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FEATURE ARTICLE

Dietary habits of patients with schizophrenia: A self-reported questionnaire survey

Agustin J. Simonelli-Muñoz, [1] ***Maria I. Fortea,*** [1] ***Pilar Salorio,*** [2] ***Juana I. Gallego-Gomez,*** [1] ***Sonia Sánchez-Bautista*** [1] ***and Serafin Balanza*** [1]

[1]*Department of Nursing, Catholic University of Murcia (UCAM), Guadalupe, and* [2]*Psychiatry Unit, 'Reina Sofia' University Hospital, Murcia, Spain*

ABSTRACT: *The present study was carried out to determine the dietary habits of patients with schizophrenia and the influence of these habits on the degree of obesity. The study was developed in a sample of 159 patients, who were given a self-reported questionnaire, to ascertain the influence of socio-familiar aspects, pharmacological treatment, and dietary habits. Anthropometric measurements (body mass index (BMI) and waist circumference (WC)) were also taken. Patients with schizophrenia presented unhealthy dietary habits, as indicated by the finding that 51% of the patients took no longer than 15 min to eat, 40.8% did not eat fruit daily, and 63.1% did not eat fish. Women were three times more likely to be obese than men (odds ratio (OR) = 2.91, P = 0.021). Patients classified as having unhealthy dietary habits have a 2.33-fold higher risk of obesity than patients with good dietary habits (OR = 2.33, P = 0.034). In summary, this paper highlights the fact that patients with schizophrenia have a detrimental dietary pattern that is associated with an increase in BMI and WC, with the consequent development of obesity and related metabolic alterations, regardless of the pharmacological treatment being followed. Future research directions will include exploring the need for nutritional education programmes to improve the dietary habits of such patients.*

KEY WORDS: *dietary habit, mental illness, obesity, schizophrenia.*

INTRODUCTION

Patients with schizophrenia usually present a cluster of metabolic alterations, which might seem to be related to the prescribed pharmacological treatment (McCloughen & Foster 2011). The most common of these alterations are obesity, diabetes, hypercholesterolemia, and other related pathologies. Indeed, the treatment of these comorbidities represents a significant cost for the health system (Casey 2005; Wirshing 2004).

Correspondence: Agustin J. Simonelli-Muñoz, Faculty of Nursing, Catholic University of Murcia, Campus de Guadalupe, s/n. 30107, Murcia, Spain. Email: agsimonelli@pdi.ucam.edu
Agustin Javier Simonelli-Muñoz, PhD.
Maria Isabel Fortea, PhD.
Pilar Salorio, PhD.
Juana Ines Gallego-Gomez, RN.
Sonia Sánchez-Bautista, PhD.
Serafin Balanza, MD.
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In clinical practice, the treatment selected for patients with schizophrenia and its clinical application will depend on their medical history and their general health status at the moment of the planning treatment. However, obesity and the risk of developing diabetes and cardiovascular diseases are not usually evaluated (Van Gaal 2006). Pharmacological treatment is normally prescribed independently of the previous obesity degree of the patients, although several studies have compared obesity with second-generation antipsychotics (olanzapine and clozapine) (Catapano & Castle 2004; Fountaine *et al*. 2010; Moreno *et al*. 2010).

The high risk of obesity in patients with schizophrenia is believed to be multifactorial, and related not only with antipsychotic medications, but also with genetic predisposition (Munro *et al*. 2012); lifestyle characteristics, such as the lack of exercise (Poulin *et al*. 2007); and dietary habits (Amani 2007).

However, the lack of specific works relating schizophrenia with dietary habits is of note, despite the fact that such habits have enormous importance in mental illness (Amani 2007; Tucker & Buranapin 2001).

The literature mentions that several nutrients, such as L-tryptophan, niacin, vitamin B12 (Alpert *et al*. 2002), and omega-3 fatty acids (Peet & Stokes 2005) have a beneficial effect on patients with mental illness. Biochemical studies demonstrate a relationship between low quantities of omega-3 fatty acids, which are mainly present in fish, and depression and schizophrenia (Peet & Stokes 2005). Moreover, in Spain, a part of the world characterized by its Mediterranean dietary pattern, there are no previous studies regarding dietary habits and patients with schizophrenia, and international studies are also scarce (Strassning *et al*. 2003; Villegas *et al*. 2005).

