

Eating Behaviors, Body Composition and Risk of Relapse among Persons withdrawing from Substance Abuse: A 3-months Follow-up Study

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Abstract

Objective: To describe eating behaviors and body composition before, during and after substance abuse withdrawal, and to assess if these factors were related with withdrawal outcome.

Methods: This was a three month follow-up study examining eating behaviors (measured by validated questionnaires and interview), substance use (assessed with Addiction Severity Index) anthropometry (weight, height and bioimpedance for body composition), medical conditions and psycho-social environment (recorded from medical files and Addiction Severity Index) of 117 patients enrolling in a detoxification program at the University Hospitals, Geneva, Switzerland. Characteristics at baseline and after one month were compared according to patients' outcome. Variables showing a significant association with relapse were entered in a multivariate logistic regression

Results: Most patients were men (84, 71%), and detoxified from alcohol (95, 81%). Relapse rates were 27% after 1 month and 45% after 3 months. Eating disorders were rare but 19% scored high on shape concern scale, 35% experienced nibbling, 20% compulsive night eating and 14% binge episodes, 24% displayed lower than normal fat-free mass and 40% had higher than normal fat mass. Bivariate analysis showed that low nutritional status (low BMI, or low fat mass or low fat free mass), was associated with a decreased risk of relapse. Withdrawal from drugs, higher tobacco consumption and higher severity index for legal area were associated with relapse. These determinants showed no effect on outcome in a multivariate analysis.

Conclusion: Problematic eating behaviors were common in this group, whereas eating disorders were rare. Relapse rate was high. No variable was related with relapse at multivariate level. As in general population, overweight and high fat mass were common among persons abusing substances. BMI was a poor indicator of their nutritional status. Our study suggests attention should be given to patients' eating behaviors, weight and shape preoccupation during substance withdrawal and follow-up.

Keywords: Eating behaviors; Eating disorders; Addiction; Substance withdrawal; Cohort study; Body composition; Substance-related disorders

Introduction

Eating behaviors and nutritional status of persons suffering from psychoactive substance abuse have generally been studied separately. The relationship between eating disorders and addiction has been subject of numerous publications. To date, it is insufficiently described, especially among clinical, heterogeneous samples to justify interventions. Even if there is currently a debate whether food (or certain eating behaviors) can be addictive or not [1-4], two major commonalities between eating behavior and drugs consumption behavior have been demonstrated: 1) their co-occurrence and 2) their shared neurobiological pathways.

Co-morbidity surveys show an association of eating disorders or eating problems and substance use or abuse [5-10]. Prevalence of substance use is higher than expected in persons with eating disorders [11]. A meta-analysis including 16 papers investigated drug use in people with eating disorders or eating problems and showed that the relationship was stronger for persons with bulimia, binge eating disorders or binge eating characteristics [12]. Conversely, high rates of eating disorders or problematic eating behaviors were found among people suffering from substance use disorder [13-15]. The majority of studies included women only.

Some neurobiological pathways linking food intake with reward are similar to those observed in substance use [3,16-18]. Whereas

motivation to eat is usually triggered by the lowering of energy stores via hypothalamic circuits, the pleasure associated with the intake of the so-called palatable foods can overrule the energy homeostasis. The reward circuit can then promote overeating via the mesolimbic dopamine pathway [2,4,19] and the food itself reinforces consumption of intake, as in drug use [20]. Mostly based on animal models, these data have clinical implications. Alcohol drinking and binge eating seem to have a similar role of emotional relief [21]. Also, the triggering capacity of small amounts of food into binge eating can be compared to the urge of drug taking after a small dose in people suffering from addiction [17].

Nutritional status among people suffering from substance use

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disorder is generally considered as poor [22], but studies on this topic are scarce, at least among persons living in the community. Data vary greatly depending on country, type of substance used and medical status, and variations among methods make comparisons difficult [23]. Several studies among persons with drug use disorder have showed high prevalence (20-60%) of depleted nutritional status in Europe, Asia or the United States of America [24-26]. However, medical, socio-economic and lifestyle parameters, more than the addiction in itself, play an important role in nutritional state [27,28]. Among patients with alcohol use disorders, insufficient nutritional state was frequent in several studies led in Spain and Portugal [29-31], but another study found normal body mass index (BMI) among a group of people treated for alcohol or drugs abuse, with a high prevalence of excessive fat mass (54%) measured by bio-impedance analysis [15].

