptors or transporters in essential body tissues, adipose tissue, pancreatic tissue and liver and skeletal muscle tissue can cause disruption of the glucose metabolism. With such knowledge in mind one can try to explain the differences between the diabetogenic propensities of various antipsychotics. It is well known that clozapine and olanzapine cause weight gain and DM, whereas aripiprazole and ziprasidone have much less disruptive clinical profiles. The most significant risk factor for adiposity seems to be strong blocking of histaminergic receptors. An agonistic activity on serotonergic-1a receptors, with a very low affinity for muscarinic-3 receptors, might protect against the development of DM. More data will become available which may help to solve the puzzle.

Body weight gain frequently occurs during drug treatment of psychiatric disorders and is often accompanied by increased appetite. The consequence of weight gain in most patients is overweight or obesity. Weight classification is based on the body mass index (BMI, weight (kg)/height (m)). Normal subjects have a BMI between 18.5 and 24.9 kg/m<sup>2</sup>. Subjects with a BMI from 25 to 29.9 kg/m<sup>2</sup> are classified as overweight, and from 30 to 39.9 kg/m<sup>2</sup> as obese. Patients with a BMI above 40 kg/m<sup>2</sup> are designated extremely obese<sup>16,37</sup>. Some studies investigated health effects of obesity in the context of psychotropic drug treatment. Fontaine et al., (2001)<sup>38</sup> estimated the consequences of antipsychotic treatment-induced weight gain on health and mortality rate, based on data from the Framingham Heart Study. Assuming a weight gain of e.g. 12.5 kg, they predict the occurrence of 2335 additional cases of diabetes mellitus, 9456 cases of hypertension, and 662 additional deaths among 100,000 schizophrenic patients within 10 years. This virtual

model corresponds to epidemiological data on the causes of excess mortality in schizophrenic patients reviewed by Harris and Barraclough (1998)<sup>39</sup>.

Therefore, it is of consensus that the use of psychotropic drugs that treats depression may increase appetite with resultant weight gain<sup>37,40-43</sup> and understanding that the overweight and obesity not only induce aesthetic problems affecting well-being, but profoundly increase morbidity and mortality<sup>37</sup>. Clinicians and caregivers need to be aware of potential endocrine and metabolic adverse effects of psychiatric medications, performing statistically correlations with the cardiovascular risk.

The mortality rate for individuals who suffer from severe mental illness is on average at least 25 years earlier than the general population<sup>44,45</sup>. While suicide and injury account for 30% of excess mortality, the other 60% is caused by natural causes such as cardiovascular diseases, diabetes, respiratory diseases and infectious diseases<sup>46,47</sup>.

In a study conducted in Maine in which the authors compared health problems between SMI and Non-SMI group's results concluded that twice as many people who suffer from SMI developed health problems in contrast to the Non-SMI groups. A total of 9224 SMI and 7352 non-SMI individuals were studied and compared and results indicated that 33.9% developed gastro intestinal problems versus 20% of the non-SMI group. 30% develop obesity/dyslipid versus 20% of the non-SMI group. 22.8% develop hypertension versus 18% of the Non-SMI, diabetes (16.5% vs. 10%), cancer (11.5% Vs. 10%), heart diseases (11.5% vs. 8%), and liver diseases (5.9% vs. 1%)<sup>47</sup>.

Another authors completed a study on  $n=608$  participants in the Ohio area and they found that the major factor for deaths for SMIs included diseases of the heart ( $n=126$ ), diabetes mellitus ( $n=18$ ), malignant cancers ( $n=44$ ), pneumonia and influenza ( $n=16$ ) and chronic respiratory diseases ( $n=31$ )<sup>47</sup>.

According to Prior et al., (1996)<sup>48</sup> the longevity of SMI individuals is lower than their non-SMI counterparts and they are at a greater risk of dying from all causes.

In order to effectively treat people who are suffering from psychotic features prescribers utilize psychotropic such as: Haldol (haloperidol), Loxitane (Loxapine), Mellaril (Thioridazine), Anafranil (clomipramine), Asendin (amoxapine), Elavil (Amitriptyline), Luvox (fluvoxamine), Paxil, (Paroxetine), etc. Most of these psychotropic medications have a positive effect on the psychotic symptom but a negative effect on the health of the person's body organs<sup>48</sup>.

Finally, the effect of a treatment with special diet and patient engagement on a healthy lifestyle habit must be studied in order to control the prevalence of metabolic disorder and for hence the diseases risks.

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