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# Low Prevalence of Metabolic Syndrome in a Group of Patients with Chronic Psychotic Disorders Taking Antipsychotic Polypharmacy in Residential Treatment While Adhering to a Mediterranean Diet

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***Authors' contributions***

*This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.*

***Short Communication***

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## ABSTRACT

The aim of this abbreviated report is to describe the prevalence of the Metabolic Syndrome (MS) in a sample group of patients with psychosis in residential treatment in Spain, who have been treated with antipsychotic polypharmacy for 5 years or more. We designed a cross sectional study to describe the prevalence of MS in a population sample of 21 of such patients. Using the criteria recommended by the *Third Report of the National Cholesterol Education program Expert panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults* (NCP-ATP III), In this group 19, 04% of these patients met such criteria. The prevalence is much smaller than those reported in other countries, especially the U.S. This is even more remarkable, given the use of antipsychotic polypharmacy in this sample group of patients, which is an additional risk factor for the development of M.S. Residential treatment (a controlled living environment),

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Mediterranean diet, tobacco restriction and continuous medical supervision may have contributed to these results. We further inquire whether these factors could protect patients against MS.

*Keywords: Metabolic syndrome; psychosis; mediterranean diet; prevention.*

## 1. INTRODUCTION

Metabolic Syndrome (MS) is a cluster of conditions (High glucose, dyslipemia, increased waist circumference and hypertension) that occur together increasing the risk for heart disease and diabetes. MS has been related to a combination of genetic and environmental factors [1].

Since the early 1990's there has been increased use of atypical antipsychotics [2]. Psychiatrists are concerned about the increased risk of MS in patients taking second generation antipsychotics. The prevalence of MS in patients with psychosis seems to vary depending on the country where the study has been carried out. In the U.S.A., Meyer J et al. described a prevalence of 51% [3]. Another study carried in the U.S. reported numbers around 68% (74% of the Hispanic population met the criteria) [4]. In a Australian study, a prevalence of 54% was described [5].

In Europe this incidence seems to be lower: For instance, in Sweden, Hägg S et al. conclude that 34.6% of their patients suffered MS [6]. In another study made in Belgium the prevalence was 23.7% [7]. These results decrease in the Mediterranean Europe, with values of 32% (Turkey, using IDF criteria) [8]; 24.6 % (Spain) [9] and 27% (Croatia) [10].

Poly-therapy with second generation antipsychotics increases the risk for MS compared with mono-therapy [11].

Mediterranean diet is gaining popularity nowadays. It consists of the use of olive oil, légumes, white fish, abundant fruits and vegetables and little red meat. Mediterranean diet is thought to be protective against metabolic syndrome [12-14].

The aim of this short report is to describe the prevalence of MS in Spanish patients living in residential treatment facilities who are treated with long-term antipsychotic polipharmacy. We would like to explore whether residential treatment and diet control could protect against MS.

## 2. METHODS

This is a cross sectional study with a sample of 21 patients, with an average age of 57 years, living in Murcia (Spain). The study was approved by the Ethical Committee at The University of Murcia. All patients met DSM IV criteria for psychotic disorders (295.30; 295.10; 295.20; 295.60; 295.70 and 297.1) diagnosed for 15 or more years. They had been in residential treatment for at least 5 years and had been in treatment with polipharmacy second generation antipsychotics for at least 5 years. They all had followed a strict low fat Mediterranean diet. All patients had a sedentary lifestyle and smoking was reported in 57.14% of the patients. Two patients were previously diagnosed for diabetes mellitus. One of the patients was in monotherapy with an antipsychotic. Another patient was not on antipsychotics due to very advanced state of dementia.

The antipsychotics used (and their doses) were as follows: Risperidone (6 patients, mean dose of 12 mg/day); Risperidone longer acting (5 patients, 50 mg every 14 days); Olanzapine (7 patients, mean dose of 15.7 mg/day); Quetiapine (4 patients, mean dose of 475 mg/day); Clozapine (2 patients, mean dose of 175 mg/day); Aripiprazole 2 patients (mean dose of 12.5 mg/day); Levomepromazine (2 patients, mean dose of 25 mg/day); Zuclopentixol longer acting (2 patients, mean dose of 200 mg every 15 days); Clotiapine (1 patient, 20 mg/day) and Haloperidol (3 patients, mean dose of 3.5 mg/day). Only one of our patients was in monotherapy with an antipsychotic (aripiprazole). Also, another patient was no longer receiving antipsychotics for the last year due to an advanced state of dementia.

Past medical history (including history of diabetes, HTN, CVA, coronary syndromes, ventricular hypertrophy, tobacco use and sedentarism) were collected. A psychiatric history specifying year of diagnosis and psychiatric comorbidities were taken.

All patients were evaluated for blood pressure (BP) and antropometric data was collected, Body Mass Index (BMI), height, weight and waist circumference.

Blood tests including total cholesterol, low density lypoproteins (LDL), high density lypoproteins (HDL), triglycerides, fasting glucose, hemoglobyn A1-C (HbA1c), Thyroid-stimulating hormone (TSH) and prolactin were collected. The aterogenic index was calculated using the formula of total cholesterol/Cholesterol HDL. Two patients had been previously diagnosed with insulin dependent diabetes mellitus.

Positive and Negative Syndrome Scale (PANSS) and the Clinical Global Impression (CGI) in all patients were completed.

The design of the study was cross sectional and the statistical analysis consisted of chi square analysis of frequences and t-Student contrast proofs. Data was analyzed using Statistical Packet for Social Sciences (SPSS-15) and Systat-12 programs.