Wolfe et al. [32] noted that prospective studies on eating behaviors in relation with substance withdrawal are lacking and that studies underlying theories on eating patterns and outcome of substance abuse treatment are generally based on initial presence of eating disorders. Also, problematic eating behaviors like nibbling or night eating have not been given much attention according to published literature. The interplay of eating behavior, drug abuse and body composition has potential clinical repercussions, as there is some evidence of interference with substance withdrawal outcome [13,14,33]. Also, food intake, and more specifically hyperphagia, is related with body composition: after weight loss, the increase in appetite persists after restoration of fat mass, until muscle mass is back to initial level [34]. Data on these factors are scarce and follow-up studies in “naturalistic and clinical cohorts”, as pointed out by Calero et al. [12], are lacking. In order to contribute to disentangling the interplay between eating behaviors, body composition and substance abuse, the goals of our study were to assess: 1) eating behaviors and their changes during substance abuse withdrawal as well as body composition 2) if these factors were related with treatment outcome.

Methods

This cohort study a three month follow-up period examined eating behaviors, substance use, anthropometry, medical conditions and psycho-social environment of 117 patients enrolling in a detoxification program at the University Hospitals, Geneva, Switzerland. The Ethical Comity of the Geneva University Hospitals approved the study protocol and each patient signed an informed consent.

Setting and procedures

The study took place at the Geneva University Hospitals. From July 2009 to October 2010, each eligible patient was approached by the field investigator (CS), a well-trained registered dietitian, who explained the purpose and process of the study. Upon consent, the dietitian proceeded to the anthropometric measures. Substance use, eating behaviors and psycho-social parameters were assessed during the first 72 hours after starting the detoxification program. Substance use and eating behaviors were re-evaluated at the end of the detoxification program (one week after inclusion), one and three months after detoxification. At the end of detoxification, patients were seen by the investigator and a follow-up visit was planned. A few days before the appointment, the investigator contacted the patient to confirm. In case of no show, up to four attempts of encounters were made before considering the patient as drop-out. All measures and data collection procedures were performed by the same investigator. In case of relapse during follow-up, the patients' data were censored.

The detoxification was offered in two specialized settings of

the University Hospitals of Geneva: The Division of Primary Care (Department of Community Medicine, Primary Care and Emergency) and the Division of Addictology (Department of Mental Health and Psychiatry). Patients were hospitalized for one week and subsequently followed intensively as outpatients. No intervention or information on diet or eating behaviors was provided. During hospitalization, patients took their meals (provided by the hospital kitchen) together, without the staff. They were free to buy snacks from the cafeteria and vending machines.

Study population

Any adult patient suffering from substance abuse or dependence (alcohol, benzodiazepines, cocaine or opioids) and entering the detoxification program was eligible to participate in the study. Patients not able to give informed consent were excluded. One hundred eighty-eight patients were approached, 143 gave their consent from which 20 (14%) could not be assessed within 72 hours, and 123 were included. From those, 6 (3%) did not finish the first week withdrawal process, so the data of 117 patients were analyzed.

Measures

Substance use

Substance use, including tobacco, was assessed following the validated French version of the Addiction Severity Index (ASI) questionnaire, considered as the standard assessment tool for alcohol and other addictions [35,36]. Type of substance, frequency and quantity of consumption were documented, as well as last abstinence duration and rating of the addiction severity by the respondent and the interviewer. Primary substance refers to the substance for which the patient was detoxified. Lifetime harmful consumption refers to consumption characterized as problematic by the patient.

Relapse was defined for the substance for which the patient was detoxified. For drugs, any consumption was considered as relapse, for alcohol it was defined as at least one heavy drinking day (≥ 5 standard drinks for men, ≥ 4 standard drinks for women) during the last 28 days [37,38].