The main objective of the present study was to evaluate the dietary habits of patients with schizophrenia, and to determine their influence on the degree of obesity of these patients.

MATERIALS AND METHODS

Study design and patients

The study was descriptive, transversal, and observational, based on a quantitative methodology, using a self-reported questionnaire. The patients were recruited by a consecutive, non-probabilistic sampling procedure.

The population size was determined according to a previous study (Menza *et al*. 2004). The present study was on patients with schizophrenia, and obtained a ± 1 kg m^{-2} accuracy, a 95% confidence interval (CI; α: 0.05), and a standard deviation of 6.3 kg m^{-2}. A total of 13 357 patients were enrolled in the study.

The target population comprised 159 patients with any type of schizophrenia or any of its clinical variations, and living in the province of Murcia, Spain. The patients were diagnosed following the criteria described in the DSM-IV (First 2009). The study was conducted from March to December 2009.

The survey was carried out with the written authorization of the different mental health centres of Murcia, and by the Ethical Committee of the Regional Health Service of Murcia. Patients were informed about the design of this study orally and in writing. The patients were also informed that there was no economic or commercial involvement. They were informed about the aim of the results obtained, and guaranteed confidentiality and anonymity of the data. The study was done in accordance with the Declaration of Helsinki.

The questionnaire was given to the patients when they attended the specialist consultation, and nurses acted as interviewers. Prior to this, several meetings were held with the nurses in order to explain the data-collection method to avoid bias in the sample selection and measurement of variables. The methodological characteristics of the present study, based on a self-reported questionnaire, forced us to establish as the only exclusion criterion, the patient's clinical status, that is, a deficient intellectual capacity to answer questions.

Anthropometric measurements

Obesity was assessed, according to the criteria proposed by the Spanish Society for the Study of Obesity (SEEDO) (Salas-Salvadó *et al*. 2007). Weight was determined in bare-footed patients who wore light clothes using a digital scale. Height was determined using a Harpenden digital stadiometer (range 0.70–2.05 m), with the patient upright, and the head in the Frankfurt plane. From these data, the body mass index (BMI) was calculated. Body fat distribution was assessed using the waist circumference (WC), midway between the lower rib margin and the iliac crest.

Self-reported questionnaire of dietary habits

The questionnaire used (Appendix 1) to measure the quality of dietary habits is mainly based on the recommendations of the Spanish Society of Community Nutrition (Dapcich *et al*. 2004), and has 17 items. The questionnaire score varies from zero to 51 points; the more points scored in the test, the healthier the dietary habits of the patient concerned. All items, except the first one, had three to four possible answers, with a 0, 2, or 3 score, depending on answer C (C1 or C2), B (B1 or B2), or A (A1 or A2), respectively. The first item of the questionnaire had five possible answers (A, B, C, D, and E). If patients mark A, C, or E, plus any of the other two options, the score will be 3. The score will be 2 if patients answer A, C, and E; and 0, if the patients answer only two options (Appendix 1).

Statistical analysis

Data were analysed using SPSS 18.0 for Windows (SPSS, Chicago, IL, USA). The different variables under study were assessed through the calculation of the basic descriptive statistics and frequencies, with a CI of 95%.

In order to contrast hypotheses, one-way ANOVA was used. Pearson's χ^2-test was also performed for qualitative variables. McNemar's test was performed to analyse qualitative variables of repeated measures, using Bowker's test variety, when the variables for contrast had

more than two categories. A logistic regression analysis was performed with the purpose of determining which variables independently predicted the risk of obesity, based on a model where all variables were considered independent, both categorical and quantitative, using the stepwise method. The significance level for the results obtained in the hypothesis contrast was $P < 0.05$.

