



PHYSICAL HEALTH CARE IN PEOPLE WITH SEVERE MENTAL ILLNESS. PREVALENCE AND DISPARITIES COMPARING WITH GENERAL POPULATION

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A B S T R A C T

Objectives: Due to the high rates of premature death in people with schizophrenia and major mood disorders the aims of this study were: 1) to describe the physical health status of individuals with severe mental disorders, 2) to compare the general health status of individuals with severe mental disorders with general population of Canary Island, 3) to determine the cardio metabolic risk of individuals with severe mental disorder comparing with general population.

Study design: This is an observational study conducted in 231 participants with serious mental illness supervised by the assertive Community team in Tenerife

Methods: Within the psychiatric sample we examined the correlations with the composite parameters of health status and the association between health indicators and risk factors and the presence of cardiovascular risk and metabolic syndrome. Finally, we compared these parameters with the general reference population.

Results: The percentage of overweight (67.1% vs. 36.2%) ($p < 0.001$), obesity (33.3% vs. 18.2%) ($p < 0.001$), total cholesterol (42.4% vs. 20.6%) ($p < 0.001$), and smoking habit (79.2% vs. 28.4%) ($p < 0.001$), are statistical significantly greater in the study population when comparing with general population.

Conclusions: There is a clear relationship between heart disease, diabetes, obesity and respiratory diseases with mental health. Multidisciplinary assessment of psychiatric and medical conditions is needed. Psychiatric treatment facilities should offer and promote healthy lifestyle interventions.

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INTRODUCTION

Physical health care of people with severe mental illness (SMI) has become relevant to public health policies by the particularities of these patients¹ (Saiz et al, 2008): a) its low adherence to treatment recommendations and contact with health services and their ineffective self-care. b). Consumption of psychotropic drugs for a very long period of his life which makes you be exposed to greater risks. c). Absence of risk perception and problems of isolation and communication. d) A life expectancy 20% lower than healthy population of the same age. High rates of premature death in individuals with schizophrenia and major mood disorders have focused attention on the problems of somatic health in people with SMI^{2,3} (Bobes et al, 2008; Rodríguez P et al, 2010).

Health problems that have been identified include obesity, smoking, sedentary lifestyle and concomitant clinical diseases^{4,5} (Méndez A et al, 2010; Tosh G et al, 2014). Most of the studies have focused on these issues as individual health issues. However, worse health condition and mortality risks are determined by the combination of several factors operating synergistically⁶ (Dembling et al, 1999). It is therefore important to examine multiple health indicators that together determine overall health. A multidimensional perspective facilitates comparison of global health in populations and monitor changes in the overall health of a population over time⁷⁻⁹ (Jones et al, 2004; Sokal et al, 2004; Daumit et al, 2005) The analysis of multiple health indicators also help better identify predictors of the cost of health care¹⁰ (Kuriyama et al, 2004). The increased morbidity and mortality seen in SMI population are largely due to a higher prevalence of modifiable risk factors, many of which are related to individual life style choices. On the other hand, side effects of the use of antipsychotics in the physical health of patients with SMI are

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an unquestionable clinical reality although in the promotion of atypical antipsychotics the disappearance of side effects is emphasized. Side effects of antipsychotics have been recently reviewed in the literature^{11,12} (Van der Wilk *et al*, 2005; Reeves *et al*, 2005) In the clinical practice of the last decade there has been a greater concern for the physical health of our patients since along with the development of these molecules there has been a manifest deterioration in the physical health of patients motivating many of their complaints.

In this research we studied the physical health status of people with SMI with psychiatric treatment carried out in the community, supervised by the assertive community team in Tenerife and compared their health with the identical individual general population. Also within the psychiatric sample we examined the correlations with the composite parameters of health status and the association between health indicators and risk factors and the presence of cardiovascular risk and metabolic syndrome.

METHODS

Study population

This is an observational study conducted between October 2008 and December 2009 in Tenerife. The population was all patients diagnosed of psychosis who reside in the study period, in the resources of alternative accommodation within the Health Care Plan Disability and the Insular Plan of Psychosocial Rehabilitation of Tenerife.