Eating behaviors

Eating disorder symptoms were assessed with the French version of the 28-item “Eating disorder examination questionnaire” (EDE-Q) [39,40]. EDE-Q has good psychometric properties (test-retest correlations 0.66 to 0.94, internal consistency alphas 0.70 to 0.93) [41]. It assesses dietary restraint, eating concern, shape concern and weight concern, as well as a global score over the past four weeks on a 0 to 6-point rating scheme. We considered scores >4 as abnormally high, as this cut-off has been suggested for clinical significance [42,43]. Global score ≥ 2.3 was considered as cut-off for eating disturbances [44].

Binge eating disorder were assessed with the French version of “Eating disorders in obesity” (EDO) [45,46]. EDO is a 11-item instrument with good psychometric properties with regard to the ability to detect eating disorders (Cohen's $\kappa=0.67$) and binge eating (Cohen's $\kappa=0.63$) [45]. Patients were also asked if they had had a history of diagnosed Anorexia Nervosa or Bulimia Nervosa.

A semi-structured interview was also conducted to describe problematic eating behaviors. This interview in French is widely used in the clinical field in Switzerland, it presents good face validity and the data collection was standardized and performed by the same well trained registered dietitian [47,48]. It assesses nibbling (repeated

consumption of small amounts of food consumed separately from meals and without hunger), compulsive night eating (characterized by irrepressible nocturnal food consumption, occurring in the absence of hunger), and perceived cognitive and dietary restraint.

Anthropometric measures

Each patient was weighed on a similar scale (Seca Cosmos, Bienne, Switzerland) to the nearest 0.1 kg, wearing neither shoes nor heavy clothing, and was measured to the nearest 1.0 cm using a mobile stadiometer. BMI was calculated by dividing weight in kilograms by squared height in meters. Cut-offs for BMI were those recommended by World Health Organization [49].

Body composition was assessed using bio-impedance analysis (Nutriguard M Analyzer). A low intensity, 50 kHz electrical current was applied through four electrodes placed on the patient's right ankle and wrist [50] in supine position. The average of three consecutive resistance measures was used to estimate the proportions of body compartments using the "Geneva Formula" [51]. To avoid fat free mass

overestimation, the Segal equation was used for men with BMI >27 and women with BMI >30 [52]. Fat free mass (in kg) and proportion of fat mass (in % of body weight) between 25th and 75th percentile of the reference population were considered normal [51].

Low nutritional status was attributed if at least one of the following conditions was present: BMI below 18.5, or fat free mass below 25th percentile of the reference population, or fat mass below 25th percentile of the reference population. Adiposity status was attributed if at least one of the two following conditions was present: BMI above 25, or fat mass above 75th percentile of the reference population.

Other variables

Medical and psychological problems were assessed using the ASI questionnaire, as well as information on employment, social support, legal situation, family and social relationships, on a scale from 0 to 9 (0=not a problem at all, 9=very severe problem). Psychiatric comorbidities were recorded according to the medical chart.