## 3. RESULTS

In our sample, 19.04 % (4 patients) met NCEP-ATP III criteria for MS. The 4 patients who met ATP-III criteria for M.S. showed statistically significant higher values for waist circumference (125.750 vs 100.471 cm), triglycerides (188.750 vs. 88.765 mg/dl), aterogenic index (4.807 vs. 3.136) and diastolic blood pressure (89.500 vs. 76.059 mmHg). They also showed lower levels of HDL (41.750 vs 58.000) (Table 1).

**Table 1. Values comparing patients not meeting criteria for MS and patients meeting criteria for MS**

| | Group without MS (n=17) | Group with MS (n=4) | P value |
|---|---|---|---|
| Age (years) | 56.64 SD (13.38) | 61.50 SD (6.80) | .496 |
| Glucose (mg/dl) | 81.588 SD (17.004) | 97.000 SD (35.618) | .204 |
| Glycosilated Hemoglobin (HbA1C) | 5.917 SD (0.862) | 6.215 SD (1.448) | .590 |
| Total cholesterol (mg/dl) | 176.353 SD (37.792) | 198.250 SD (30.988) | .298 |
| High Density Lypoprotein (HDL) (mg/dl) | 58.000 SD (12.500) | 41.750 SD (6.946) | .023* |
| Low Density Lypoprtein (LDL) (mg/dl) | 100.318 SD (29.739) | 118.775 SD (25.627) | .268 |
| Triglycerides (mg/dl) | 88.765 SD (40.613) | 188.750 SD (33.110) | .000* |
| Aterogenic index | 3.139 SD (0.704) | 4.807 SD (0.798) | .001* |
| Systolic Blood Pressure (mm Hg) | 125.437 SD (16.813) | 142.000 SD (12.728) | .084 |
| Dyastolic Blood Pressure (mm Hg) | 76.437 SD (10.046) | 89.500 SD (9.883) | .032* |
| Prolactin (ng/mL) | 45.505 SD (44.603) | 31.897 SD (14.335) | .560 |
| Thyroid Stimulating Hormone (TSH) (mIU/L) | 2.595 SD (3.343) | 1.817 SD (0.607) | .654 |
| Waist (cm) | 97.118 SD (22.550) | 125.750 SD (30.966) | .046* |
| Body Mass Index (BMI) mean value | 28.27 | 26.01 | |

## 4. DISCUSSION

Despite the risk factors present in this population to develop MS, such as tobacco use, a sedentary life, average age (57 years) and polipharmacy with second generation antipsychotics, their prevalence of MS (19,04%) was significantly lower than the ones reported in other studies carried around the world.

There seem to be prevalence differences of MS depending on the country where patients live. Prevalence from the U.S.A. and Australia for example, are almost doubled as compared to those seen in European population. Of all the aspects that could contribute to these differences, we would like to make an emphasis on the role of the diet. Mediterranean diet is high in monosaturated fatty acids, on the contrast, In the U.S.A. and Australia diets high in polysaturated fatty acids are more popular. Polysaturated fatty acids are well known to increase the risk for MS. and this could be an important reason for the different results. Our patients follow a strict Mediterranean diet based in the use of olive oil, legumes, blue fish and green vegetable. Meals are regularly boiled and rarely fried. This diet has been proved to be protective against type II diabetes [12-14] and olive oil is known to have cardioprotective effects [15]. Considering that life expentancy has been reported decreased up to 20 years in patients with schizophrenia, preventive measures as diet could play an important role decreasing the risk of metabolic syndrome in patients with schizophrenia [16].

Some of the protective factors that could come with residential treatment are diet control, the restriction of tobacco use and continuous medical supervision. Tobacco has been thought to

contribute to dyslipemia and MS [17]. The quantity of tobacco that our patients consume was controlled. Continuous medical supervision can be an important resource in the early detection, treatment and control of metabolic changes appearing in our patients.

The role of chronic psychosocial stress has been related to MS [18]. In residential treatment, patients live a routine lifestyle with reduced levels of stress (compared with life outside of the hospital). This could be another potential explanation for the results.

Many studies on MS with individuals taking antipsychotic medication have been made where patients take the medication for a short amount of time. Since our patients have a lower prevalence of MS, we hypothesize whether the risk period for the development of MS could be higher in the first few years of treatment and if, as years go by, there could be a tendency to the normalization of these values.

The prevalence of the MS in this small sample group of patients with chronic psychotic disorders following antipsychotic polypharmacy for years and living in residential treatment with a Mediterranean diet in Murcia (Spain) is small. This short communication report has important limitations. The sample size is small (21 patients) and these results could be explained by casual findings. As a result, this study cannot prove that Mediterranean diet and residential treatment protect against MS. However it sheds light on some possible interventions on how to control risk for MS. Our project in the future is to determine whether Mediterranean diet could decrease prevalence of MS in patients already meeting criteria. Mediterranean is rich in omega 3 fish oil, a substance that has been proved helpful in the prevention of severe mental illness due to its antinflamatory properties [19]. Therefore, Mediterranean diet could also have been helpful in the treatment of our patients' psychotic symptoms. We believe that more research is needed in this area. It would be interesting to see if residential treatment might play a protective role in larger samples from other countries and, if so, to try and clarify the role played by possible protective factors.

## 5. CONCLUSION

Metabolic syndrome in a group of patients with psychosis living in residential treatment was diagnosed in 19% of our sample, considerable smaller than the rates of metabolic syndrome in other studies of patients with psychosis. In this study we propose the role of a controlled living environment, decreasing the stressors that psychotic patients face as well as the role of Mediterranean diet as one of the potential reasons for the lower rates of metabolic syndrome in our sample.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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