The Tenerife Insular Psychosocial Rehabilitation Plan is a planning tool for the Rehabilitation and Recovery devices of people with severe mental disorders in the community through the formation of a network conformed by Psychosocial Rehabilitation Centers, alternative accommodation (floors and Residences of low intensity), occupational centers and individualized support to the employment. This network was developed in the island of Tenerife, during 2005-2008, following a criterion of sectorization linked to the public mental health care network for adults. In the decisions participated organizations of the regional public administration, the organizations of relatives and the Insular Council of Psychosocial Rehabilitation of Tenerife, attached to the Canary Health Service.

Alternative housing resources are spread throughout the geography of Tenerife and served by the assertive community equipment according to areas corresponding to North Zone, Metropolitan and South Zone.

The number of places available for the whole of the island of Tenerife is shown in Table 1. The total number of participants included in this study was 231.

Table 1 Type of housing resources and number of seats

Housing Resources	n
Mini residences	77
Flats	89
Health care at home	65
TOTAL	231

The study was approved by the Human Research Ethical Committee at the University Hospital “Nuestra Señora de la Candelaria” in Tenerife.

Inclusion criteria for this study were:

- Patients aged between 18 and 65 years
- Being followed by the Assertive Community Team (ACT).
- Receiving health care by the specialized mental health care services of the Canary Islands Health Service.
- Living in the ACT housing resources with clinical diagnosis of severe mental disorder (psychosis).

We excluded from the study patients: a) with organic mental disorders, b) minor mental disorders, c) consumptions of drugs d) those who were not allocated at the alternative resources and finally we also excluded patients with no disabilities.

Measures

The physical health assessment included measurement of waist circumference, BMI, systolic and diastolic blood pressure, fasting plasma glucose, LDL and HDL cholesterol and triglycerides. Metabolic syndrome was determined following the criteria established by the National Cholesterol Education Program (NCEP ATP-III)¹³ (NCEP, 2002) and the risk of cardiovascular diseases (CVD) was defined according the Framingham Risk Tables¹⁴ (Grundy *et al*, 1998). We also determine the psychiatric diagnosis, years of evolution of the psychosis, drug treatment for psychosis, history and actual toxics consumption.

Finally several variables regarding life style habits were recollected: physical activity (METS), smoking habit, presence or absence of concomitants physical diseases during life and presence or absence of injuries requiring medical treatment in the preceding 90 days. Online medical records were reviewed for each user and an individual interview was performed. This information was gathered by the nurses from the assertive community team following the guidelines for physical care of people with SMI established in the clinical service guide of the Canary Islands Health Service. Subsequently, the data were analyzed by the research team.

The results of our study were compared with the general population according to the latest Health Survey conducted in 2009 in the Canary Islands¹⁵ (ISTAC, 2009) on those variables similar to the participants in our study. Also, the Health Survey conducted in 2004 was used to assess the evolution of the results of several variables, as well as scientific literature on health status of the Canary Island population were used to compare the variables of our interest^{16,17} (HMSO, 2004; MSSSI, 2015)

Statistics

Descriptive statistics were computed to describe the demographic and clinical variables. Quantitative variables were expressed as means and Standard Deviations (SD) and categorical variables were expressed as percentages. In order to compare the main demographic and clinical characteristics between groups, the unpaired Student’s T test and the analysis of covariance were performed to analyze continuous variables. Categorical variables were analyzed using the χ^2 test or Fisher’s exact test.

The confidence intervals were set at 95 %. A value of p <0.05 was considered significant.

The data were analyzed using SPSS software package for Windows (Version 19.0).

RESULTS

The main characteristics of the study population are shown in Table 2. From the 231 participants in this study, 161 were men and 70 women. The mean age was 43.7 (9.2) being 45.7 (8.2) for women and 42.8 (9.5) for men ($p=0.024$). For the stay in the recruitment center and the length of illness we did not found statistically significant difference.

Table 3 shows the prevalence of modifiable cardiovascular disease risk factors in the study population comparing with general population according data from latest Health Survey conducted in 2009 in the Canary Islands¹⁵. The percentage of overweight (67.1% vs. 36.2%) ($p< 0.001$), obesity (33.3% vs. 18.2%) ($p< 0.001$), total cholesterol (42.4% vs. 20.6%) ($p< 0.001$), and smoking habit (79.2% vs. 28.4%) ($p< 0.001$), are statistical significantly greater in the study population when comparing with general population.

Table 2 Characteristics of the study population.