| | All patients (n=117) | Patients withdrawing from alcohol (n=95) | | Patients withdrawing from drugs (n=22) | |
|--|--------------------------------------|---|-----------------|---|----------------|
| | | Men (n=67) | Women (n=28) | Men (n=17) | Women (n=5) |
| Age (mean; SD) | 43 (10.2) | 44.6 (9.6) | 45.4 (11.1) | 35.2 (7.3) | 35.0 (6.4) |
| Addiction severity score (mean; SD) | 5.7 (2.8) alcohol 2.2 (3.2) drugs | 6.8 (1.5) | 6.9 (0.9) | - 7.2 (0.9) | - 5.8 (3.9) |
| N Cigarettes/day (mean; SD) | 20.5 (15.0) | 22.6 (16.3) | 14.3 (12.3) | 21.7 (13.4) | 20 (0) |
| Smoking >30 cig/day (N; %) | 38 (52%) | 27 (59%) | 5 (33%) | 6 (50%) | 0 |
| No smokers (N; %) | 23 (20%) | 12 | 10 | 0 | 1 |
| Eating disorders (N; %) | | | | | |
| Binge Eating Disorder | 9 (8%) | 3 (4.5%) | 2 (7%) | 4 (24%) | 0 |
| Bulimia Nervosa | 3 (2.6%) | 0 | 3 | 0 | 0 |
| Anorexia Nervosa | 2 (1.7%) | 0 | 1 (4%) | 1 (6%) | 0 |
| History of Anorexia Nervosa | 4 (3.4%) | 0 | 2 (7%) | 2 (12%) | 0 |
| EDE-Q Subscores > 4 (N; %) | | | | | |
| Dietary restraint | 3 (3%) | 2 (3%) | 1 (3.6%) | 0 | 0 |
| Eating concern | 1 (0.9%) | 0 | 1 (3.6%) | 0 | 0 |
| Shape concern | 21 (19%) | 11 (16%) | 8 (29%) | 1 (5.9%) | 1 (20%) |
| Weight concern | 6 (5.5%) | 4 (6%) | 2 (7%) | 0 | 0 |
| EDE-Q Global score ≥ 2.3 (N;%) | 2 (2%) | 1 (1.5%) | 1 (3.6%) | 0 | 0 |
| Eating behaviors* (N, %) | | | | | |
| Nibbling | 41 (35%) | 21 (31%) | 8 (28%) | 8 (47%) | 4 (80%) |
| Compulsive night eating | 23 (20%) | 8 (12%) | 7 (25%) | 6 (35%) | 2 (40%) |
| Experiencing bingeing episodes | 16 (14%) | 4 (6%) | 7 (25%) | 5 (29%) | 0 |
| Cognitive restraint | 17 (15%) | 8 (12%) | 6 (21%) | 2 (11%) | 1 (20%) |
| Dietary restraint | 21 (18%) | 11 (16%) | 6 (21%) | 3 (17%) | 1 (20%) |
| Anthropometry (mean; SD) | | | | | |
| Weight | 75.4 (16.2) | 78.5 (15.0) | 67 (12.1) | 81.4 (20.5) | 58.2 (6.0) |
| BMI | 24.9 (4.5) | 25.1 (4.1) | 24.7 (4.5) | 25.5 (5.8) | 21.2 (1.6) |
| Body Mass Index* (N, %) | | | | | |
| BMI < 18.5 (underweight) | 5 (4%) | 1 (1.5%) | 2 (7%) | 2 (12%) | 0 |
| BMI >18.5 <25 (normal) | 62 (53%) | 36 (53.8%) | 13 (46.4%) | 8 (47%) | 5(100%) |
| BMI ≥25 <30 (overweight) | 34 (29%) | 24 (35.8) | 7 (25%) | 3 (18%) | 0 |
| BMI > 30 (obesity) | 15 (13%) | 6 (9%) | 5 (18%) | 4 (24%) | 0 |
| Fat Free Mass** (N, %) | | | | | |
| <25 th percentile | 36 (31%) | 23 (34%) | 9 (32%) | 3 (18%) | 1 (20%) |
| 25 th – 75 th percentile | 44 (38%) | 28 (42%) | 5 (18%) | 9 (53%) | 2 (40%) |
| >75 th percentile | 32 (27%) | 15(22%) | 11 (39%) | 4 (24%) | 2 (40%) |
| Fat Mass** (N, %) | | | | | |
| <25 th percentile | 7 (6%) | 7 (10%) | 1 (4%) | 2 (12%) | 1 (10%) |
| 25 th – 75 th percentile | 43 (37%) | 26 (39%) | 10 (36%) | 5 (29%) | 4 (80%) |
| >75 th percentile | 62 (53%) | 33 (49%) | 14 (50%) | 9 (53%) | 0 |
| Low nutritional status* (BMI <18.5 or FM or FFM<25 th P.) | 40 (35%) | 24 (36%) | 8 (29%) | 6 (35%) | 2 (40%) |
| Adiposity status* (BMI>25 or FM > 75 th P.) | 58 (50%) | 35 (52%) | 15 (54%) | 8 (50%) | 0 |

*1 missing data; **5 missing data

Table 1: Baseline characteristics of 117 patients entering a detoxification program, by gender and primary substance.