RESULTS

The mean age of patients was 38 ± 1 years (95% CI: 37–39), with age ranging between 14 and 62 years. Of the patients, 82.4% were men, and BMI was 30.4 ± 0.4 kg m^{-2} (95% CI: 29.5–31.3). From the total population studied ($n = 159$), 133 (83.6%) patients showed some degree of obesity. According to the SEEDO classification (Table 1) (Salas-Salvadó *et al*. 2007), 60 (37.7%) patients had type I obesity, 62 (39%) showed type II obesity, and the remaining 11 (6.9%) had a severe degree of obesity (type III or higher). Mean WC was 105.4 ± 1.2 cm (95% CI: 103.0–107.8), with 108 patients (67.9%) having a WC higher than the recommended values (Alberti *et al*. 2006; Salas-Salvadó *et al*. 2007).

The pharmacological treatment was mainly based on second-generation antipsychotics (102 patients), whereas first-generation drugs were used by seven patients, and the remaining 50 patients used a combination of both drugs.

According to the data obtained by the questionnaire, the mean score for dietary habits was 27.3 ± 0.4 points (95% CI: 26.3–28.2). In the present study, our data showed that a score of 27 corresponds to the 50th percentile, while a score of 31 corresponded to the 75th percentile. The latter percentile was taken as reference to classify the patients as having either healthy or unhealthy dietary habits, with a healthy diet a score considered ≥31. This applied only to 35 (22%) patients, which underlines the fact that our patients with schizophrenia presented unhealthy dietary habits.

Briefly, 51% of the patients ate in 15 min or less, 40.8% did not eat fruit daily, 63.1% did not eat fish, and 70.1% of the patients ate more meat than fish. In contrast, we should also stress the healthy habit of consuming olive oil (87.9% of patients) (Table 2).

Prior to analysing the relation between dietary habits and the risk of obesity, we considered it important to determine whether patients with unhealthy habits already showed a higher BMI, as was to be expected. This was found to be the case for patients with unhealthy eating habits and those with healthy eating habits (30.89 ± 5.98 kg m^{-2} and 28.66 ± 4.32 kg m^{-2}, respectively; $P = 0.028$). The mean BMI values, according to each item of the dietary habits questionnaire, are shown in Table 2. Thus, we observed significantly higher BMI values in patients who always eat between meals, those who eat very quickly, and those who eat four or five meals per day (Table 2).

Consequently, we analysed the different parameters that were thought to influence the BMI. Table 3 shows that sex (66.7% of women were obese) and dietary habits were significant determinants of the risk of an increased BMI. Moreover, a previous diagnosis of obesity was the variable identifying the highest risk of an increased BMI (Tables 3,4). When we analysed the influence of several variables on WC (Table 3), our results were found to be similar to those obtained concerning the obesity degree, although this time, sex was the most determinant variable (Table 3). It is important to emphasize that in the present work, drug treatment was not a determinant factor in predicting the risk of developing obesity in our patients ($P = 0.522$) (data not shown).

To confirm our data, a stepwise multivariate logistic regression analysis was also performed, where sex (adjusted odds ratio (OR) = 2.91) and dietary habits (adjusted OR = 2.33) were the only variables that independently predicted the risk of developing moderate–severe obesity in our patients (Table 5).

TABLE 1: *Classification of overweight and obesity, according to the BMI and WC based on the criteria defined by the Spanish Society for the Study of Obesity (SEEDO 2007)*

Classification SEEDO (2007)	
Limit values of BMI (kg m^{-2})	Normal weight: 18.5–24.9 Overweight: 25.0–29.9 Obesity degree I: 30.0–34.9 Obesity degree II: 35–39.9 Obesity degree III: ≥40
Limit values of WC (cm)	Men ≥ 102 Women ≥ 88

Source: Salas-Salvadó *et al*. 2007. BMI, body mass index; WC, weight circumference.

DISCUSSION

Taking into account the methodology used, we stress the difficulties that we found in applying the self-reported questionnaire, due to the psychological characteristics of the patients, although they seemed totally committed to collaborating. For that reason, although the sample size was relatively low, the difficulty involved in working with patients who have schizophrenia should be taken into consideration.