Variables	Total (n=231)	Men (n=161)	Women (n=70)	P
Age	43.7 (9.2)	42.8 (9.5)	45.7 (8.2)	0.024
Stay in the recruitment center (months)	24.3 (16.1)	24.5 (16.3)	23.8 (15.7)	0.653
Length of illness (years)	22.0 (10.4)	21.4 (10.6)	23.4 (9.9)	0.188
Physical activity*	129 (56%)	92 (57%)	37 (53%)	0.547
Physical exploration:				
Body mass index (kg/cm ²)	28.1 (5.5)	27.6 (4.9)	29.5 (6.5)	0.015
Waist circumference (cm)	101.5 (12.5)	101.1 (12.7)	102.5 (12.1)	0.418
Total Cholesterol (md/dl)	198.9 (38.1)	194.2 (35.4)	209.7 (41.9)	0.004
LDL Cholesterol (md/dl)	120.8 (43.0)	120.2 (43.0)	122.3 (43.3)	0.751
HDL Cholesterol (md/dl)	46.0 (12.6)	44.5 (13.1)	49.5 (10.5)	0.005
Triglycerides (mg/dl)	153.8 (79.8)	150.9 (74.0)	160.3 (92.1)	0.419
Blood Glucose (mg/dl)	102.1 (52.3)	99.3 (56.6)	108.6 (40.6)	0.216
Systolic BP (mmHg)	121.2 (13.5)	121.5 (12.9)	120.6 (14.8)	0.630
Diastolic BP (mmHg)	74.3 (9.3)	74.2 (9.4)	74.5 (8.9)	0.778
Toxic habits:				
Smoking*	183 (79.2%)	133 (82.6%)	50 (71.4%)	0.054
Alcohol*	51 (22.1%)	44 (27.3%)	7 (10.0%)	0.006
Cannabis*	76 (32.9%)	67 (41.6%)	9 (12.9%)	<0.001
Metabolic Syndrome*	71 (30.9%)	42 (26.1%)	29 (42.0%)	0.016
Associated medication:				
Antipsychotic*	224 (97.0%)	156 (96.9%)	68 (97.1%)	0.919
Anti-depressives*	48 (20.8%)	34 (21.1%)	14 (20.0%)	0.847

The values represent mean (s.d.) and (*) frequency (percentage).

On the contrary, there are significant differences for BMI, 29.5 for women against 27.6 in men ($p= 0.015$) and for values of total cholesterol and HDL cholesterol being highest for women 209.7(41.9) vs. 194.2 (35.4) ($p=0.004$) and 49.5(10.5) vs. 44.5 (13.1) ($p=0.005$) respectively when comparing with men. Furthermore, the greatest significant differences between men and women were found regarding toxic habits. The percentage of men that smoke, and consume alcohol and cannabis is greater when comparing with women especially for alcohol and cannabis consumption, 27.3% against 10.0% for alcohol consumption ($p=0.006$) and 41.6% against 12.9 % for cannabis ($p<0.001$). Finally, the percentage of women with metabolic syndrome is significantly greater than men 42.0% vs. 26.1% ($p= 0.016$).

For HTA the prevalence is significantly greater for general population when compared with the sample population 23.5% vs. 16.9% ($p=0.017$) and for the prevalence of type 2 Diabetes Mellitus (DM2) (glucose>200mg/dl) and sedentary life style we did not found statistically significant differences. Finally, regarding respiratory diseases the prevalence of Asthma was significantly greater for general population 10.8% vs. 1.7% ($p< 0.001$) and the prevalence of Chronic Obstructive Pulmonary Disease (COPD) was similar in both populations but not statistically significant.

DISCUSSION

The results of this study showed that most common risk factors exposure in the sample have been smoking and overweight,

houses began to be implemented in 2005 within the Assertive Community Treatment, until then the axis of health care in people with major mental illness was conducted in the

Table 3 Estimated prevalence of modifiable cardiovascular disease risk factors in the study population comparing with general population.