Statistical procedures

Descriptive data are presented as frequencies for categorical variables and as mean and standard deviation for continuous data. Characteristics of the patients, measured either at baseline or after one month, were compared according to patients' outcome (relapse or not) using chi-2 for categorical variables and Student's t-test for continuous variables. Given the small sample size, type I error was fixed to 10% for all inferential computations in order to avoid the impossibility of detecting useful associations. Pearson's correlations between EDE-Q scores and anthropometric measures were performed and considered significant with $p < 0.05$. All variables showing a significant association with relapse were considered as candidates to enter a multivariate logistic regression predicting the risk of relapse. Results were controlled for age and gender.

Results

At baseline, our study population consisted of 117 patients, 84 men and 33 women, aged on average 42.7 (SD 9.9) and 43.8 (SD 11.1) years respectively. Most patients (95, 81%) were detoxified for alcohol, 9 for heroin, 9 for cocaine, 3 for cannabis and 1 for benzodiazepine. On average, the patients reporting alcohol as primary substance reported lifetime harmful consumption of 10 (SD 7.7) years.

One third of the patients (33, 28%) reported suffering from medical problems over the last month and 78 (67%) at least one previous hospital stay. Sixty-six (60%) suffered from a depressive disorder, 23 (21%) from a personality disorder and 13 (12%) from an anxiety disorder. Eating behaviors and anthropometric characteristics are displayed in Table 1.

A minority was married or living in a stable relationship (20; 17%) and 15 (13%) reported having no close friend at all. Thirteen patients reported being unemployed (11%), but 34 (29%) did not answer the question.

Relapse

Global relapse rate was 27% ($n=32/117$) after 1 month and 45% ($n=53/117$) after 3 months. Between follow-up visits, respectively 32 and six patients were lost to follow-up, so if we considered that these patients relapsed, the relapse rates would be 55% and 78%.

Among patients withdrawing from alcohol, 23 had relapsed after one month (24%) and 42 (44%) after three months. After 1 month, 24 patients were lost to follow-up and 5 more were lost until end of follow-up. Among the patients having detoxified from drugs, 9 relapsed after one month (41%) and 11 (50%) after three months. After 1 month, 8 were lost to follow-up and one more at 3 months.

Eating behaviors and nutritional status

Eating disorders were rare as well as most eating disorder symptoms,

except shape concern for which 1 patient in 5 scored high (Table 1). However, problematic eating behaviors were frequent at baseline (Table 1) in both men and women, and their prevalence stayed high during follow-up; especially nibbling: 35% ($n=29/83$) after one month and 49% ($n=29/59$) after three months, compulsive night eating: 16% ($n=13/83$) and 41% ($n=24/59$) after three months, cognitive restraint: 22% ($n=18/83$) and 20% ($n=12/59$) respectively, and dietary restraint: 29% ($n=24/83$) and 24% ($n=14/59$) respectively.

At baseline, most patients ($n=73$; 65%) declared being heavier than their usual weight (+8.6kg SD 8.1), and 39 (35%) weighed less than usual (-3.8 kg SD 4.3). After one month, 17 patients (21%) had gained at least 5% of their body weight (24% after 3 months), from which one was underweight at baseline. Eighteen patients (22%) had a weight loss of at least 5% after one month (27% at three months) from which 7 had a normal BMI at baseline.

Average body composition at baseline was normal. Subgroup analysis showed that among those who displayed lower than normal fat-free mass or higher than normal fat mass (Table 1), BMI was not systematically affected: 26 patients with insufficient fat free mass were displaying a normal or high BMI and 9 patients with excessive fat mass had a normal BMI.

There were significant positive correlations between EDE-Q subscores, BMI and fat mass (Table 2). These correlations were also existent when considering men and women separately.