TABLE 2: *Frequency (number and percentage of patients) of each of the different dietary habits present in the questionnaire, and BMI in relation to each of those habits*

Variable	*n* (%)	BMI Mean ± SD
No. meals per day		***F* = 4.985 *P* = 0.008**
0, unhealthy habit (≤2 meals)	5 (3.2%)	28.16 ± 4.51
2 moderate habit (3 meals)	65 (41.4%)	28.79 ± 4.79
3, healthy habit (4 or 5 meals)	88 (55.4%)	31.54 ± 6.04
Breakfast foods		*F* = 2.120 *P* = 0.124
0, unhealthy habit (no breakfast)	4 (2.5%)	26.85 ± 5.42
2, moderate habit (only 1 food)	67 (42.7%)	29.53 ± 5.19
3, healthy habit (2 or more foods)	86 (54.8%)	31.05 ± 5.94
Eating between meals		***F* = 5.410 *P* = 0.002**
0, unhealthy habit (every day)	20 (12.7%)	34.11 ± 6.46
2, moderate habit (sometimes)	67 (42.7%)	30.21 ± 5.39
3, healthy habit (never)	52 (33.1%)	28.96 ± 5.20
Time spent eating		***F* = 6.941 *P* = 0.001**
0, unhealthy habit (15 min)	80 (51.0%)	31.87 ± 6.17
2, moderate habit (30 min)	65 (41.4%)	28.80 ± 4.83
3, healthy habit (1 hour)	12 (7.6%)	27.88 ± 2.62
Where do you usually eat?		*F* = 0.498 *P* = 0.609
0, unhealthy habit (fast food)	2 (1.3%)	27.82 ± 4.62
2, moderate habit (homemade food outside home)	13 (8.2%)	28.99 ± 4.04
3, healthy habit (homemade food at home)	149 (93.7%)	30.41 ± 5.75
How many times a day do you eat fruit and vegetables?		*F* = 0.023 *P* = 0.978
0, unhealthy habit (once or never)	64 (40.8%)	30.21 ± 5.94
2, moderate habit (2 or 3 times)	79 (50.3%)	30.31 ± 5.58
3, healthy habit (4 or more times)	14 (8.9%)	30.56 ± 5.08
How many times a day do you eat legumes?		*F* = 0.746 *P* = 0.476
0, unhealthy habit (less than 2 times)	47 (29.9%)	29.62 ± 5.09
2, moderate habit (2 times)	71 (45.2%)	30.29 ± 5.28
3, healthy habit (more than 2 times)	39 (24.8%)	31.12 ± 6.88
How many times a day do you eat cereals, breads, and potatoes?		*F* = 1.099 *P* = 0.336
0, unhealthy habit (less than 4 times)	84 (53.5%)	30.48 ± 6.20
2, moderate habit (between 4 and 6 times)	67 (42.7%)	30.36 ± 5.09
3, healthy habit (more than 6 times)	6 (3.8%)	26.95 ± 2.15
How many times a week do you eat rice and pasta?		*F* = 0.529 *P* = 0.590
0, unhealthy habit (less than 2 times)	42 (26.8%)	29.52 ± 5.54
2, moderate habit (2 times)	89 (56.7%)	30.57 ± 5.79
3, healthy habit (3 or more times)	26 (16.6%)	30.60 ± 5.45
How much milk or containing-milk food do you eat a day?		*F* = 0.585 *P* = 0.558
0, unhealthy habit (2 foods or more)	77 (49.0%)	29.84 ± 5.39
2, moderate habit (3 foods)	62 (39.1%)	30.57 ± 5.33
3, healthy habit (4 foods or more)	18 (11.5%)	31.28 ± 7.72
How many times do you eat fish do you eat a week?		*F* = 0.402 *P* = 0.670
0, unhealthy habit (1 or none)	99 (63.1%)	30.45 ± 5.73
2, moderate habit (2 or 3 times)	55 (35.0%)	30.16 ± 5.46
3, healthy habit (4 or more times)	3 (1.9%)	27.55 ± 8.22
Do you eat more fish that meat?		*F* = 0.587 *P* = 0.557
0, unhealthy habit (no)	110 (70.1%)	30.54 ± 5.56
2, moderate habit (equal)	33 (21.0%)	29.61 ± 5.03
3, healthy habit (yes)	14 (8.9%)	30.91 ± 7.25
How many eggs do you eat a week?		*F* = 0.587 *P* = 0.557
0, unhealthy habit (2 or less, or more than 5 units)	83 (52.9%)	30.54 ± 5.56
2, moderate habit (3 units)	51 (32.5%)	29.61 ± 5.03
3, healthy habit (4 or 5 units)	23 (14.6%)	30.91 ± 7.25
Which oil do you normally consume?		*F* = 1.333 *P* = 0.184
0, unhealthy habit (margarine or butter)	2 (1.3%)	–
2, moderate habit (sunflower)	17 (10.8%)	32.04 ± 6.78
3, healthy habit (olive)	138 (87.9%)	30.10 ± 5.53
How many spoonfuls of sugar do you consume a day?		*F* = 0.564 *P* = 0.570
0, unhealthy habit (less than 4 and more than 8)	111 (70.7%)	30.60 ± 6.09
2, moderate habit (4 or 5)	33 (21.0%)	29.53 ± 3.99
3, healthy habit (from 6 to 8)	13 (8.3%)	29.60 ± 5.54
How much water do you drink a day?		*F* = 1.377 *P* = 0.256
0, unhealthy habit (less than 1 L)	40 (25.5%)	30.20 ± 5.73
2, moderate habit (between 1 and 1.5 L)	49 (31.2%)	29.31 ± 4.92
3, healthy habit (more than 1.5 L)	68 (43.3%)	31.06 ± 6.06
How many hours do you exercise a day?		*F* = 1.959 *P* = 0.145
0, unhealthy habit (none)	60 (38.2%)	31.17 ± 6.13
2, moderate habit (30 min)	49 (31.2%)	30.47 ± 5.54
3, healthy habit (1 hour or more)	48 (30.6%)	29.03 ± 4.99

