



## Short Communication

## The association of Mediterranean diet and exercise modifications with anthropometric parameters in a psychiatric community population: A pilot study

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## ABSTRACT

Weight gain and related metabolic syndrome (MS) are major current issues in public health. MS consists of abdominal fat, atherogenic dyslipidemia, hypertension, hyperglycemia, insulin resistance, pro-inflammatory and pro-thrombotic state, and accounts for both cardiovascular diseases and type II diabetes mellitus risk factors. Patients affected by psychiatric illness present a prevalence of 35–40% of MS. Many studies have shown that Mediterranean diet is associated with the reduction of mortality due to cardiovascular and malignant diseases, potentially preventing both obesity and type II diabetes mellitus. Our pilot study explores the effects of a 12-month healthy lifestyle program (Mediterranean diet and mild physical activity) on metabolic and anthropometric parameters of patients affected by chronic psychiatric disorders who live in a psychiatric community facility. A Mediterranean diet was provided by a senior nutritional clinician and adapted by two dietitians, according to the needs and preferences of the community population. Concomitantly, a program of moderate physical activity, consisting in 30-min walks on level ground 4 days a week, and psycho-educational group sessions with educational and therapeutic purposes were implemented. The metabolic and anthropometric parameters of our patients improved after both 6 (T6) and 12 (T12) months. Body Mass Index was statistically significantly reduced at T6 and T12, with patients perceiving good quality of life. These positive outcomes suggest that a low-cost healthy lifestyle program can produce good adherence and feasibility even among patients with chronic psychiatric diseases, reducing their risk for MS, cardiovascular diseases and other complications.

## 1. Introduction

Weight gain and related metabolic syndrome (MS) are major recent issues in public health. The main components of MS are abdominal fat, atherogenic dyslipidemia, hypertension, hyperglycemia, insulin resistance, pro-inflammatory and pro-thrombotic state, accounting for both cardiovascular diseases and type II diabetes mellitus risk factors (Grundy et al., 2004). Patients affected by psychiatric illness present an increased risk for MS if compared with the general population, showing a MS prevalence of 35–40%, further increased in female gender (McEvoy et al., 2005). In particular, the prevalence of obesity, with an unfavorable ratio of lean and fat mass (Saarni et al., 2009), is almost

doubled among patients affected by psychiatric illness compared to the general population (Allison et al., 2009). Although the causes that may increase MS prevalence among patients with chronic psychiatric disorder are not fully known, many risk factors are indicated: altered lifestyle habits induced by psychiatric disorders, high-fat diets, glucose and lipid metabolism alteration induced by antipsychotics, a genetic tendency to accumulate intra-abdominal fat, poor glucose control (Chaggar et al., 2011), hypercortisolemia and related central obesity induced by hypothalamic pituitary abnormalities. This high prevalence of MS is responsible for organic co-morbidities and premature death among patients affected by psychiatric disorders, who present an average life expectancy decreased by 20% (Kilbourne et al., 2009;

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Hennekens, 2007). One of the most important strategies aimed at reducing cardiovascular and diabetics risk consists of an early lifestyle modification through a balanced diet and increased physical activity (Rosenbaum et al., 2014). This strategy combined with or without pharmacological therapy (statins and oral hypoglycemic agents) remains the main goal of primary intervention (Halcox and Misra, 2015). Lifestyle changes can be easily implemented in different cultural and social backgrounds, representing a primary cost-effective intervention in MS prevention. Nevertheless, this approach does not appear feasible in patients with chronic mental illness, who often show low therapeutic compliance (Ratliff et al., 2012), since self-determination in changing lifestyle is necessary (Vancampfort et al., 2013). In particular, it is essential that patients with MS be aware of the benefits gained from lifestyle modification, not only to significantly decrease cardiovascular risks but also to improve their perceived well-being and quality of life (Lin et al., 2014; Kolotkin et al., 2008; Lakka and Laaksonen, 2007). Prospective studies and clinical trials have shown that the Mediterranean diet is associated with a reduction in MS risk factors, preventing increases of waist circumference, systolic and diastolic pressure and sugar, triglyceride and LDL cholesterol blood levels (Kastorini et al., 2011). Mediterranean diet is positively related to health improvement in terms of mortality reduction from cardiovascular and malignant diseases, preventing both obesity and type II diabetes mellitus (Babio et al., 2014).