Factors associated with relapse

Bivariate analysis with type I error fixed to 10% showed that low nutritional status (BMI below 18.5, low fat free mass or low fat mass) was associated with a decreased risk of relapse, as well as withdrawal from alcohol (vs drugs). Higher tobacco consumption and higher severity index for legal area were associated with relapse (Table 3). However, when considered together and controlling for age and gender, none of these factors remained significant (Table 4).

| | BMI | Fat Mass |
|-------------------|--------|----------|
| Dietary restraint | 0.19* | 0.2* |
| Eating concern | 0.17 | 0.23* |
| Shape concern | 0.51** | 0.46** |
| Weight concern | 0.55** | 0.46** |
| Global score | 0.48** | 0.15** |

* $p < 0.05$

** $p < 0.01$

Table 2: Pearson's correlation coefficients (bivariate) between EDE-Q subscores and global score and anthropometric measures among 117 patients entering a detoxification program.

| Variable | Total sample (n=85) | Non-relapse group (n=53) | Relapse group (n=32) | p-value |
|--|---------------------|--------------------------|----------------------|---------|
| Categorical variables¹ | | | | |
| Low nutritional status | 29.41 | 35.85 | 18.75 | 0.094 |
| Alcohol withdrawal | 83.53 | 90.57 | 71.88 | 0.024 |
| Continuous variables² | | | | |
| Age | 44.05 (9.34) | 45.70 (10.43) | 41.31 (9.34) | 0.054 |
| Baseline number of cigarettes / day | 20.39 (15.57) | 16.43 (13.61) | 26.94 (16.59) | 0.002 |
| Severity index for legal area | 0.71 (2.02) | 0.28 (1.25) | 1.52 (2.84) | 0.046 |

¹For categorical variables, percentage of the category of interest for the whole sample and each group (non-relapse vs relapse), with p-value of the chi-2 test between groups

²For continuous variables, mean value (SD) for the whole sample and each group (non-relapse vs relapse), with the p-value of the Student's t test comparing groups

Table 3: Determinants with a 10% significant association with risk of relapse after one month (bivariate analysis) among 85 patients entering a detoxification program

| Independent variables | Odds ratio | 95% confidence interval | p-value |
|-------------------------------------|------------|-------------------------|---------|
| Factors | | | |
| Low nutritional status | 0.63 | [0.18 : 2.18] | 0.470 |
| Alcohol withdrawal | 0.59 | [0.12 : 2.87] | 0.517 |
| Baseline number of cigarettes / day | 1.03 | [0.99 : 1.07] | 0.130 |
| Severity index for legal area | 1.19 | [0.87 : 1.62] | 0.271 |
| Control variables | | | |
| Age | 0.97 | [0.91 : 1.03] | 0.315 |
| Gender (ref category: men) | 2.78 | [0.75 : 10.22] | 0.125 |

Table 4: Logistic regression for the risk of relapse among 117 patients entering a detoxification program, by gender and primary substance.

Discussion

The goal of this study was to provide knowledge on eating behaviors, body composition and their relation with withdrawal outcome among patients suffering from psycho-active substance abuse. Our main finding was that “low nutritional status” (defined as BMI below 18.5 or body composition below 25th percentile) and withdrawal from alcohol (vs drugs) were associated with a decreased risk of relapse. At a multivariate level however, these variables were not significant. Our second finding was that problematic eating behaviors were very common in this group at baseline and during follow-up, particularly nibbling, night eating and restraint (cognitive and dietary), whereas eating disorders were rare. None of these variables were related with relapse on a multivariate level. Finally, overweight, excess body fat mass and low fat free mass were common among persons abusing alcohol or illegal drugs, and BMI was a poor indicator of their nutritional status.

Eating behaviors and relapse

We observed no evidence that eating disorders increased after drug withdrawal, or that eating disorders symptoms predicted the failure of the withdrawal, contrarily to what has been suggested previously [13,14]. Cohen et al. [14] showed an increased risk of relapse among women with at least one binge eating episode during the previous month. However, the authors compared abstinence rates between groups (with versus without binge episodes) without providing number of patients followed until the end of the study. It is therefore difficult to compare impact of binge episodes on treatment outcome between our studies.

Major eating disorders were infrequent in this group of patients. However, shape preoccupation, nibbling, compulsive night eating and binge eating episodes were frequently reported, both in men and women. These persons, seeking treatment for alcohol or drug addiction are preoccupied by their weight and shape, similarly as reported among a large group of women in substance abuse treatment [53]. We suggest this should be given great attention during substance withdrawal and follow-up for at least three reasons.