Significant differences are represented in bold. $P < 0.05$, statistical significance. BMI, body mass index; SD, standard deviation.

TABLE 3: *Clinical and sociodemographic characteristics that had a significant influence on the BMI of the patients in the present study*

	Body mass index		
	<30 kg m^{-2} *n* (%)	≥30 kg m^{-2} *n* (%)	OR (95% CI)
Sex			
Men (*n*: 130)	77 (59.2%)	53 (40.8%)	2.90 (1.21–6.95)
Women (*n*: 27)	9 (33.3%)	18 (66.7%)	*P*: 0.014
Obesity prior to diagnosis			
No, BMI <25 (*n*: 83)	60 (72.3%)	23 (27.7%)	6.95 (3.06–15.7)
Yes, BMI ≥25 (*n*: 44)	12 (27.3%)	32 (72.7%)	*P* < 0.001
Dietary habit			
Healthy ≥31 points (*n*: 42)	29 (69.0%)	13 (31.0%)	2.27 (1.07–4.80)
Unhealthy <31 points (*n*: 115)	57 (49.6)	58 (50.4%)	*P*: 0.030
	Waist circumference		
	Low *n* (%)	High *n* (%)	OR (95% CI)
Sex			
Men (*n* = 130)	49 (37.7%)	81 (62.3%)	7.56 (1.71–33.3)
Women (*n* = 27)	2 (7.4%)	25 (92.6%)	*P*: 0.002
Obesity prior to diagnosis			
No, BMI <25 (*n*: 83)	39 (47.0%)	44 (53.0%)	5.61 (2.14–14.7)
Yes, BMI ≥25 (*n*: 44)	6 (13.6%)	38 (86.4%)	*P* < 0.001

P < 0.05 (χ^2 statistic). BMI, body mass index; CI, confidence interval; OR, odds ratio.

TABLE 4: *Influence of the degree of obesity prior to the diagnosis of schizophrenia and its influence on the risk of developing obesity after the establishment of the mental illness*

	Obesity degree			
Obesity degree prior to diagnosis	<25 *n* (%)	25–30 *n* (%)	≥30 *n* (%)	Total *n* (%)
<25	21 (25.3)	39 (47.0)	23 (27.7)	83 (100)
25–30	1 (3.1)	9 (28.1)	22 (68.8)	32 (100)
≥30	0 (0)	2 (16.7)	10 (83.3)	12 (100)
McNemar–Bowker test: 75.763, *P* < 0.001				

P < 0.05.