Variables	Study population (n=231)	General population (N = 1784860)	p
Obesity			
Overweight (BMI \geq 25 kg/m ²)	155 (67.1%)	646,156 (36.2%)	< 0.001
Obese (BMI \geq 30 kg/m ²)	77 (33.3%)	324,176 (18.2%)	< 0.001
HTA			
Total (Systolic BP \geq 140mmHg y/o Diastolic BP \geq 90 mmHg)	39 (16.9%)	419,840 (23.5%)	0.017
Systolic BP (\geq 140 mmHg)	25 (10.8%)	-	
Diastolic BP (\geq 90 mmHg)	24 (10.4%)	-	
Diabetes			
Glucose (>200mg/dl)	24 (10.4%)	167,791 (9.4%)	0.607
Dyslipidemia			
Total-c (> 200mg/dl)	98 (42.4%)	367,875 (20.6%)	< 0.001
Triglycerides (> 200mg/dl)	38 (17.0%)	-	
Smoking habit	183 (79.2%)	507,436 (28.4%)	< 0.001
Respiratory diseases			
Asthma	4 (1.7%)	192,416 (10.8%)	< 0.001
COPD	24 (10.4%)	185,531 (10.4)	0.998
Sedentary lifestyle (METS)	102 (44.2%)	808,261(45.3%)	0.730

with percentages significantly higher than other factors, between 65% to 80% of the sample, followed by sedentary lifestyle with 44.2%. Other factors, such as obesity and metabolic syndrome are present in 30% of the sample and with equal or less than 10% percentages, diabetes, hypertension, asthma and COPD. Risk factors in the sample are distributed according gender. In men the exposure factors that have been more frequently are, contact with psychoactive substances (snuff, alcohol, cannabis and other drugs ...), COPD and asthma, while women are more exposed to the consumption of drugs for their somatic problems, obesity, diabetes and metabolic syndrome. Finally, the age group that presents major risk factors is the group between 45-64 years old, which may be related to the clinical manifestations of the usual adult diseases.

The study sample refers to people with severe mental disorder with a time of evolution of the disease between 12 and 32 years. So, many of the risk factors present could have been avoided from the beginning of his illness, if physical health care had been a priority. It is noteworthy that before entering the housing resources 74.5% of the sample did not receive treatment despite having diagnosed a concomitant physical illness. Likewise, before entering the housing resources, 48.9% of the sample had had some kind of contact with different toxins in the course of the disease, especially cannabis and alcohol. Community rehabilitation resources in the island of Tenerife have a history of 10 years. The resources supportive

Psychiatric Hospital and in the mental health community devices. The development of supportive houses presents more advantages than conventional treatment in a closed or semi-open hospital setting because people are not uprooted from their usual referents such as their natural environment, families and their closest friends by staying in the community with a set of alternative devices. The continuity of care is guaranteed and people are not lost because of the cracks in the care system. Also, relapses are always minor with the follow-up of the community assertive team.

The results of this study also showed that 79.2% of the participants are current smokers and by sexes this percentage increases in men 82.1% against 72.5% in women. For the general population 28.43% of the population between 16 and 65 years smoke, 33.16% of men and 23.75% of women. Smoking constitutes one of the risk factors with the greatest potential impact on global health of people in the Canary Islands. In people with SMI this impact is more relevant, smoking almost tripled (2.8 times) in relation to the general Canarian population, both in men and women. In the supportive housing (supervised floors and at home), this control becomes more difficult, since there is no caretaker for 24 hours so they can smoke more quantity. 80% of patients in the sample were smokers. Moreover, 67.1% smoke between 20 and 40 cigarettes a day. In our study, cigarette smoking is significantly related to medium and high cardiovascular risk.

These findings are similar to those reported in other studies.¹⁸⁻²⁰ (Kavanagh *et al*, 2002; Patkar *et al*, 2002; Addington *et al*, 1997). People with severe mental disorder are more exposed to this risk factor in relation to the general population and also to the population that is treated in health centers²¹⁻²⁶ (Rodríguez *et al*, 2004; Pauwels *et al*, 2001; Serna *et al*, 1997; Arias *et al*, 2000; Merino *et al*, 1993; OMS, 1974). Regarding respiratory diseases, despite the fact that in SMI population the prevalence of especially COPD is high, in our study we found similar prevalence for both population and not significant. However, many studies confirm higher numbers in population with schizophrenia^{27,28} (Chafetz *et al*, 2005; Filik *et al*, 2006) when it is associated with smoking.