First, it is likely that persons with high shape-concern and displaying both cognitive and dietary restraint will submit to some food deprivation. Volkow has shown that food deprivation increases the rewarding effects of food and drugs [54].

Second, substance withdrawal often elevates emotional stimuli or distress, which seem to induce an increase of food intake among restrained eaters [55]. This could lead to a vicious circle of increased distress about shape and tentative weight loss. In our sample, participants reported high rates of nibbling, at baseline and during follow-up, as well as perceived cognitive and dietary restriction. Given the small sample

size and the qualitative character of the data, interpretation has to be cautious, but could be exemplary of this process.

Third, dietary restriction often leads to a loss of fat free mass [56,57]. Recent research has pointed out that during cycles of weight loss/weight regain, overfeeding persists even after recovering of fat mass losses, and disappears only when fat free mass is back to normal [34]. Therefore, this population is at risk of the so-called “fat-overshooting” [34] i.e. the fact that more fat is deposited during weight regain.

The fact that persons with “low nutritional status” seem to have a lower risk of relapse might relate with this process: it could be possible that weight and shape is not an important preoccupation and therefore does not interfere with the effort of withdrawal from the substance. This is only a hypothesis, however, and should be confirmed, especially as we did not observe an increased risk of relapse among persons with high body weight or fat mass.

Body composition and corpulence

In our study, as shown previously for other population groups, BMI was not a good individual indicator for nutritional status [58]. More than half of our sample had excessive fat mass, suggesting that persons withdrawing from substances are also affected by the increasing body fat observed in the general population. This has also been shown in a study on more than a thousand deceased persons suffering from illicit drug addiction whose BMI increased in similar proportions as in the general population between 1988 and 2000 [59]. Impaired body composition should be taken into account in this population, as it has an effect on body image, appetite and meal size, as fat free mass is a regulator of dietary intake. Proposing regular and accompanied physical activity during detoxification treatment might help to increase fat free mass, regulate food intake, as well as reduce withdrawal symptoms [60].

To our knowledge, this is the first study looking at eating behaviors and substance abuse in a group with a majority of male patients, underrepresented in other studies. Instead of looking only at eating disorders, we took into account problematic eating behaviors as perceived from the point of view of the participants. Also, we included, with a high acceptance rate, a relatively unbiased, unselected sample of patients with a variety of addictions, offering thus data on a “naturalistic and clinical cohort” as proposed by Calero-Elvira [12].

The main limitation of our study is the decreasing statistical power over time of follow-up. Patients who relapsed or dropped-out were not assessed during follow-up, limiting the possibility to make comparisons over time. However, knowing the difficulty of obtaining extensive data and follow-up in an unselected substance-using population with major social and psychological difficulties, we consider our follow-up satisfactory. Also, validity of body composition measures can be affected in patients with alcohol abuse, because of possibly deranged fluid status. However, the consequence would be an overestimation of fat free mass, which would not affect the direction of our results. Given the small sample size for those withdrawing from illegal drugs, we could not perform separate analysis for this group, but controlled for this variable in statistical analysis. Also, given limited power, we could not take into account all co-factors such as use of other substances or medication, which are part of the clinical reality. Finally, the timeframe is too short to draw definite conclusions.

Conclusion and Perspectives

Although eating behaviors and body composition were not significantly related with risk of relapse in our sample of patients enrolling for withdrawal from alcohol or drugs, problematic eating

behaviors and shape preoccupation were experienced in a large subgroup of both men and women. Additionally, normal BMI can hide a deleterious nutritional state, either excessive fat mass or low fat free mass, or both. Published literature suggests behaviors like dietary restriction, nibbling and compulsive night eating can worsen the body composition but interventions addressing these concerns during detoxification should be developed and evaluated for impact on risk of relapse and well-being. Future studies should also include assessment of physical activity and dietary intake (food items, frequencies of food consumption and nutrient intake) of this population and track changes after withdrawal.

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