TABLE 5: *Stepwise multivariate logistic regression analysis of the different clinical and sociodemographic characteristics that significantly predict the risk of obesity*

Variables	β	*P*-value	Adjusted OR	95% CI
Sex				
Men	Reference category†			
Women	1.069	0.021	2.913	1.176–7.212
Dietary habits classification				
Healthy habits	Reference category†			
Unhealthy or not very healthy habits	0.844	0.034	2.325	1.065–5.075

†Obesity degree as the dependent variable. Variables excluded: age, obesity prior to diagnosis, pharmacological treatment. BMI <30, reference value 0; BMI ≥30, reference value 1. CI, confidence interval; OR, odds ratio.

Patients with schizophrenia represent an interesting study target, because of their high prevalence of obesity. According to the National Health Survey (2006) in Spain, the prevalence of obesity in the general population is lower (53.3%) than that of our study patients (83.6%).

Several data regarding the sociodemographic characteristics of our patients strongly drew our attention. For instance, sex was an important determinant of the risk of developing obesity, as women had a threefold higher risk of obesity than their male counterparts. Several previous studies have also stated that women with schizophrenia have an increased risk of obesity (Bobes *et al*. 2007; Hakko *et al*. 2006; Kolotkin *et al*. 2008; Limosin *et al*. 2008; Sanchez-Araña *et al*. 2007), a fact that is confirmed in our study (Table 3). Moreover, we noticed that patients with a previous diagnosis of obesity showed a clear trend to be at risk of severe obesity after the mental illness was established (Table 4).

Furthermore, when we revised the available literature, we found a lack of information concerning the dietary habits of patients with schizophrenia. This at first seems somewhat contradictory, as there is a plethora of information regarding schizophrenia and the development of obesity and other related metabolic alterations. However, these studies are mainly focused on the effect of antipsychotic drugs on such patients (Falissard *et al*. 2011; Medved *et al*. 2009; Tschoner *et al*. 2009). Although pharmacological treatment is important in the development of obesity in patients with schizophrenia, it is also important to emphasize the relevance of dietary habits in the weight gain of patients with schizophrenia, as it is these habits that lead such patients to becoming obese. In fact, according to our data, the antipsychotic treatment itself was not a significant determinant or predictive factor of the risk of obesity ($P = 0.522$) (data not shown), which highlights the necessity of determining the dietary habits of these patients prior to the commencement of any pharmacological treatment.

One of the few studies on the dietary habits of patients with schizophrenia was carried out in 2007 by Amani (Amani 2007), who performed a study comparing the diet of patients with schizophrenia with a healthy population, in an attempt to identify the best dietary recommendations for this group of patients. Our results are in agreement with those of Amani, who concluded that patients with schizophrenia showed detrimental dietary behaviour (Amani 2007).

Of all the dietary habits studied, there were several factors that stood out, as they have a higher influence on the development of obesity in our patients. For example, our data showed that patients tended to eat in less than 15 min, snack between meals, and eat four or five times per day, all of which are related to an increased risk of obesity (Table 2). According to the criteria proposed by SEEDO (Salas-Salvadó *et al*. 2007), the number of meals per day considered to be healthy is four or five. However, in our results, the patients who ate four or five meals per day had the higher BMI than those who at less meals per day (Table 2). The main reason for this was that those who ate four to five meals per day also had a high intake of fast food and cold meat. This is corroborated by the results obtained in another food frequency questionnaire, where the Spearman correlation demonstrated statistically-significant results in this case (data not shown). The same factors have been widely associated with the development of obesity in the general population worldwide. A recent review by Piernas and Popkin (2010) showed that the consumption of snacks, as well as other detrimental dietary habits, in the last 30 years in the USA have increased with the number of people with obesity. Thus, it is clear that such habits predispose our patients to obesity, independent of the antipsychotic treatment prescribed.

Also of note is the low consumption of fruit and fish among our patients (Table 2), a result that confirms their unhealthy dietary habits. This is in concordance with the results obtained by Darmon and Drewnowski (2008) of the general population. In fact, the literature mentions that omega-3 fatty acids have a beneficial effect on patients with schizophrenia (Peet & Stokes 2005). In contrast, we should also stress that, as a healthy habit, the fact that 87.9% of patients consumed olive oil (Table 2), which was to be expected, as patients came from a Mediterranean region of Spain.