## 2. Aims

To evaluate the association of Mediterranean diet and mild physical activity on metabolic and anthropometric parameters, and, concomitantly, on quality of life and global functioning of patients with chronic psychiatric illness, residents in a socio-rehabilitative community.

## 3. Methods

The current pilot study explores the effectiveness of a healthy lifestyle program (Mediterranean diet and mild physical activity) over a 12 month period for improving metabolic and anthropometric parameters in patients affected by chronic psychiatric disorders who live in a psychiatric community facility. It represented an intervention aimed at raising awareness for a healthy lifestyle among patients and staff of a community where no other similar programs had ever been implemented previously. This study was approved by the Local Ethical Committee (Prot. 4458) and was conducted over a 1-year period (01/04/2015–1/4/2016).

A Mediterranean diet, which represents a proper nutritional educational model in accordance with the literature (Willett et al., 1995), was provided by a senior nutritional clinician and adapted by two dieticians according to the needs and preferences of community population. The daily diet included proteins (17%), fats (28%), carbohydrates (55%), cholesterol (152 mg/day), fibres (38 g/day) and consisted of fresh vegetables and fruits, beans, nuts, grains and seeds, olive oil as a main source of fats, cheese and yogurt, small amounts of fish and poultry, very small amounts of red meat per week. A percentage of between 25 and 35% of energy source intake was represented by fats, of which only 7% saturated ones. In our study, dietary intake normally consisted in 3 main meals and two snacks provided by the community. Additional food was available and could be purchased by patients at the community café. Only occasionally did patients spend meal time outside the community with their family and friends. The integrated indexes of nutritional assessment were analysed to assess the possible risk of the subjects' malnutrition during the study period. Concomitantly, a program of moderate physical activity was implemented: walking on level ground supervised by the community professionals for 30 min a day, 4 days a week. Psycho-educational group sessions conducted by the two dieticians were implemented with double aims: educational (in

terms of nutrition) and therapeutic (in terms of motivation and relationship with others). These psycho-educational groups met bi-monthly for the first three months, then monthly for the remaining period of the study. In addition, the professionals and the cook working in the community and the co-investigators of this study also participated in group management. The dieticians, during the psycho-educational groups, motivated patients to reduce extra-meal food consumption and involved them in changing their lifestyle. In particular, they suggested that patients rearrange the community café, reducing the availability of most caloric foods, the quantity of food displayed on the shelves, etc.

The sample for this pilot study was collected according to our selection criteria. Inclusion criteria: all patients living in the community during the study period affected by chronic and severe psychiatric diseases and treated with multiple anti-psychotic drugs; they also suffered from organic diseases treated with cardiovascular and metabolic medicines. Exclusion criteria: patients with special dietary needs due to severe organic diseases and patients unable to give a valid and informed consent.

The community where the program was implemented is a psychiatric facility with a maximum of 19 patients who need rehabilitative programs in a residential setting for a long period of time (on average 18 months). The community is managed by 9 professionals in rehabilitative programs, two nurses and a cook, who prepares meals in the community kitchen. Medical and psychiatric treatment is provided by the general practitioner and each Patient's Mental Health Service psychiatrist. Many volunteers and the Patients themselves participate in all rehabilitative activities normally aimed at developing their daily life skills.

For each patient the following variables were selected:

1. Demographic variables collected: age, gender, nationality, marital status, education.
2. Psychiatric variables:
  - psychiatric disorder
  - years of psychiatric illness
  - substance abuse comorbidity
  - psychiatric drug therapy
  - number of admissions in the observation year
3. Organic variables:
  - blood pressure, heart rate and ECG
  - Body Max Index (BMI), waist circumference
  - total cholesterol, LDL, HDL, triglycerides, blood glucose, uric acid, homocysteine and TSH reflex
  - cardiovascular and metabolic therapy.

The mentioned data were collected from patient medical records and Department Health Service clinical information systems and were reported in an Excel database. Additional information was obtained from the psychiatrists who treated the patients.

The following tests were administered to the patients:

- Global Assessment Functioning (GAF), (Rush et al., 2008) at T0 and T6.
- Brief Psychiatric Rating Scale (BPRS) (Overall and Gorham, 1962) at T0 and T6.
- EuroQuol-5D (EQ-5D) at T6 and T12 (Brooks et al., 2010).

### 3.1. Statistical analysis

The descriptive statistical analysis and comparison of endpoints between T0, T6 and T12 (mean  $\pm$  standard deviation, paired *t*-test for continuous variables; percentages and Chi2 test for categorical variables) were carried out.

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