In the study sample, overweight is present in 67.1%, compared to 36.83% in the general population from Canary Island¹⁵. According to gender, 66.0% of men in our sample present overweight compared to 42.05% in general population and in women 69.6% compared to 31.67%. The percentages in the sample practically double the findings in the general population. Mechanisms for these high percentages could be explained in a multifactorial way of complex associations²⁹⁻³³ (Carney *et al*, 2006; Oud *et al*, 2009; Allison *et al*, 1999; Casey *et al*, 2004; Daumit *et al*, 2003). The prevalence of obesity in patients with schizophrenia is 1.5-4 times higher than in the general population³⁴⁻³⁸ (Brown *et al*, 1999; McCreddie *et al*, 1998; ADA, 2004; Silverstone *et al*, 1988; Daumit *et al*, 2003). Obesity multiplies the risk of all-cause mortality, coronary heart disease, stroke, and type 2 Diabetes Mellitus, increases the risk of cancer, musculoskeletal problems and loss of function and produces negative psychological consequences³⁹ (Susce *et al*, 2005) Patients with schizophrenia are faced with the combined challenges of living with the disease and, in many cases, with obesity and related illnesses. This combination is a major public health problem⁴⁰ (Wirshing, 2004). Recognition of this problem raises concerns about what would be the best intervention⁴¹⁻⁴⁵ (Green *et al*, 2000; Le Fevre, 2001; Osborn, 2001; Birt, 2003; Catapana *et al*, 2004)

Regarding DM2, if we compare the presence of diabetes in the population of Canary Island in 2009, we observed that this risk factor is present in 9.40% of the population¹⁵, and by sex, very similar percentages are presented in men and women (9.53% vs. 9.26%). In our sample participants with DM2 are slightly above the general population, around 10.4%. And, by sex, women have a higher incidence (17.4%) than men (6.2%), but this difference are not significant. The prevalence of DM2 in our sample is lower than that found in other scientific studies where the diabetes rate for people with severe mental disorders is 2 to 4 times higher than in general population^{7,8} (Sokal *et al*, 2004; Daumit *et al*, 2005) This may be due to the fact that the prevalence of DM2 is also high for general population according to data from the European Health Survey, performed in Spain in 2015.

Taking into account all of these risk factors 81.6% of the participants in our study were at medium cardiovascular risk and 6.5% were at high risk. We couldn't compare our results with the prevalence in general population since the criteria followed to determine the risk were different. In our study the risk of CVD was defined according the Framingham Risk Tables¹⁴ (NCEP, 2002)

However, the preponderance of evidence suggests that patients with major depression, bipolar disorder and schizophrenia are at significantly higher risk for cardiovascular morbidity and mortality than their counterparts in the general population⁴⁶ (WHO, 2010) The etiology of CVD is multifactorial and likely includes genetic and lifestyle factors as well as disease specific and treatment effects⁴⁵ (Catapana *et al*, 2004) People with SMI are more likely to be overweight or obese, to have DM2, or dyslipidemia and to smoke.

To our knowledge this is the first time that data were recollected from people with SMI allocated in housing resources and not in a clinical setting. And neither, there are comparative studies conducted in Spain with the general population. However, several limitations in our study have to be addressed. As a cross-sectional study, it is not possible to determine whether the exposure factor under study preceded the effect. Its limitation to establish causality between exposure and effect is compensated by its flexibility to explore associations between multiple exposures and multiple effects. Another fact to take into account is that people included in this study are not all people with SMI prevalent on the island, but a group of patients who have been referred to the alternative accommodation resources. The size of the sample is limited by the number of places occupied at the time of the study, which corresponds to the number of places available on the island. However, none of the participants in the sample refused to participate in the study and the information was collected from the medical records following the clinical guide that was elaborated in the Community Assertive Team itself. So the search and collection of information was homogeneous.

CONCLUSIONS

In summary, the relationship between heart disease, diabetes, obesity and respiratory diseases to mental health is as narrow as inevitable. Many physical disorders have been identified that are more prevalent in individuals with SMI. The notion of "integration of care" by focusing on the connection and relationship of mental health disorders to chronic diseases is essential in public health care programs. Changes in lifestyle based on avoidance of smoking, regular physical activity and improved dietary habits could be the most effective intervention in a population sector with its own specificities in the field of SMI. Multidisciplinary assessment of psychiatric and medical conditions is needed. Psychiatric treatment facilities should offer and promote healthy lifestyle interventions.

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Statements of ethical approval, funding and competing interests

The authors declare no conflicts of interest.

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