Having confirmed that patients with schizophrenia show detrimental dietary behaviour, we considered it important to look at the role that schizophrenia itself plays in the alteration of such habits. It should be remembered that patients with schizophrenia usually develop other mental illnesses, such as anxiety and stress, which have been also associated with an increased body weight (Maslov *et al*. 2009). Nevertheless, our data clearly demonstrated that the prior diagnosis of obesity was the main factor that influenced the risk of obesity (Table 4). Thus, although the establishment of the mental illness might affect the homeostasis of body weight, in our opinion, the previous physical status, as well as the dietary and health-related habits, are more determinant that the pathology itself, at least regarding the patient's body weight.

In conclusion, this study represents one of the first to explore the dietary habits of patients with a mental illness. The results confirm that patients with schizophrenia have unhealthy dietary habits, which lead to increases in body

weight, which consequently put them at risk of obesity and other related metabolic alterations, independent of the pharmacological treatment being followed.

From a prevention point of view, the most important recommendation should be to promote healthy dietary habits in these patients that are directed at reducing the number of meals per day (limiting this number to 5 meals day^{-1}), and particularly to avoid eating between meals, with the aim of modifying these habits to subsequently decrease their BMI and WC, as well as the comorbidities associated with obesity.

It is hoped that this work will underline the need to include a nutritional education programme focusing on healthy dietary habits in the standard nursing clinical procedure. This would be a great step towards preventing the risk of obesity, a pathology frequently diagnosed in patients with schizophrenia.

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APPENDIX 1

Dietary habits questionnaire – mark with an X

1. How many meals do you eat a day?

A	Breakfast	Yes
B	Morning snack	Yes
C	Lunch	Yes
D	Afternoon snack	Yes
E	Dinner	Yes

2. How many foods do you usually eat for breakfast?

A1	I normally eat a great variety of foods for breakfast (more than three different foods).	
A2	Besides a coffee, milk, or a herbal infusion, I also eat toast, a piece of pastry, or cereal or fruit.	
B	I only have a coffee, or milk, or a herbal infusion.	
C	No breakfast.	

3. Do you eat between meals?

A	Never	
B	Sometimes	
C	Every day	

4. How long does it take you to eat a meal?

A	1 hour	
B	30 min	
C	15 min	

5. Where do you usually eat?

A	At home (homemade food)	
B1	At work (but with homemade food)	
B2	At a restaurant or canteen (homemade food)	
C	Fast food	

6. How many times do you eat fruit or vegetables a day?

A	4 times or more	
B	2 or 3 times	
C	Once or never	

7. How many times do you eat legumes a week?

A	More than 2 times	
B	2 times	
C	Less than 2 times	

8. How many times do you eat cereals, breads, and potatoes a day?

A	More than 6 times	
B	Between 4 and 6 times	
C	Less than 4 times	

9. How many times do you eat rice and pasta a week?

A	3 times or more	
B	2 times	
C	Less than two times	

10. How many milk or milk-containing food (i.e. yogurt, cheese) do you eat a day?

A	4 foods or more	
B	3 foods	
C	2 foods or less	

11. How many times do you eat fish a week?

A	4 times or more	
B	2 or 3 times	
C	Once or never	

12. Do you eat more fish than meat a week?

A	Yes	
B	Equal	
C	No	

13. How many eggs do you eat a week?

A	4 to 5 units	
B	3 units	
C1	2 or less units	
C2	More than 5 units	

14. Which oil do you often consume or consume more?

A	Olive	
B	Sunflower	
C1	Butter	
C2	Margarine	

15. How many spoonfuls of sugar do you consume a day?

A	6 to 8	
B	4 or 5	
C1	Less than 4	
C2	More than 8	

16. How much water do you drink a day?

A	More than 1.5 L	
B	Between 1 and 1.5 L	
C	Less than 1 L a day	

17. How many hours do you exercise a day, such as walking or going up and down stairs?

A	1 hour or more	
B	30 min	
C	None	